



MHRD
Ministry of Human
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NCERT
National Council of
Educational
Research and Training

NAS 2017

National Achievement Survey

CLASS III, V & VIII



**National Report to
inform Policy, Practices and
Teaching Learning**



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**National Report to
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Teaching Learning**



प्रकाश जावडेकर
Prakash Javadekar



मंत्री
मानव संसाधन विकास
भारत सरकार
MINISTER
HUMAN RESOURCE DEVELOPMENT
GOVERNMENT OF INDIA



MESSAGE

I am glad to learn that the Technical Report on National Achievement Survey (NAS) based on assessment data conducted for Classes III, V and VIII is being brought out by NCERT. The most salient feature of NAS 2017 was its administration throughout the nation on a single day i.e. 13th November 2017. The data for NAS was collected from 2.2 million students in 1,10,000 schools from 36 States and UTs and Districts. The most significant departure of NAS 2017 was mapping progress in student learning against learning outcomes.

I am sure that the huge data generated in this survey will be fruitfully used in analyzing and understanding the education system of the country in a much better way. Relating learning outcomes with students' learning will facilitate attainment of 21st century skills. It will also guide education policy, and implementation in a much systematic and coherent manner.

I hope that the report will be useful for policy planners, researchers and all others in understanding students' learning levels and raising the quality of school education in the country.

I convey my best wishes to the team in this endeavour.

(PRAKASH JAVADEKAR)



Rina Ray, IAS

Government of India
Ministry of Human Resource Development
Department of School Education & Literacy



MESSAGE

It is a matter of great pleasure to learn that after successfully conducting National Achievement Survey (NAS) throughout the nation on a single day for grades III, V & VIII in November, 2017, the NCERT has now brought out the Technical Report on NAS based on the countrywide data on student assessment.

Thirty six State Learning Reports (SLRs) and 7010 District Report Cards (DRCs) developed by the team to provide immediate interventions for improving the learning outcomes of students followed by a series intervention programmes at the regional, state and district level were added milestones as an epilogue to the NAS.

It is expected that this Technical Report will be useful for educational planners and policy makers including researchers in understanding the interdependence of assessment pedagogical processes and learning outcomes improving the quality of elementary education in the country.

This is a flagship programme of the MHRD in collaboration with NCERT and I wish this endeavour a great success.



(Rina Ray)



Foreword

NCERT has been conducting National Achievement Survey (NAS) since 2001. It has successfully conducted four cycles for Classes III, V and VIII and two cycles for Class X. The latest NAS, conducted in 2017 for Classes III, V and VIII is based on learning outcomes.

The major objective of conducting NAS is to have a system level reflection on effectiveness of school education in the country. An accurate assessment of the learning outcomes at different stages of school education can provide important insight to inputs made available to the elementary education system that might help in improving the educational health of the system. The performance of students on the different learning outcomes in the different Districts is now available. The data collected and analyzed is summarized in the form of District Reports Card (DRC) that gives an objective overview of learning attainments of students in the District. State Learning Reports (SLRs) as well as DRCs developed for each State/UTs and district respectively were shared with stakeholders so that state/district-specific intervention programmes can be carried out. Regional Consultation workshops were organized on Post NAS Interventions with the purpose to sensitize States/UTs on how to use assessment results for collecting experiences of conducting NAS and develop an understanding of the use of NAS data for pedagogical interventions. These educational transformation workshops helped in gauging the need for developing capacities at State and District level on interpretation and use of assessment data.

This Technical Report on NAS is based on the data collected from approximately 1,10,000 schools, 2,70,000 teachers and 22,000,00 students through tests and questionnaires from 701 districts of 36 States/UTs of the country. It presents systematic process of conducting data starting from development of assessment framework tools development, sampling, data analysis procedures and interpreting survey data.

NCERT is grateful to MHRD, UNICEF, States/UT and District level functionaries for their continued support and cooperation in the conduct of the National Achievement Survey and its further implications in improving the learning process. It is hoped that this report will fill a gap in understanding and analyzing systematically assessment results for improving pedagogical processes, and in turn, the competencies of learners so as to equip young generation with essential competencies for 21st Century.

Professor Hrushikesh Senapaty
Director, NCERT

Preface

Merely expanding the education system is not adequate. Though improved enrolment is necessary, but it is not a sufficient condition for progress. Instead, enhanced learning outcomes—in the form of competencies are a key to bring about quality in education and ensure its sustainability. Acquiring the relevant competencies and skills are fundamental to realise the Sustainable Development Goals (SDGs). Children need to develop the competencies to analyse, reason and communicate their ideas effectively and build their capacity for being a life-long learner. In this direction, periodic and technically robust learning assessment surveys play a vital role to gauge the competencies attained by the children and its subsequent progress through the grades.

National Council of Educational Research and Training (NCERT) has been periodically conducting the large-scale surveys of student learning achievement in government and government aided schools at grades III, V and VIII in different curricular areas since 2001 with an interval of three years. In year 2015, NCERT conducted learning achievement survey on grade 10 students for the first time covering the different types of school management, including those which are privately managed. In 2018, the second cycle of NAS for Class X was conducted.

NCERT has been implementing these surveys on sample basis at the State/UT level. Even though the learning gaps were being identified and shared, it did not percolate to the grass root and since the interventions suggested were generic, it lost its applicability and suitability at the implementation stage. With the passage of time it was felt that these concerns need to be addressed in a much more decentralized manner. Keeping the above in view, it was proposed to conduct the National Achievement Surveys, with districts as the unit of sampling. NAS (2017) provides the learning levels of the children vis-a-vis the learning outcomes developed by the Council. The learning gaps identified at the school level were used to provide feedback to the districts. A framework of intervention was developed which was shared with the States to improve the quality of teaching and learning in the schools.

NAS, 2017 had been a enormous exercise of assessing 2.2 million students from grades III, V and VIII on a single day. This necessitated meticulous planning at each and every step. The methodology used in developing the test items, preparing the sampling frame, sampling procedures, administration of the tests and the analysis of the results have been elaborately

discussed in the ensuing chapters. Some of the important steps in the implementation of NAS were:

- Sensitization of the state officials and the stakeholders in the States/UTs and Districts.
- Development of an assessment framework and the tools for assessing the learning levels and competencies of the students and the background information.
- Communicating the roles and responsibilities of the different personnel ('who would do what') involved at the State and National levels.
- Development of guidelines and protocol for administration of the survey in the schools.
- Development of templates using different software for data capturing, storing and analysis.
- Development of guidelines and protocol for data capturing, data storing, and data analysis.
- Sample selection for Classes III, V and VIII for reporting at the district level.
- Administration of tools in the sampled schools with the help of a trained cadre of field investigators.
- Monitoring the administration of the tools at the School, Block, and District level.
- Collation of the data collected from the Schools at the Block, District and State level.
- Following the protocol for data capturing, storing and analysis.
- Analysis of the data at the District levels to understand the learning gaps and preparation of 701 District Report Cards (DRCs), 36 State Learning Reports (SLRs) and the National Technical Report to Inform Policies, Practices and Teaching Learning.
- Development of packages for interventions and sharing with the States for addressing the learning gaps at the district level.

NAS 2017 helps us to understand the progress towards achieving the learning outcomes and also suggests ways to improve the learning levels of our children. But then again NAS is much more than just a report card for the districts. It is a protocol developed which helps us examine our student's progress towards the attainment of learning outcomes. It is designed to look behind the scorecard to illuminate how our education policies and practices need to evolve to improve the learning levels of our children. The implementation of NAS includes in its ambit the capacity development of school leaders, teachers and the whole network of officials at blocks, DIETs, SCERT, boards of school education and the Directorate of Education in the different States/UTs.

NAS 2017 is a fair and accurate statement of the educational health of the different States and Union Territories in the country. The students who participated in NAS were randomly selected to represent all students in their respective districts. The entire assessment process was scrutinized by national and international experts to ensure its adherence to established standards. At each step of its development, NAS used careful quality control procedures. During the test development process, each item went through all the technical rigours before finalization. The items were translated adhering to the guidelines developed and vetting of each and every item was carried out before its acceptance. A cadre of field investigators were trained who administered the tests following standardized procedures. The tests administration was carefully monitored. The raw data from each district were scrutinized to be sure that no anomalies existed, and all analyses were double checked. Finally, this report has been written and carefully reviewed to make it suitable for the target audience. An external third party scrutinized each and every process of the implementation of NAS.

For dissemination purposes 4 reports for NAS are developed targeting the different audience. The District Report Cards (DRCs) which were 7010 in number and were auto generated using a web application and were meant for teachers and district level functionaries, State Learning Reports (SLRs), designed and developed for the State level functionaries, to enable them for differential planning at the district level in consonance with the DRCs and the National Technical Report for Policy, Practice and Teaching Learning (NPPTL) and the NAS highlights and Policy Briefs are for the researchers, and policy framers respectively.

I thank one and all who have participated, contributed and helped to make this study a success. I earnestly hope that this report is utilized as a baseline document by policy planners, researchers, curriculum developers and all others in raising the quality of elementary education in our country.



Indrani Bhaduri
Professor and Head, ESD
National Coordinator, NAS
NCERT
New Delhi, 2019

Executive Summary

Introduction

NAS 2017, a national-level large scale assessment study was conducted to provide information about the learning achievement of students studying in government and government-aided schools. This was achieved by administering standardized tests to students of Classes III, V and VIII. NAS 2017 has contributed several new elements and gave remarkable momentum to the development of competency based assessment. One of the main virtues of NAS 2017 is that it is embedded in an extremely rich system of background variables. The results help to accurately discover the students' performance in different learning outcomes vis-à-vis the contextual variables. The very aim of this national assessment is to compare the performance across spectrum and across population in order to find the desirable direction for the changes and provide a basis for the necessary decisions. The synthesis of the results of the national level provides a rich repository of evidences for developing and designing the future course of action for the Indian education system.

Methodology

This report presents the findings of national achievement survey conducted on students studying in Class III, V and VIII. Selecting a representative sample in India is a challenging and arduous task. For selecting the representative sample of NAS, government and government aided

schools were included in the sample frame. School level samples from each district were drawn using Probability Proportional to Size (PPS). The PPS methodology is accepted internationally and is used by Organisation for Economic Co-operation and Development (OECD) for drawing samples for Programme of International Student Assessment (PISA). The NAS survey comprises of sample of approx. 2.2 million students from

1,10,000 government and government aided schools across 36 States/Union Territories. The subjects covered in this survey were Language, Mathematics, and Environmental Studies (EVS) for Classes III and V; and Language, Mathematics, Science and Social Science for Class VIII.

An assessment framework was developed to assess the learning levels based on subject specific Learning Outcomes (LO) for Classes III, V and VIII. It was followed by item development process, translation and vetting of the translated tests before its administration. All the rigours of the item development process was followed which was in consent with the third party validation checks for quality control.

Tools Development

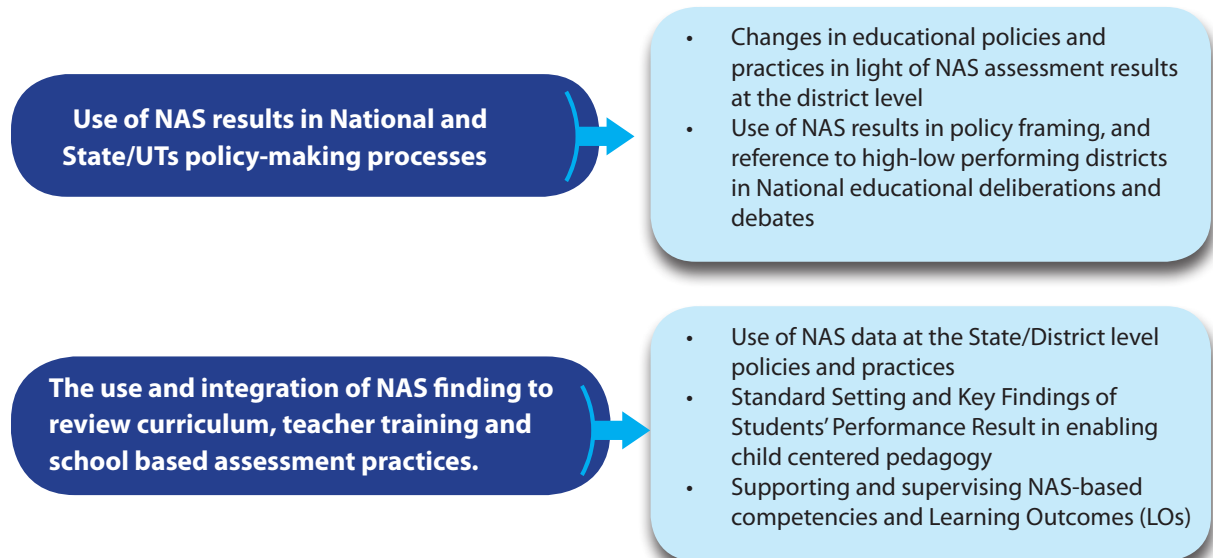
Both tests and questionnaires comprised multiple choice questions. Students of Classes III, V and VIII were assessed through two test forms while test forms of Classes III and V comprised of 45 questions,

forms of Class VIII comprised of 60 questions. Each question was associated with the measurement of one learning outcome. Students of Classes III and V were tested on Language, Mathematics and Environmental studies (EVS). Class VIII students were tested on Language, Mathematics, Science and Social Science. Three questionnaires i.e. Pupil Questionnaire (PQ), Teacher Questionnaire (TQ) and School Questionnaire (SQ) were also developed for NAS 2017 to analyze the associations between the achievement and the background variables.

on an underlying construct being tested. A construct is a latent trait such as intelligence, motivation or language ability. Constructs are latent, and can be indirectly measured through scores on tests and questionnaires.

Unlike CTT, where student ability is expressed within the boundaries of 0-100% correct responses on a test, a latent trait in IRT is measured on an infinite continuum, where the measurement unit is denoted as a logit. IRT uses a mathematical model to link a student's probability of responding correctly to a particular item, thus taking care of the two main factors, i.e. the student's level

Role of NAS in policy making processes



Use of IRT Theory

Within the domain of psychometric theory, two approaches are used for analyzing test data i.e. Classical Test Theory (CTT) and the Item Response Theory (IRT). Under CTT, raw percentages of correct responses are used to measure students' abilities and item difficulties. However, the linkages between student scores and item difficulties are not clear in CTT. IRT models emphasize on estimating each student's ability and make inferences about each student's ability level

of ability and the item's level of difficulty. Therefore, analysis in IRT is more complex than traditional methods like CTT. IRT uses the concept of an Item Characteristic Curve (ICC) to show the relationship between students' ability and performance on an item.

Major Findings

Performance of States/UTs in Class III

In Language, 7 States/UTs performed substantially above the national average, 5 States/UTs performed substantially below,

and 24 States/UTs showed no substantial difference from the national average (refer p. 65). Some of the States and UTs in which the performance of the students in the Learning Outcomes of Language was found to be low were: Arunachal Pradesh, Lakshadweep, Uttar Pradesh, Puducherry and Delhi. It was observed that language poses a lesser challenge than other subjects.

In Mathematics, 8 States/UTs performed substantially above the national average, 10 States/UTs performed substantially below, and 18 States/UTs showed no substantial difference from the national average (refer p. 66). Some of the States and UTs in which the performance of the students in the Learning Outcomes of Mathematics was found to be low were: Arunachal Pradesh, Delhi, Punjab, Meghalaya and Haryana.

In EVS, 10 States/UTs performed substantially above the national average, 9 States/UTs performed substantially below and 17 States/UTs showed no substantial difference from the national average (refer p. 67). The average performance of the students at the national level being 321. Some of the States and UTs in which the performance of the students in the

Learning Outcomes of EVS was found to be below were: Arunachal Pradesh, Lakshadweep, Uttar Pradesh, Delhi and Sikkim.

Students of Rajasthan, Andhra Pradesh, Karnataka, West Bengal, Chandigarh, Assam and Kerala performed substantially above the national average in all subjects, i.e. Language, Mathematics and EVS. Whereas Arunachal Pradesh, Lakshadweep, Uttar Pradesh and Delhi performed substantially below the overall national average in all three subjects.

Performance of States /UTs in Class V

In Language, 7 States/UTs performed substantially above the national average, 11 States/UTs performed substantially below and 18 States/UTs showed no substantial difference from the national average (refer p. 68). Some of the States and UTs in which the performance of the students in the Learning Outcomes of Language was found to be low were: Arunachal Pradesh, Meghalaya, Sikkim, Uttar Pradesh and Puducherry.

In Mathematics, 8 States/UTs performed substantially above the national average, 11 States/UTs performed substantially below and

Some of the low performing Learning Outcomes (LOs) in the States/UTs are:

Language	<ul style="list-style-type: none"> • Reads small text with comprehension i.e. identifies main ideas, details, sequence and draws conclusion
Mathematics	<ul style="list-style-type: none"> • Estimates and measures length and distance using standard units like centimeters or meters and identifies relationship • Fills a given region leaving no gaps using a tile of a given shape • Extends patterns in simple shapes and numbers
Environmental Studies	<ul style="list-style-type: none"> • Observes rules in games (local, indoor, outdoor) • Records observations, experiences, information on objects/activities/ places visited in different ways and predicts patterns etc. • Identifies simple features (eg. movement at places found/kept, eating habits, and sounds) of animals and birds in the immediate surroundings.

17 States/UTs showed no substantial difference from the national average (refer p. 69). Some of the States and UTs in which the performance of the students in the Learning Outcomes of Mathematics was found to be low were: Arunachal Pradesh, Sikkim, Meghalaya, Delhi and Daman & Diu.

In EVS, 10 States/UTs performed substantially above the national average, 10 States/UTs performed substantially below and 16 States/UTs showed no substantial difference from the national average (refer p. 70). Some of the States and UTs in which the performance of the students in the Learning Outcomes of EVS was found to be low were: Arunachal Pradesh, Sikkim, Meghalaya, Lakshadweep and Daman & Diu.

Students of Kerala, Karnataka, Chandigarh, Uttarakhand, Andhra Pradesh and Rajasthan performed substantially above national average in language, Mathematics and EVS. Whereas students of Delhi, Lakshadweep, Arunachal Pradesh showed substantially low performance than the national average.

Performance of States /UTs in Class VIII

In Language, 5 States/UTs performed substantially above the national average, 12 States/UTs performed substantially below and 19 States/UTs showed no substantial difference from the national average (refer p. 71). Some of the States and UTs in which the performance of the students in the Learning Outcomes of Language was found to be low were: Nagaland, Jammu & Kashmir, Puducherry, Arunachal Pradesh and Mizoram.

In Mathematics, 7 States/UTs performed substantially above the national average, 19 States/UTs performed substantially below and 10 States/UTs showed no substantial difference from the national average (refer p. 72). Some of the States and UTs in which the performance of the students in the Learning Outcomes of Mathematics was found to be low were: Puducherry, Sikkim, Daman & Diu, Punjab and Delhi.

In Science, 8 States/UTs performed substantially above the national average, 15 States/UTs performed substantially below

Some of the low performing learning outcomes (LOs) in the States/UTs are:

Language	<ul style="list-style-type: none"> • Reads and comprehends independently story books, news items/headlines, advertisements etc.
Mathematics	<ul style="list-style-type: none"> • Estimates the volume of a solid body in known units • Identifies and forms equivalent fraction of a given fraction • Applies operations of numbers in daily life situations
Environmental Studies	<ul style="list-style-type: none"> • Establishes linkages among terrain, climate resources (food, water, shelter, livelihood) and cultural life (eg. life in distant/difficult areas like hot/cold deserts) • Groups objects, materials, activities for features/properties such as shape, taste, colour, texture, sounds, traits etc. • Guesses (properties, conditions of phenomena), estimates spatial quantities (distance, area, volume, weight) and time in simple standard units and verifies using simple tools/setup

and 13 States/UTs showed no substantial difference from the national average (refer p. 73). Some of the States and UTs in which the performance of the students in the Learning Outcomes of Science was found to be low were: Puducherry, Lakshadweep, Nagaland, Daman & Diu and Delhi.

In Social Science, 8 States/UTs performed substantially above the national average, 17

States/UTs performed substantially below and 11 States/UTs showed no substantial difference from the national average (refer p. 74). Some of the States and UTs in which the performance of the students in the Learning Outcomes of Social Science was found to be low were: Puducherry, Lakshadweep, Tamil Nadu, Mizoram and Daman & Diu (refer Appendix F).

Some of the low performing learning outcomes (LOs) in the States/UTs are:

Language	<ul style="list-style-type: none"> • Reads textual/non textual material with comprehension and identifies the details, characters, main idea, and sequence of ideas and events while reading
Mathematics	<ul style="list-style-type: none"> • Finds surface area and volume of cuboidal and cylindrical objects • Generalises properties of addition and subtraction, multiplication and division of rational numbers through patterns • Finds out approximate area of closed shapes by using units square grid/graph sheets • Solves problems related to conversion of percentage to fraction and decimals and vice versa • Arranges given/collected information in the form of table, pictograph and bar graph and interprets them • Uses exponential form of numbers to simplify problems involving multiplication and division of large numbers
Science	<ul style="list-style-type: none"> • Conducts simply investigation to seek answers to queries • Explains processes and phenomenon • Plots and interprets graphs • Constructs models using materials from surroundings and explains their working
Social Science	<ul style="list-style-type: none"> • Describes the functioning of rural and urban local government bodies in sectors like health and education • Analyse the decline of pre-existing urban centers and handicraft industries and the development of new urban centers and industries in India during the colonial period • Locates important historical sites, places on outline map of India. • Locates distribution of important minerals, e.g. coal and mineral oil on the world map • Draws interrelationship between types of farming and development in different regions of the world • Applies the knowledge of the fundamental rights to find out about their violation, protection and promotion in a given situation • Identifies the role of government in providing public facilities such as water, sanitation, road, electricity etc. and recognizes their availability

Performance of States /UTs by Gender in Class III

In Language, girls performed significantly better than boys in 18 States/UTs and there is no significant difference between the performance of girls and boys in 18 States/UTs (refer p. 75). Some of the States in which the performance of the girls in the Learning Outcomes of Language was found to be higher were: Andhra Pradesh, Karnataka, West Bengal, Kerala and Assam.

In Mathematics, girls performed significantly better than boys in 6 States/UTs, boys performed significantly better than girls in 5 States/UTs, and no significant difference between the performance of girls and boys was observed in 25 States/UTs (refer p. 76). Some of the States in which the performance of the girls in the Learning Outcomes of Mathematics was found to be higher were: Karnataka, Kerala, Assam, Gujarat and Maharashtra.

In EVS, girls performed significantly better than boys in 15 States/UTs, no significant difference between the performance of girls and boys was observed in 21 States/UTs (refer p. 77). Some of the States in which the performance of the girls in the Learning Outcomes of EVS was found to be higher were: Kerala, Karnataka, Andhra Pradesh, West Bengal and Assam.

Performance of States/UTs by Gender in Class V

In Language, girls performed significantly better than boys in 16 States/UTs, boys performed significantly better than girls in 1 State and no significant difference between the performance of girls and boys was observed in 19 States/UTs (refer p. 78). Some of the States in which the performance of the girls in the Learning Outcomes of Language was found to be higher were:

Kerala, Karnataka, Maharashtra, Gujarat and Jharkhand.

In Mathematics, girls performed significantly better than boys in 6 States/UTs, boys performed significantly better than girls in 1 State and there is no significant difference between the performance of girls and boys in 29 States/UTs (refer p. 79). Some of the States in which the performance of the girls in the Learning Outcomes of Mathematics was found to be higher were: Karnataka, Jharkhand, Gujarat, Maharashtra and Tamil Nadu.

In EVS, girls performed significantly better than boys in 12 States/UTs, boys performed significantly better than girls in 2 States and no significant difference between the performance of girls and boys was observed in 22 States/UTs (refer p. 80). Some of the States in which the performance of the girls in the Learning Outcomes of EVS was found to be higher were: Kerala, Karnataka, Jharkhand, Assam and Gujarat.

Performance of States /UTs by Gender in Class VIII

In Language, girls performed significantly better than boys in 18 States/UTs, boys performed significantly better than girls in 4 States and no significant difference between the performance of girls and boys was observed in 14 States/UTs (refer p. 81). Some of the States in which the performance of the girls in the Learning Outcomes of Language was found to be higher were: Gujarat, Kerala, Maharashtra, Karnataka and Chandigarh.

In Mathematics, girls performed significantly better than boys in 9 States/UTs, boys performed significantly better than girls in 3 States and there is no significant difference between the performance of girls and boys in 24 States/UTs (refer p. 82). Some of the States in which the performance of the girls

in the Learning Outcomes of Mathematics was found to be higher were: Jharkhand, Karnataka, Gujarat, Madhya Pradesh and Maharashtra.

In Science, girls performed significantly better than boys in 4 States, boys performed significantly better than girls in 9 States/UTs and no significant difference between the performance of girls and boys was observed in 23 States/UTs (refer p. 83). Performance of the girls in the Learning Outcomes of Science was found to be higher in the following States: Karnataka, Gujarat, Andhra Pradesh and Tamil Nadu.

In Social Science, girls performed significantly better than boys in 11 States/UTs, boys performed significantly better than girls in 4 States and no significant difference between the performance of girls and boys was observed in 21 States/UTs (refer p. 84). Some of the States in which the performance of the girls in the Learning Outcomes of Social Science was found to be higher were: Gujarat, Chandigarh, Karnataka, Andhra Pradesh and Haryana.

Although girls perform slightly higher than boys in most of tests, the differences are not significant.

Performance of States/UTs by Location in Class III

In Language, urban schools performed significantly better than rural schools in 11 States/UTs, rural schools performed significantly better than urban schools in 11 States/UTs and no significant difference between the performance of urban and rural schools was observed in 14 States/UTs (refer p. 85). Some of the States in which the performance of the rural students in the Learning Outcomes of Language was found to be higher were: Andhra Pradesh, Karnataka,

Uttarakhand, Nagaland and Maharashtra.

In Mathematics, urban schools performed significantly better than rural schools in 12 States/UTs, rural schools performed significantly better than urban schools in 10 States/UTs, and no significant difference between the performance of urban and rural schools was observed in 14 States/UTs (refer p. 86). Some of the States in which the performance of the rural students in the Learning Outcomes of Mathematics was found to be higher were: Karnataka, Andhra Pradesh, Uttarakhand, Maharashtra and Himachal Pradesh.

In EVS, urban schools performed significantly better than rural schools in 10 States/UTs, rural schools performed significantly better than urban schools in 9 States/UTs, and there is no significant difference between the performance of urban and rural schools in 17 States/UTs (refer p. 87). Some of the States in which the performance of the rural students in the Learning Outcomes of EVS was found to be higher were: Karnataka, Andhra Pradesh, Uttarakhand, Maharashtra and Himachal Pradesh.

Performance of States /UTs by Location in Class V

In Language, urban schools performed significantly better than rural schools in 13 States/UTs, rural schools performed significantly better than urban schools in 10 States/UTs, and no significant difference between the performance of urban and rural schools was observed in 13 States/UTs (refer p. 88). Some of the States in which the performance of the rural students in the Learning Outcomes of Language was found to be higher were: Kerala, Karnataka, Maharashtra, Nagaland and Chhattisgarh.

In Mathematics, urban schools performed

significantly better than rural schools in 5 States/UTs, rural schools performed significantly better than urban schools in 16 States/UTs, and no significant difference between the performance of urban and rural schools was observed in 15 States/UTs (refer p. 89). Some of the States in which the performance of the rural students in the Learning Outcomes of Mathematics was found to be higher were: Karnataka, Kerala, Assam, Uttrakhand and Delhi.

In EVS, urban schools performed significantly better than rural schools in 8 States/UTs, rural schools performed significantly better than urban schools in 14 States/UTs, and no significant difference between the performance of urban and rural schools was observed in 14 States/UTs (refer p. 90). Some of the States in which the performance of the rural students in the Learning Outcomes of EVS was found to be higher were: Kerala, Karnataka, Uttrakhand, Assam and Odisha.

Performance of States /UTs by Location in Class VIII

In Language, urban schools performed significantly better than rural schools in 19 States/UTs, rural schools performed significantly better than urban schools in 6 States/UTs, and no significant difference between the performance of urban and rural schools was observed in 11 States/UTs (refer p. 91). Some of the States in which the performance of the rural students in the Learning Outcomes of Language was found to be higher were: Gujarat, Chandigarh, Karnataka, Uttarakhand and Andhra Pradesh.

In Mathematics, urban schools performed significantly better than rural schools in 4 States/UTs, rural schools performed significantly better than urban schools in

15 States/UTs, and no significant difference between the performance of urban and rural schools was observed in 17 States/UTs (refer p. 92). Some of the States in which the performance of the rural students in the Learning Outcomes of Mathematics was found to be higher were: Rajasthan, Jharkhand, Karnataka, Andhra Pradesh and Gujarat.

In Science, urban schools performed significantly better than rural schools in 8 States/UTs, rural schools performed significantly better than urban schools in 15 States/UTs and there is no significant difference between the performance of urban and rural schools in 13 States/UTs (refer p. 93). Some of the States in which the performance of the rural students in the Learning Outcomes of Science was found to be higher were: Rajasthan, Karnataka, Jharkhand, Gujarat and Andhra Pradesh.

In Social Science, urban schools performed significantly better than rural schools in 10 States/UTs, rural schools performed significantly better than urban schools in 12 States/UTs, and no significant difference between the performance of urban and rural schools was observed in 14 States/UTs (refer p. 94). Some of the States in which the performance of the rural students in the Learning Outcomes of Social Science was found to be higher were: Rajasthan, Gujarat, Jharkhand, Karnataka and Andhra Pradesh.

Differences between urban and rural students are virtually non-existing in Class III, however, they become statistically significant in Class V, and even stronger in Class VIII, indicating that urban students are higher performing in Language, whereas in Math, EVS, Science, and Social Science performance in rural areas is significantly higher than in urban areas.

Performance of States /UTs by School Management in Class III

In Language, Government aided schools performed significantly better than Government schools in 7 States/UTs, government schools performed significantly better than Government aided schools in 9 States/UTs and there is no significant difference between the performance of Government and Government aided schools in 20 States/UTs (refer p. 95). Some of the States in which the performance of the students of Government schools in the Learning Outcomes of Language was found to be higher were: Andhra Pradesh, Karnataka, Rajasthan, Kerala and Assam.

In Mathematics, Government aided schools performed significantly better than Government schools in 5 States/UTs, Government schools performed significantly better than Government aided schools in 12 States/UTs, and no significant difference between the performance of Government and Government aided schools was observed in 19 States/UTs (refer p. 96). Some of the States in which the performance of the students of Government schools in the Learning Outcomes of Mathematics was found to be higher were: Andhra Pradesh, Kerala, Rajasthan, Assam and Telangana.

In EVS, Government aided schools performed significantly better than Government schools in 10 States/UTs, Government schools performed significantly better than Government aided schools in 9 States/UTs, and no significant difference between the performance of Government and Government aided schools was observed in 17 States/UTs (refer p. 97). Some of the States in which the performance of the students of Government schools in the Learning Outcomes of EVS was found to be higher were: Kerala, Karnataka, Rajasthan, Andhra Pradesh and Assam.

Performance of States /UTs by School Management in Class V

In Language, Government aided schools performed significantly better than Government schools in 9 States/UTs, Government schools performed significantly better than Government aided schools in 9 States/UTs, and no significant difference between the performance of Government and Government aided schools was observed in 18 States/UTs (refer p. 98). Some of the States in which the performance of the students of Government schools in the Learning Outcomes of Language was found to be higher were: Kerala, Karnataka, Chandigarh, Gujarat and Assam.

In Mathematics, Government aided schools performed significantly better than Government schools in 7 States/UTs, Government schools performed significantly better than Government aided schools in 13 States/UTs, and no significant difference between the performance of Government and Government aided schools was observed in 16 States/UTs (refer p. 99). Some of the States in which the performance of the students of Government schools in the Learning Outcomes of Mathematics was found to be higher were: Karnataka, Kerala, Chandigarh, Assam and Gujarat.

In EVS, Government aided schools performed significantly better than Government schools in 7 States/UTs, Government schools performed significantly better than Government aided schools in 13 States/UTs, and no significant difference between the performance of Government and Government aided schools was observed in 16 States/UTs (refer p. 100). Some of the States in which the performance of the students of Government schools in the Learning Outcomes of EVS was found to be higher were: Kerala, Karnataka, Chandigarh, Assam and Gujarat.

Performance of States by School Management in Class VIII

In Language, Government aided schools performed significantly better than Government schools in 18 States/UTs, Government schools performed significantly better than Government aided schools in 2 States and no significant difference between the performance of Government and Government aided schools was observed in 16 States/UTs (refer p. 101). Some of the States in which the performance of the students of Government schools in the Learning Outcomes of Language was found to be higher were: Kerala and West Bengal.

In Mathematics, Government aided schools performed significantly better than Government schools in 9 States/UTs, Government schools performed significantly better than Government aided schools in 12 States/UTs and there is no significant difference between the performance of Government and Government aided schools in 15 States/UTs (refer p. 102). Some of the States in which the performance of the students of Government schools in the Learning Outcomes of Mathematics was found to be higher were: Jharkhand, Andhra Pradesh, Kerala, Gujarat and Bihar.

In Science, Government aided schools performed significantly better than Government schools in 10 States/UTs, Government schools performed significantly better than Government aided schools in 12 States/UTs and no significant difference between the performance of Government and Government aided schools was observed in 14 States/UTs (refer p. 103). Some of the States in which the performance of the students of Government schools in the Learning Outcomes of Science was found to be higher were: Jharkhand, Kerala, Gujarat, Andhra Pradesh and Uttarakhand.

In Social Science, Government aided schools performed significantly better

than Government schools in 8 States/UTs, Government schools performed significantly better than Government aided schools in 9 States/UTs, and no significant difference between the performance of Government and Government aided schools was observed in 19 States/UTs (refer p. 104). Some of the States in which the performance of the students of Government schools in the Learning Outcomes of Social Science was found to be higher were: Gujarat, Jharkhand, Chandigarh, Andhra Pradesh and Uttarakhand.

In Class III the Government schools perform higher than the Government aided schools in Language and Mathematics, however, in Classes V and VIII the Government schools are outperforming the Government aided schools in all subjects but Language in Class VIII where the Government aided schools still perform higher.

Performance of States by Social Groups in Class III

States/UTs in which ST students performed better than other social groups in Languages are: Nagaland, Manipur and Tamil Nadu (refer Table 5.1, p. 105).

States/UTs in which SC students performed better than general category students in Languages are: Manipur, Karnataka and Tamil Nadu (refer Table 5.1, p. 105).

States/UTs in which ST students performed better than other social groups in Mathematics are: Delhi, Arunachal Pradesh, Nagaland and Manipur (refer Table 5.2, p. 106).

States/UTs in which ST students performed better than other social groups in EVS are: Delhi, Arunachal Pradesh and Manipur (refer Table 5.3, p. 107).

Performance of States by Social Groups in Class V

States/UTs in which ST students performed well along with general category students in

Languages are: Jammu and Kashmir, Bihar and Gujarat (refer Table 5.4, p. 108).

States/UTs in which ST students performed better than other social groups in Mathematics are: Chhattisgarh and Maharashtra (refer Table 5.5, p. 109). States/UTs in which SC students performed well along with general category students in Mathematics are: Punjab, Uttarakhand, Delhi, Rajasthan, Tripura and Gujarat (refer Table 5.5, p. 109).

States/UTs in which ST students performed better than other social groups in EVS are: Bihar, Arunachal Pradesh, Chhattisgarh, Gujarat and Maharashtra (refer Table 5.6, p. 110).

States/UTs in which SC students performed well along with general category students in EVS are: Himachal Pradesh, Punjab, Uttarakhand, Rajasthan, Uttar Pradesh and Tripura (refer Table 5.6, p. 110).

Performance of States by Social Groups in Class VIII

Table 5.7 shows that the State in which ST students performed better than other social groups in Languages is: Manipur (refer p. 111).

State in which SC students performed better than other social groups in Languages is: Assam (refer Table 5.7, p. 111).

States/UTs in which ST students performed well along with OBC category students in Mathematics is: Maharashtra (refer Table 5.8, p. 112).

States/UTs in which SC Students performed well along with general category students in Mathematics are: Punjab, Uttarakhand, and Kerala (refer Table 5.8, p. 112).

States in which ST students performed better than other social groups in Science are: Gujarat and Maharashtra (refer Table 5.9, p. 113).

States/UTs in which SC students performed

better along with OBC category students in Social Science are: Uttar Pradesh, Gujarat and Tamil Nadu (refer Table 5.10, p. 114).

Reports and Disseminations

The results of NAS 2017 were disseminated using District Report Cards (DRCs), State Learning Reports (SLRs), National Report to inform Policy, Practices and Teaching Learning (NPPTL) and National Highlights and Policy Briefs reports. Several States/UT level workshops were organized to extensively discuss NAS results. NCERT also developed a comprehensive document on NAS Interventions (Short Term, Medium Term and Long Term) that elaborates the requisite steps to be taken at District, State and National Level in a time bound manner for the improvement of quality of education in the country.

The unit of sampling in the case of NAS being the Districts, the District Report Cards (DRCs) was a key element for understanding the NAS results by one and all. The DRCs were primarily targeted at the school teachers for their understanding of the performance of the district at different grades in the learning outcomes, The DRCs were made very simple, only two pages and the achievement in the learning outcomes were listed in percentages. There were in all 7010 district report cards for the 701 districts. The DRCs along-with the State learning Reports (SLRs) were designed keeping in mind the State level functionaries to enable a differential planning at the State level. The National Technical Report to Inform Policy, Practices and Teaching learning (NPPTL) and the National Highlights and Policy Briefs are developed keeping in mind the researchers, policy framers, decision makers and all the top administrative officials responsible for improving school education in the country.

Determinants of high or low level of learning achievement

Students' learning achievement is influenced by numerous factors such as,

- socio-economic background,
- context and institutional factors like school, teachers and learning environment.

NAS 2017 reiterates that facilitations of students' learning, teacher quality and institutional resources are the prominent determinants of the learning levels of students. Multiple regression analysis found that students' attendance, participation in pre-school, their understanding of what teacher says in class and their engagement in the classroom are significantly associated with the learning achievement. School related factors such as functional library, monitoring of the schools by the department of education and participation of school in literary activities influences the learning achievement of students. Similarly, teacher related factors such as their engagement in professional development, peer support and networking, and job satisfaction significantly contribute to learning achievement of students.

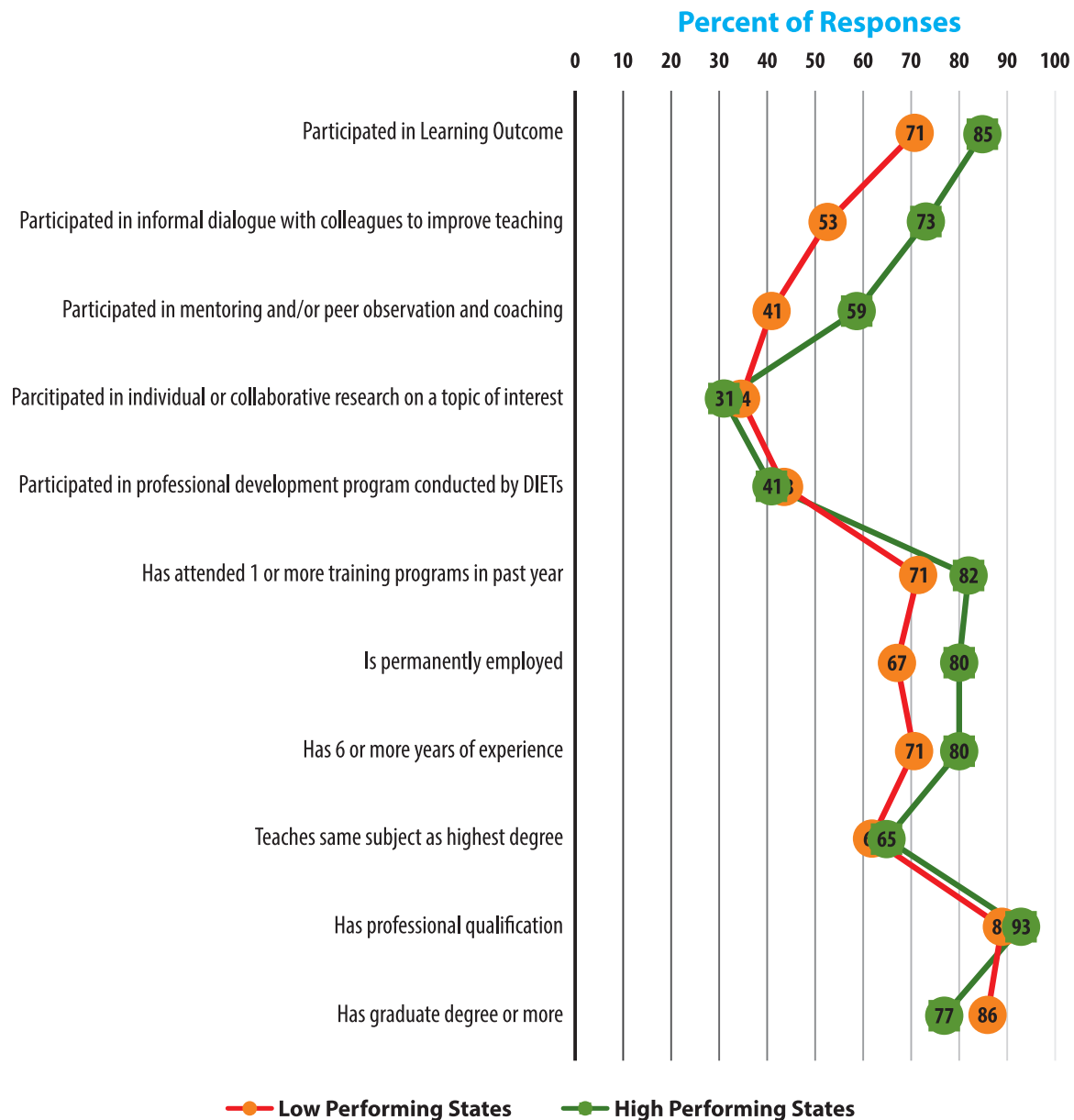
Further, multiple indicators from high and low achieving States were processed to understand what are the key contributing factors that separate out low achieving States from high achieving States. Thus States and Union territories were grouped into high and low achieving States on the basis of following criteria.

Profiles of HIGH and LOW Performing States

10 Highest Performing States (those with over 40% of students in top performing bands)	10 Lowest Performing States (over 35% of students performing in bottom bands)
Rajasthan	Arunachal Pradesh
Karnataka	Delhi
Chandigarh	Puducherry
Andhra Pradesh	Meghalaya
Jharkhand	Lakshadweep
Dadra & Nagar Haveli	Daman & Diu
Assam	Uttar Pradesh
Gujarat	Sikkim
Kerala	Punjab
Uttarakhand	Nagaland

The graphical interpretation of the contextual analysis of variables for determining high performing and low performing States/UTs and the factors associated with their performance, is as given below:

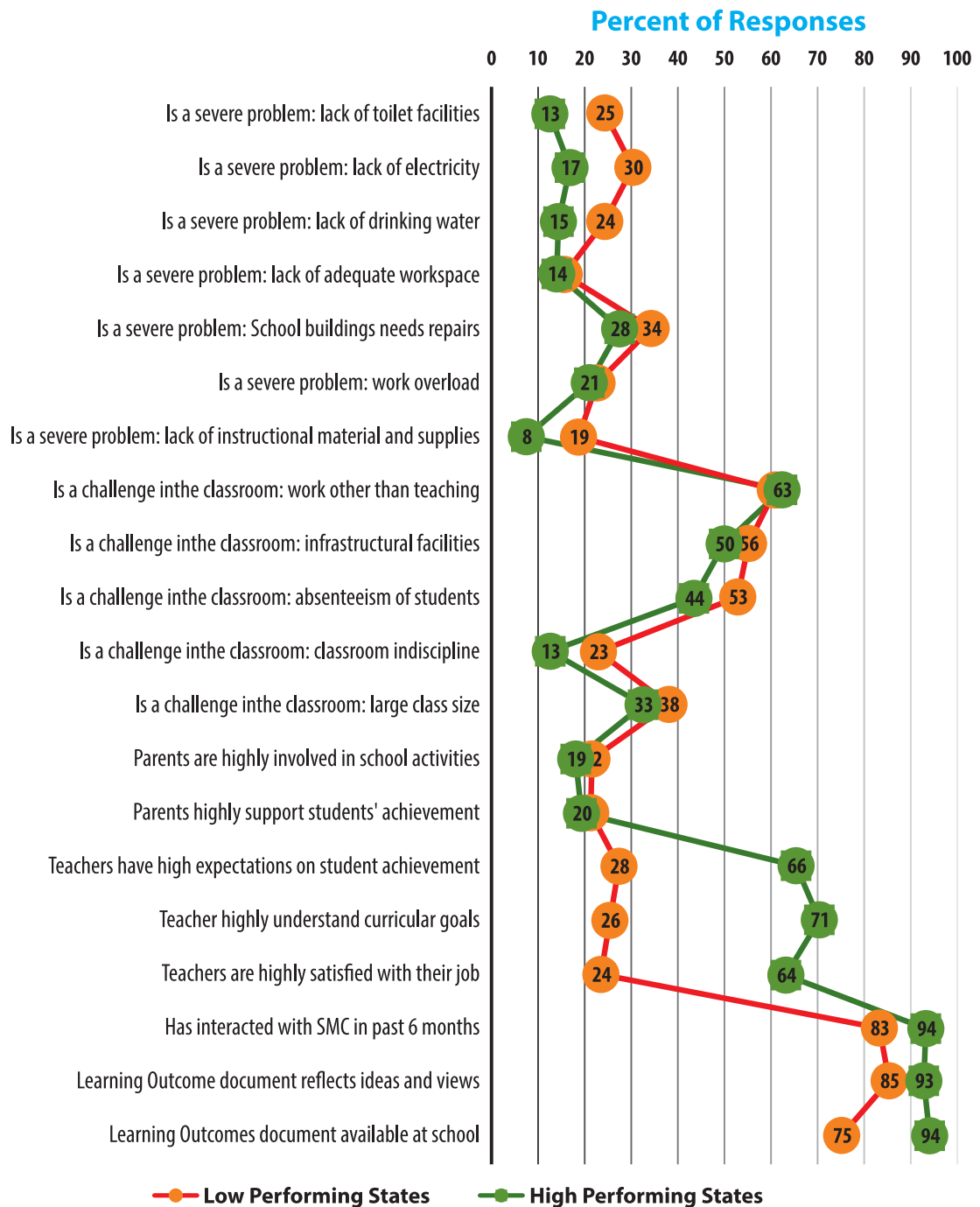
High-Low State Profiles by Teacher Background - School Environment



Teachers having professional qualification, are permanently employed, have six or more years of experience and have attended training programs show higher impact on students' achievement.

Also, teachers' participation in learning outcomes and their participation in informal dialogues with colleagues to improve teaching have higher association with students' achievement.

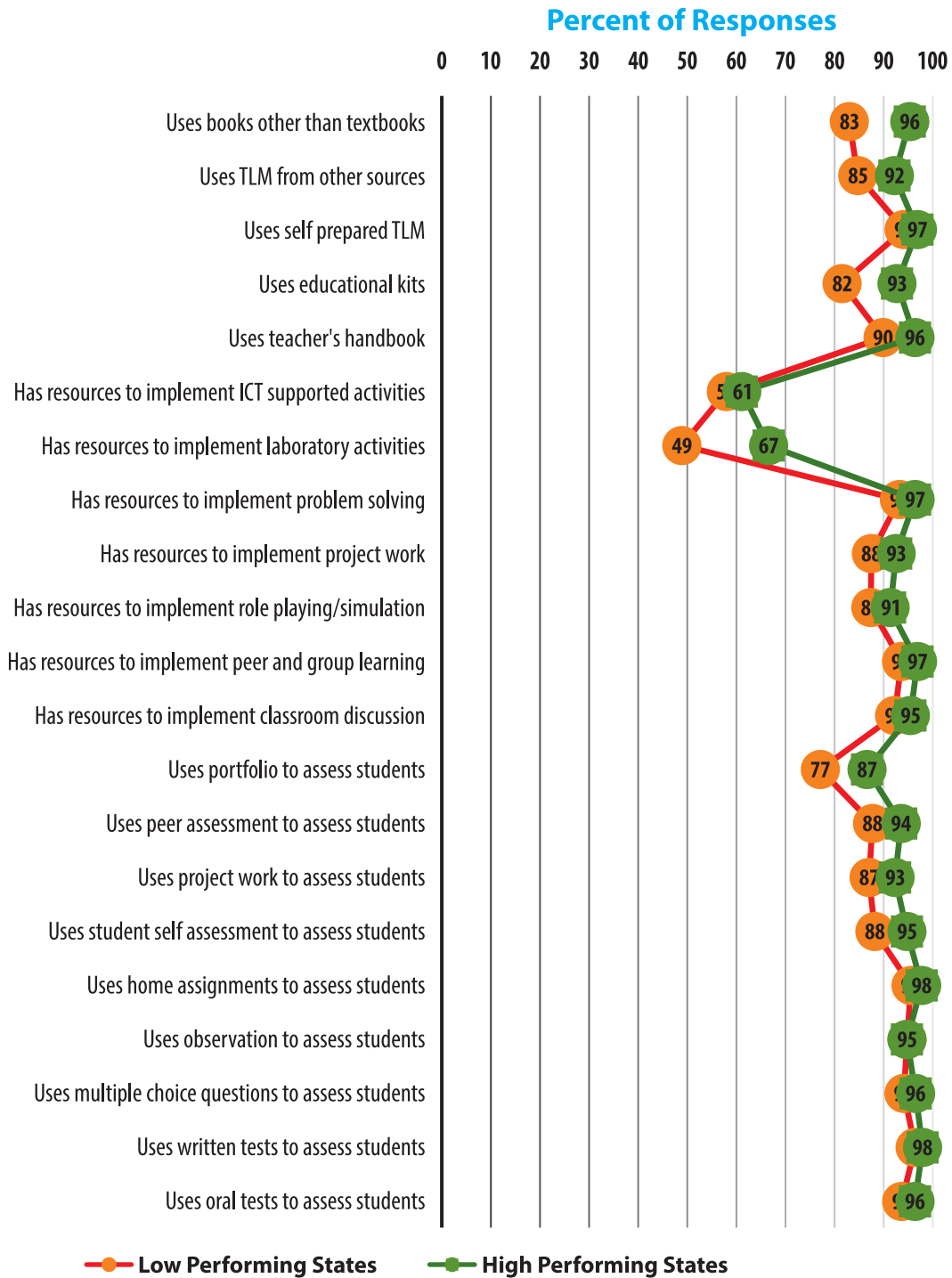
High-Low State Profiles by Teacher Perception - School Environment



Teachers' expectations on students' achievement, their understanding of curricular goals, their satisfaction with jobs and availability of learning outcomes

document at school have a greater impact on the States/UTs where in students are performing better.

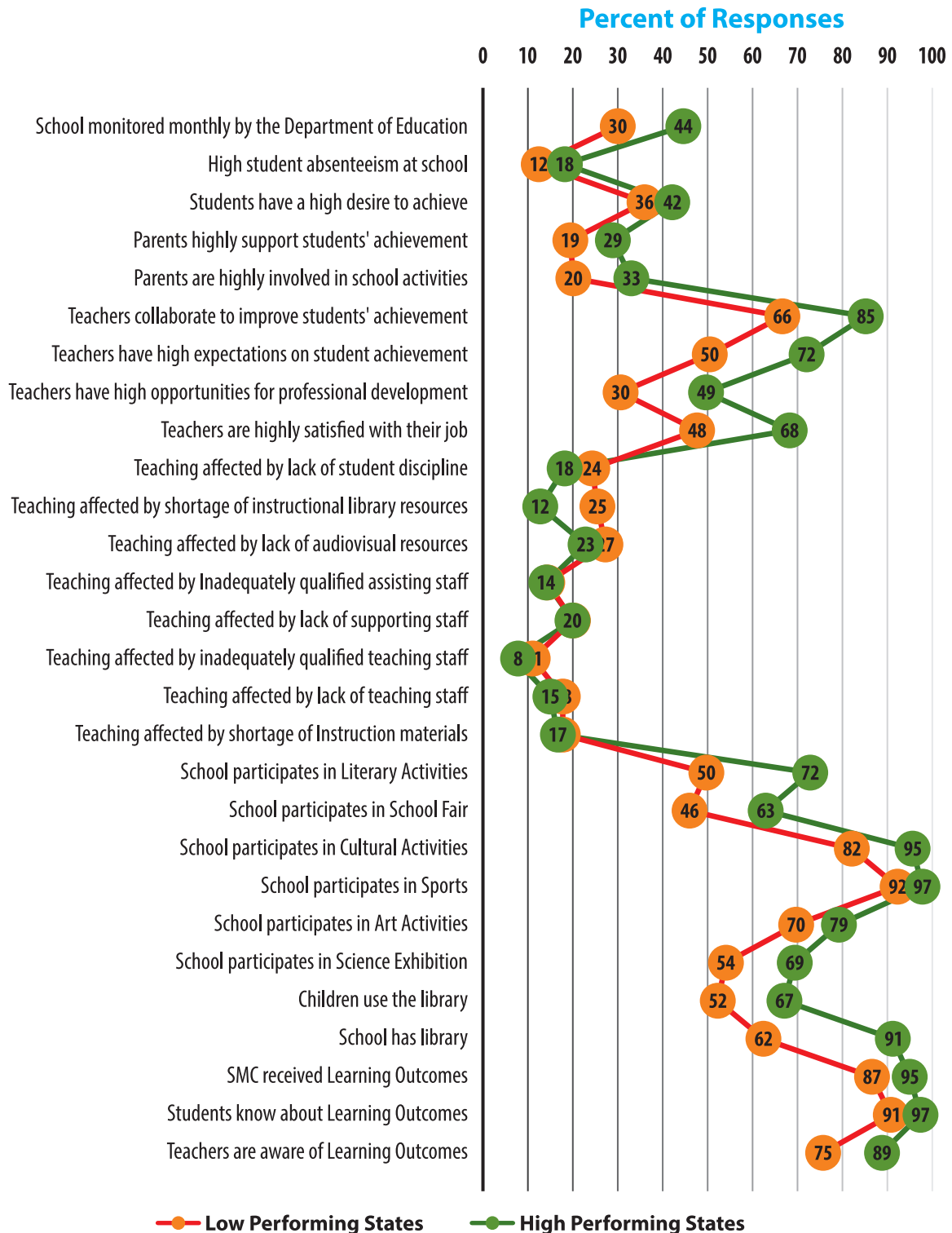
High-Low State Profiles by Teacher Activities



When we observe the affect of teachers' activities on students' achievement, we see that for most of the teachers' activities, high performing States/UTs are in-line with

low performing States/UTs. Teachers' usage of books other than the text books shows impact on higher performing States/UTs.

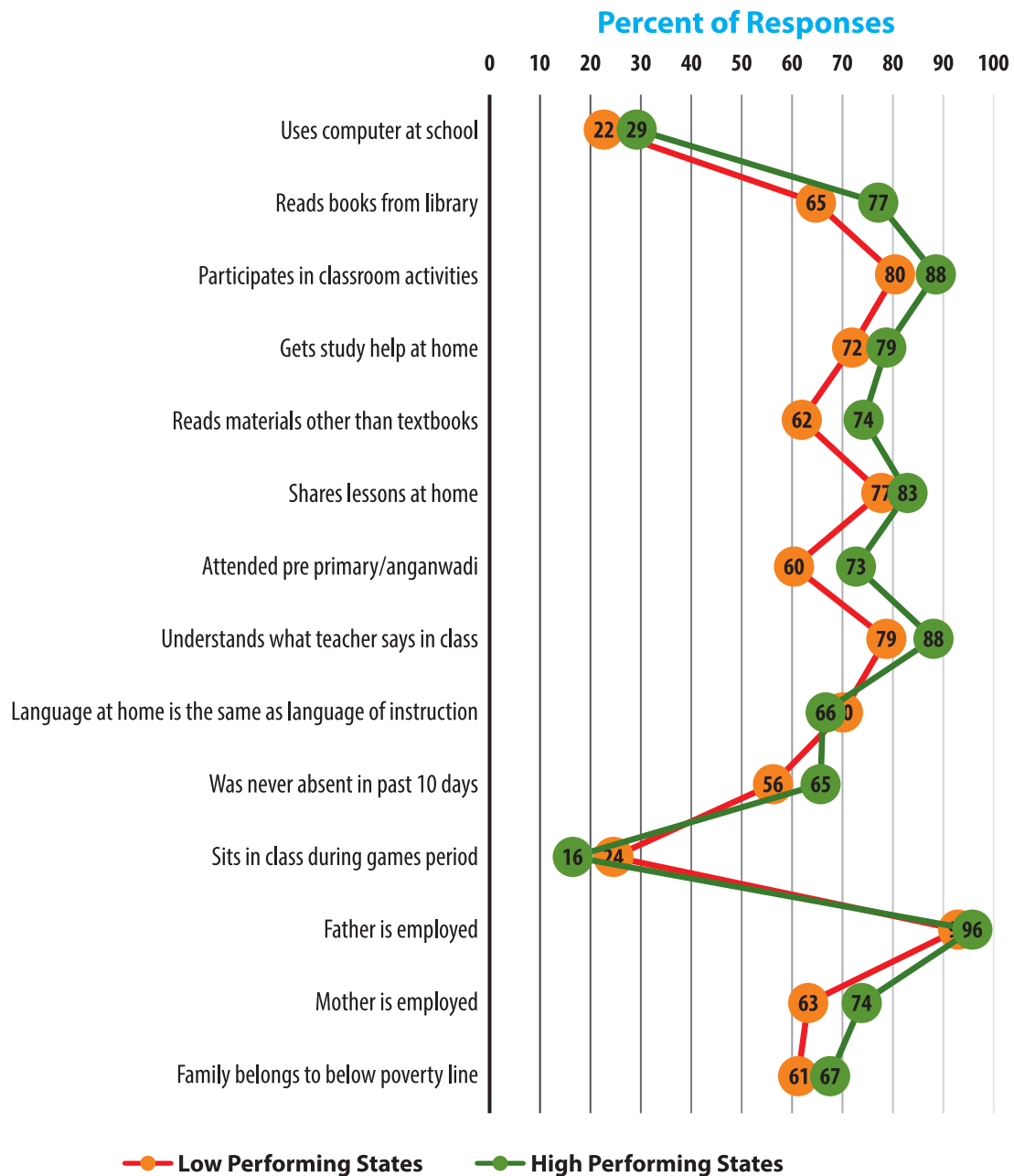
High-Low State Profiles by School Background



School being monitored monthly by the Department of Education, teachers' collaboration to improve students' achievement, their high expectations on students' achievement, their job satisfaction,

schools' participation in literary activities, school fair and school having library have a greater impact on States/UTs where in students' achievement is higher.

High-Low State Profiles by Student Background



Students' participation in classroom activities, attending pre-primary schools/anganwadi, their understanding of what the teacher says in class, their being present in

class and reading books other than the text books have higher impact on the States/UTs where in students are performing better.

Acronyms

ANCOVA	Analysis of Co-variance
ANOVA	Analysis of Variance
AWPB	Annual Work Plan Budget
BAS	Baseline Achievement Survey
B.Ed.	Bachelor of Education
BPL	Below Poverty Line
CABE	Central Advisory Board of Education
CM	Chief Minister
CTT	Classical Test Theory
DAMIAS	Data Mangement and Item Analysis System
DCs	District Coordinators
DCM	Data Capturing Manual
DIET	District Institute of Education and Training
DIF	Differential Item Functioning
DISE	District Information System for Education
DLUs	District Level Users
DMU	District Monitoring Unit
DPC-SSA	District Project Coordinators- Sarva Shiksha Abhiyan
DRC	District Report Cards
DSEL	Department of School Education and Literacy
ESD	Educational Survey Division
ETS	Educational Training Service
EVS	Environmental Studies
FIs	Field Investigators
ICC	Item Characteristic Curve
ICT	Information and Communication Technology
ID	Identity Document
IRT	Item Response Theory
JRM	Joint Review Missions
JRR	Jackknife Repeated Replication Technique
LMS	Learning Management System
LO	Learning Outcome
MAS	Mid-term Achievement Survey
MCQ	Multiple Choice Question
MHRD	Ministry of Human Resource Development
MIL	Modern Indian Language
MIS	Management Information Systems
MLE	Maximum Likelihood Estimation
MOS	Measure of Size
MPs	Members of Parliament
NAEP	National Assessment of Educational Progress
NAS	National Achievement Survey

NAS-PMU	National Achievement Survey-Project Management Unit
NCERT	National Council of Educational Research and Training
NIC	National Informatics Centre
NLU_s	National Level Users
NPPTL	National Report to inform Policy, Practices and Teaching Learning
OECD	Organisation for Economic Co-operation and Development
OMR	Optical Mark Recognition
PISA	Programme of International Student Assessment
PL	Performance Level
PPT	Power Point Presentation
PPS	Probability Proportional to Size
PQ	Pupil Questionnaire
PTA	Parent Teacher Association
PV	Plausible Values
RMSA	Rashtriya Madhyamik Shiksha Abhiyan
RS	Random Start
RTE	Right to Education
SCERT	State Council of Educational Research and Training
SE	Standard Error
SES	Socio Economic Status
SIE	State Institute of Education
SLMT_s	State Level Master Trainers
SLR	State Learning Report
SLU_s	State Level Users
SMC	School Management Committee
SMS	Short Message Service
SPD	State Project Director
SPD-SSA	State Project Director Sarva Shiksha Abhiyan
SPS	Setting Performance Standards
SPSS	Statistical Package for Social Sciences
SQ	Student Questionnaire
SRC	State Resource Centre
SS	Scale Score
SSA	Sarva Shiksha Abhiyan
STC_s	Special Training Centres
TAS	Terminal Achievement Survey
TIMSS	Trends in International Mathematics and Science Study
TLM	Teaching Learning Material
TQ	Teacher Questionnaire
UDISE	Unified District Information System for Education
UNICEF	United Nations Children's Fund
URL	Uniform Resource Locator
UT	Union Territory
WLE	Weighted Maximum Likelihood Estimate
WML	Weighted Maximum Likelihood

Contents

<i>Message</i>	v
<i>Foreword</i>	ix
<i>Preface</i>	xi
<i>Executive Summary</i>	xv
<i>Acronyms</i>	xxxiii
<i>List of Tables</i>	xxxvii
<i>List of Figures</i>	xli
Chapter 1. Introduction	1
1.1 History of NAS in India	2
1.2 Process	5
1.3 Objectives	5
1.4 Research Questions.....	5
1.5 Sample	6
1.6 Assessment Framework	6
1.7 Administration	7
1.8 Monitoring	8
1.9 Reporting	8
1.10 Dissemination and Post NAS Interventions.....	8
1.11 Limitations	9
Chapter 2. Methodology	11
2.1 NAS Tool Development	12
2.2 Sample	15
2.3 Data Management	15
2.4 Trainings	15
2.5 Data Analysis	15
Chapter 3. Sample Design and Procedures	23
3.1 Target Population: Definition	24
3.2 Stratification	26
3.3 The National Sampling Plan	27
3.4 School Sampling Frame.....	28
3.5 Sampling of Schools	29
3.6 Sampling of Students.....	30
3.7 Sampling of Section.....	30
3.8 Random sample drawn at the District level.....	31
Chapter 4. Data Management Procedures	53
4.1 Data Management Activities in NAS 2017.....	54
Chapter 5. Analysis	59
5.1 Evaluation of Technical Standards of Achievement Instruments.....	61

5.2 Analysis of Contextual Factors associated with Student Performance	61
5.3 Procedure of Data Analysis.....	62
5.4 Assessment of Student Performance at District Level.....	63
5.5 Assessment of Student Performance at State Level.....	63
5.6 Assessment of Student Performance at National Level	115
5.7 Item Parameters	122
Chapter 6. Standard Setting and Key Findings of Students' Performance Result.....	133
6.1 Setting Performance Standards	134
6.2 Overall National Performance Results for NAS 2017	137
6.3 National Results by Gender	138
6.4 National Results by School Location	138
6.5 National Results by School Management.....	139
6.6 National Results by Social Groups.....	139
6.7 State Results by Each Class and Subject	140
6.8 State Results Combined by Class and Subject.....	150
6.9 Key Findings of Students' Performance.....	153
6.10 Student Performance Results – National.....	153
6.11 Student Performance Results – by States	154
Chapter 7. Association of Background Variables.....	155
7.1 Association Results for Class III: Student Profile	156
7.2 Association Results for Class III: School Profile	159
7.3 Association Results for Class III: Teacher Profile	161
7.4 Policy implications of the National Achievement Survey	165
7.5 Determinants of high or low level of learning achievement	166
Chapter 8. Reporting and Dissemination	173
8.1 NAS Reports	174
8.2 NAS Dissemination	178
8.3 District level Workshops	178
8.4 State/ UT level Workshops	179
8.5 NAS Mobile Application.....	180
8.6 Way Forward.....	180
Appendices	183
Appendix A: Learning Outcomes.....	183
Appendix B : List of Languages in which Test got Translated	190
Appendix C: Sample Forms	191
Appendix D: Procedure for IRT Scaling of NAS.....	194
Appendix E: Weighting Procedure.....	197
Appendix F: Results for Class III, V and VIII	198
Appendix G: Specific Performance Level Descriptors and Percentages of Students... ..	202
Appendix H: Field Tryout Results, Class III, V and VIII.....	233
Appendix I: List of Workshops.....	243
References.....	245

List of Tables

Table 1.1	Key Characteristics of NAS 2017	3
Table 1.2	Comparison between Previous NAS Cycles and NAS 2017	4
Table 1.3	NAS 2017 Test Details	6
Table 1.4	Class and Subject wise LO Exemplars	8
Table 1.5	Short, Mid and Long Term NAS Interventions	9
Table 2.1	Exemplar LOs assessed in NAS 2017	12
Table 2.2	Item wise Raw Responses of Students	16
Table 2.3	Item wise Raw Responses of Students	16
Table 2.4	Discrimination Values and Interpretation	19
Table 2.5	P-Values and Interpretation for dichotomous items	19
Table 3.1	Stratification Parameters	27
Table 3.2	Table Number of Schools and Students for Class III, V and VIII (Andaman & Nicobar Islands)	31
Table 3.3	Number of Schools and Students for Class III, V and VIII (Andhra Pradesh)	31
Table 3.4	Number of Schools and Students for Class III, V and VIII (Arunachal Pradesh)	31
Table 3.5	Number of Schools and Students for Class III, V and VIII (Assam)	32
Table 3.6	Number of Schools and Students for Class III, V and VIII (Bihar)	33
Table 3.7	Number of Schools and Students for Class III, V and VIII (Chandigarh)	34
Table 3.8	Number of Schools and Students for Class III, V and VIII (Chhattisgarh)	34
Table 3.9	Number of Schools and Students for Class III, V and VIII (Dadra and Nagar Haveli)	34
Table 3.10	Number of Schools and Students for Class III, V and VIII (Daman & Diu)	35
Table 3.11	Number of Schools and Students for Class III, V and VIII (Delhi)	35
Table 3.12	Number of Schools and Students for Class III, V and VIII (Goa)	35
Table 3.13	Number of Schools and Students for Class III, V and VIII (Gujarat)	35
Table 3.14	Number of Schools and Students for Class III, V and VIII (Haryana)	36
Table 3.15	Number of Schools and Students for Class III, V and VIII (Himachal Pradesh)	37
Table 3.16	Number of Schools and Students for Class III, V and VIII (Jammu and Kashmir)	37
Table 3.17	Number of Schools and Students for Class III, V and VIII (Jharkhand)	38
Table 3.18	Number of Schools and Students for Class III, V and VIII (Karnataka)	38
Table 3.19	Number of Schools and Students for Class III, V and VIII (Kerala)	39
Table 3.20	Number of Schools and Students for Class III, V and VIII (Lakshadweep)	40
Table 3.21	Number of Schools and Students for Class III, V and VIII (Madhya Pradesh)	40
Table 3.22	Number of Schools and Students for Class III, V and VIII (Maharashtra)	41
Table 3.23	Number of Schools and Students for Class III, V and VIII (Manipur)	42
Table 3.24	Number of Schools and Students for Class III, V and VIII (Meghalaya)	43
Table 3.25	Number of Schools and Students for Class III, V and VIII (Mizoram)	43
Table 3.26	Number of Schools and Students for Class III, V and VIII (Nagaland)	43
Table 3.27	Number of Schools and Students for Class III, V and VIII (Odisha)	44
Table 3.28	Number of Schools and Students for Class III, V and VIII (Puducherry)	44
Table 3.29	Number of Schools and Students for Class III, V and VIII (Punjab)	45
Table 3.30	Number of Schools and Students for Class III, V and VIII (Rajasthan)	45
Table 3.31	Number of Schools and Students for Class III, V and VIII (Sikkim)	46

Table 3.32	Number of Schools and Students for Class III, V and VIII (Tamil Nadu)	46
Table 3.33	Number of Schools and Students for Class III, V and VIII (Telangana)	47
Table 3.34	Number of Schools and Students for Class III, V and VIII (Tripura)	48
Table 3.35	Number of Schools and Students for Class III, V and VIII (Uttar Pradesh)	48
Table 3.36	Number of Schools and Students for Class III, V and VIII (Uttarakhand)	50
Table 3.37	Number of Schools and Students for Class III, V and VIII (West Bengal)	51
Table 4.1	Backend infrastructure for the application	54
Table 4.2	Categories of Users, Organizations Involved, Activities Performed	55
Table 5.1	Performance of States by Social Groups in Class III Language	105
Table 5.2	Performance of States by Social Groups in Class III Mathematics	106
Table 5.3	Performance of States by Social Groups in Class III Environmental Studies	107
Table 5.4	Performance of States by Social Groups in Class V Language	108
Table 5.5	Performance of States by Social Groups in Class V Mathematics	109
Table 5.6	Performance of States by Social Groups in Class V Environmental Studies	110
Table 5.7	Performance of States by Social Groups in Class VIII Language	111
Table 5.8	Performance of States by Social Groups in Class VIII Mathematics	112
Table 5.9	Performance of States by Social Groups in Class VIII Science	113
Table 5.10	Performance of States by Social Groups in Class VIII Social Science	114
Table 5.11	Subject wise Low Performing Learning Outcomes in Class III	116
Table 5.12	Subject wise Low Performing Learning Outcomes in Class V	116
Table 5.13	Subject wise Low Performing Learning Outcomes in Class VIII	117
Table 5.14	Item Parameters Language Class III	123
Table 5.15	Item Parameters Mathematics Class III	124
Table 5.16	Item Parameters Environmental Studies Class III	125
Table 5.17	Item Parameters Language Class V	126
Table 5.18	Item Parameters Mathematics Class V	127
Table 5.19	Item Parameters Environmental Studies Class V	128
Table 5.20	Item Parameters Language Class VIII	129
Table 5.21	Item Parameters Mathematics Class VIII	130
Table 5.22	Item Parameters Science Class VIII	131
Table 5.23	Item Parameters Social Science Class VIII	132
Table 6.1	General performance level descriptors	134
Table 6.2	Final cut scores for NAS tests	137
Table 6.3	Percentage of students at each performance level (National results)	137
Table 7.1	Association Results– Below Poverty Line	156
Table 7.2	Association Results– Education of Mother	156
Table 7.3	Association Results– Likes coming to school	156
Table 7.4	Association Results– Games period activity	156
Table 7.5	Association Results–Find Difficult to travel to school	156
Table 7.6	Association Results– Student Absence over 10 days	157
Table 7.7	Association Results–Language spoken at home	157
Table 7.8	Association Results–Able to understand teacher	157
Table 7.9	Association Results–Number of siblings	157
Table 7.10	Association Results–Attended pre-primary classes/Anganwadi	158
Table 7.11	Association Results–Discusses the Lessons at Home	158

Table 7.12	Association Results–Reads other materials in addition to Textbooks	158
Table 7.13	Association Results–Gets help in study at home	158
Table 7.14	Association Results–Participates in Classroom Activities	158
Table 7.15	Association Results–Asks questions in the Class	159
Table 7.16	Association Results–Most liked activity	159
Table 7.17	Association Results– Teachers aware about the LO Document	159
Table 7.18	Association Results– Use of Library	159
Table 7.19	Association Results– School Activities	160
Table 7.20	Association Results– Activities of School affected by Instructional Materials, Teaching Staff, Supporting Staff etc.	160
Table 7.21	Association Results– School Perception	161
Table 7.22	Association Results– Frequency of Monitoring	161
Table 7.23	Association Results– Professional Qualification	162
Table 7.24	Association Results– Teaching same subject as Highest Degree	162
Table 7.25	Association Results– Employment Status	162
Table 7.26	Association Results– LO document available at school	162
Table 7.27	Association Results– Interaction with SMC	162
Table 7.28	Association Results– Attitudes and Views	163
Table 7.29	Association Results– Challenges in the Classroom Transactions	163
Table 7.30	Association Results– Problems with Facilities	163
Table 7.31	Association Results– Tools and Techniques	164
Table 7.32	Association Results– Availability of resources to implement the strategies	164
Table 7.33	Association Results– Teaching Resources	164
Table 7.34	Profiles of HIGH and LOW Performing States	166
Table A-1	Environmental Studies LOs Class III	183
Table A-2	Language LOs Class III	184
Table A-3	Mathematics LOs Class III	184
Table A-4	Environmental Studies LOs Class V	185
Table A-5	Language LOs Class V	185
Table A-6	Mathematics LOs Class V	186
Table A-7	Language LOs Class VIII	187
Table A-8	Mathematics LOs Class VIII	187
Table A-9	Science LOs Class VIII	188
Table A-10	Social Science LOs Class VIII	189
Table D-1	Overview of Calibrations	194
Table D-2	Overview of Calibrations	195
Table G-1	Specific Performance Level Descriptors for Language, Class III Advanced	202
Table G-2	Specific Performance Level Descriptors for Language, Class III Proficient	202
Table G-3	Specific Performance Level Descriptors for Language, Class III Basic	203
Table G-4	Specific Performance Level Descriptors for Language, Class III Below Basic	203
Table G-5	Specific Performance Level Descriptors for Language, Class V Advanced	204
Table G-6	Specific Performance Level Descriptors for Language, Class V Proficient	205
Table G-7	Specific Performance Level Descriptors for Language, Class V Basic	205
Table G-8	Specific Performance Level Descriptors for Language, Class V Below Basic	206
Table G-9	Specific Performance Level Descriptors for Language, Class VIII Advanced	207

Table G-10	Specific Performance Level Descriptors for Language, Class VIII Proficient	208
Table G-11	Specific Performance Level Descriptors for Language, Class VIII Basic	208
Table G-12	Specific Performance Level Descriptors for Language, Class VIII Below Basic	209
Table G-13	Specific Performance Level Descriptors for Mathematics, Class III Advanced	209
Table G-14	Specific Performance Level Descriptors for Mathematics, Class III Proficient	210
Table G-15	Specific Performance Level Descriptors for Mathematics, Class III Basic	210
Table G-16	Specific Performance Level Descriptors for Mathematics, Class III Below Basic	211
Table G-17	Specific Performance Level Descriptors for Mathematics, Class V Advanced	211
Table G-18	Specific Performance Level Descriptors for Mathematics, Class V Proficient	212
Table G-19	Specific Performance Level Descriptors for Mathematics, Class V Basic	213
Table G-20	Specific Performance Level Descriptors for Mathematics, Class V Below Basic	213
Table G-21	Specific Performance Level Descriptors for Mathematics, Class VIII Advanced	214
Table G-22	Specific Performance Level Descriptors for Mathematics, Class VIII Proficient	214
Table G-23	Specific Performance Level Descriptors for Mathematics, Class VIII Basic	215
Table G-24	Specific Performance Level Descriptors for Mathematics, Class VIII Below Basic	215
Table G-25	Specific Performance Level Descriptors for Environmental Studies, Class III Advanced	216
Table G-26	Specific Performance Level Descriptors for Environmental Studies, Class III Proficient	217
Table G-27	Specific Performance Level Descriptors for Environmental Studies, Class III Basic	218
Table G-28	Specific Performance Level Descriptors for Environmental Studies, Class III Below Basic	219
Table G-29	Specific Performance Level Descriptors for Environmental Studies, Class V Advanced	220
Table G-30	Specific Performance Level Descriptors for Environmental Studies, Class V Proficient	222
Table G-31	Specific Performance Level Descriptors for Environmental Studies, Class V Basic	223
Table G-32	Specific Performance Level Descriptors for Environmental Studies, Class V Below Basic	224
Table G-33	Specific Performance Level Descriptors for Science, Class VIII Advanced	225
Table G-34	Specific Performance Level Descriptors for Science, Class VIII Proficient	226
Table G-35	Specific Performance Level Descriptors for Science, Class VIII Basic	227
Table G-36	Specific Performance Level Descriptors for Science, Class VIII Below Basic	228
Table G-37	Specific Performance Level Descriptors for Social Science, Class VIII Advanced	229
Table G-38	Specific Performance Level Descriptors for Social Science, Class VIII Proficient	230
Table G-39	Specific Performance Level Descriptors for Social Science, Class VIII Basic	231
Table G-40	Specific Performance Level Descriptors for Social Science, Class VIII Below Basic	232
Table H-1:	Field Tryout Result for Class III, EVS	233
Table H-2:	Field Tryout Result for Class III, Language	234
Table H-3:	Field Tryout Result for Class III, Mathematics	235
Table H-4:	Field Tryout Result for Class V, EVS	236
Table H-5:	Field Tryout Result for Class V, Language	237
Table H-6:	Field Tryout Result for Class V, Mathematics	238
Table H-7:	Field Tryout Result for Class VIII, Language	239
Table H-8:	Field Tryout Result for Class VIII, Mathematics	240
Table H-9:	Field Tryout Result for Class VIII, Science	241
Table H-10:	Field Tryout Result for Class VIII, Social Science	242
Table I-1:	List of Workshops for Item Development and Finalization	243
Table I-2:	District Level Workshop Schedule	245

List of Figures

Figure 1.1	NAS Timeline	2
Figure 1.2	NAS 2017 Processes and Steps	5
Figure 2.1	NAS Activities	11
Figure 2.2	Details of Test forms	14
Figure 2.3	Proficiency Bands (Exemplar)	21
Figure 4.1	NAS 2017 Web Application	54
Figure 4.2	Preparatory Activities for Development of NAS 2017 Web Application	54
Figure 4.3	Snapshot of the offline tool.	56
Figure 5.1	Performance of States in Class III Language	65
Figure 5.2	Performance of States in Class III Mathematics	66
Figure 5.3	Performance of States in Class III Environmental Studies	67
Figure 5.4	Performance of States in Class V Language	68
Figure 5.5	Performance of States in Class V Mathematics	69
Figure 5.6	Performance of States in Class V Environmental Studies	70
Figure 5.7	Performance of States in Class VIII Language	71
Figure 5.8	Performance of States in Class VIII Mathematics	72
Figure 5.9	Performance of States in Class VIII Science	73
Figure 5.10	Performance of States in Class VIII Social Science	74
Figure 5.11	Performance of States by Gender in Class III Language	75
Figure 5.12	Performance of States by Gender in Class III Mathematics	76
Figure 5.13	Performance of States by Gender in Class III Environmental Studies	77
Figure 5.14	Performance of States by Gender in Class V Language	78
Figure 5.15	Performance of States by Gender in Class V Mathematics	79
Figure 5.16	Performance of States by Gender in Class V Environmental Studies	80
Figure 5.17	Performance of States by Gender in Class VIII Language	81
Figure 5.18	Performance of States by Gender in Class VIII Mathematics	82
Figure 5.19	Performance of States by Gender in Class VIII Science	83
Figure 5.20	Performance of States by Gender in Class VIII Social Science	84
Figure 5.21	Performance of States by School Location in Class III Language	85
Figure 5.22	Performance of States by School Location in Class III Mathematics	86
Figure 5.23	Performance of States by School Location in Class III Environmental Studies	87
Figure 5.24	Performance of States by School Location in Class V Language	88
Figure 5.25	Performance of States by School Location in Class V Mathematics	89
Figure 5.26	Performance of States by School Location in Class V Environmental Studies	90
Figure 5.27	Performance of States by School Location in Class VIII Language	91
Figure 5.28	Performance of States by School Location in Class VIII Mathematics	92
Figure 5.29	Performance of States by School Location in Class VIII Science	93
Figure 5.30	Performance of States by School Location in Class VIII Social Science	94
Figure 5.31	Performances of States by School Management in Class III Language	95

Figure 5.32	Performances of States by School Management in Class III Mathematics	96
Figure 5.33	Performance of States by School Management in Class III Environmental Studies	97
Figure 5.34	Performances of States by School Management in Class V Language	98
Figure 5.35	Performances of States by School Management in Class V Mathematics	99
Figure 5.36	Performance of States by School Management in Class V Environmental Studies	100
Figure 5.37	Performance of States by School Management in Class VIII Language	101
Figure 5.38	Performance of States by School Management in Class VIII Mathematics	102
Figure 5.39	Performance of States by School Management in Class VIII Science	103
Figure 5.40	Performance of States by School Management in Class VIII Social Science	104
Figure 5.45	National Performance Class wise and Subject wise	115
Figure 5.41	Participation by Gender	115
Figure 5.43	Participation by School Management	115
Figure 5.42	Participation by Location	115
Figure 5.44	Participation by Social Groups	115
Figure 5.46	Performance of Students by Gender	118
Figure 5.47	Performance of Students by Location	119
Figure 5.48	Performance of Students by School Management	120
Figure 5.49	Performance of Students by Social Groups	121
Figure 6.2	The Process of Setting Cut Scores	135
Figure 6.3	Ordered item booklet with cut scores.	135
Figure 6.4	Example of Feedback Agreement Data After Round 2 for Mathematics Class III	135
Figure 6.5	Example of Feedback Impact Data After Round 2 Mathematics Class III	136
Figure 6.6	Example of Feedback Cut Score Trend by Rounds for Mathematics Class III	136
Figure 6.7	Example of Feedback Impact Data by Rounds for Mathematics Class III	136
Figure 6.8	Example of Impact Data Across Subjects Within Class III for Horizontal Moderation	136
Figure 6.9	Example of Impact Data Across Classes Within Mathematics III for Vertical Moderation	137
Figure 6.10	Percentage of students in each performance level (National Results)	138
Figure 6.11	Class III National Results by Gender	138
Figure 6.12	Class V National Results by Gender	138
Figure 6.13	Class VIII National Results by Gender	138
Figure 6.14	Class III National Results by School Location	138
Figure 6.15	Class V National Results by School Location	138
Figure 6.16	Class VIII National Results by School Location	138
Figure 6.17	Class III National Results by School Management	139
Figure 6.18	Class V National Results by School Management	139
Figure 6.19	Class VIII National Results by School Management	139
Figure 6.20	Class III National Results by Social Groups	139
Figure 6.21	Class V National Results by Social Groups	139
Figure 6.22	Class VIII National Results by Social Groups	139
Figure 6.23	Language Class III (LA03) State Results by Performance Levels	140
Figure 6.24	Mathematics Class III (MA03) State Results by Performance Levels	141
Figure 6.25	Environmental Studies Class III (EV03) State Results by Performance Levels	142
Figure 6.26	Language Class V (LA05) State Results by Performance Levels	143

Figure 6.27	Mathematics Class V (MA05) State Results by Performance Levels	144
Figure 6.28	Environmental Studies Class V (EV05) State Results by Performance Levels	145
Figure 6.29	Language Class VIII (LA08) State Results by Performance Levels	146
Figure 6.30	Mathematics Class VIII (MA08) State Results by Performance Levels	147
Figure 6.31	Science Class VIII (SC08) State Results by Performance Levels	148
Figure 6.32	Social Science Class VIII (SS08) State Results by Performance Levels	149
Figure 6.33	Combined Results by Performance Levels for Class III	150
Figure 6.34	Combined Results by Performance Levels for Class V	151
Figure 6.35	Combined Results by Performance Levels for Class VIII	152
Figure 6.36	Percentage of students in each performance level (National results)	153
Figure 7.1	High-Low State Profiles by Teacher Background - School Environment	168
Figure 7.2	High-Low State Profiles by Teacher Perception - School Environment	169
Figure 7.3	High-Low State Profiles by Teacher Activities	170
Figure 7.4	High-Low State Profiles by School Background	171
Figure 7.5	High-Low State Profiles by Student Background	172
Figure 8.1	Exemplar of DRC for Andamans District for Class III in EVS	175
Figure 8.2	Snapshot of an exemplar SLR	177
Figure 8.3	Snapshot of Web Application	180



1. Introduction

The National Achievement Survey (NAS) is a large scale survey of students' learning, administered periodically, since 2001, at the elementary level and from 2015 at the secondary level, to monitor the health of the country's education system. NAS is led by the Educational Survey Division (ESD), National Council of Educational Research and Training (NCERT), under the aegis of Department of School Education and Literacy (DSEL), Ministry of Human Resource Development (MHRD). NAS conducted in November 2017 was administered in 701¹ Districts of 36 States and UTs. Nearly 2.2 million students studying in 1,10,000 (approx) Government and Government aided schools were tested in the learning outcomes developed by the Council. To understand the contextual variables three questionnaires were developed; Pupil Questionnaire (PQ), School Questionnaire (SQ) and Teacher Questionnaire (TQ). The Teacher Questionnaire was administered on 2,87,393 teachers. In addition to documenting the implementation and findings of NAS 2017, the current report also summarizes the salient features and its departures from previous cycles.

¹ West Bengal (Darjeeling) and Tamil Nadu (Krishnagiri) did not participate in NAS 2017

The NAS is a system level assessment i.e. it summarizes students achievement at National, State/ UT and District levels. NAS does not provide scores for individual student/school.

NAS provides a 'snapshot of what students know and can do' at the end of Classes III, V, VIII and X in key curricular areas. NAS findings inform stakeholders at varied levels in policy, planning, practices and teaching learning processes to improve quality and ensure equity in learning. It appraises decision makers, academicians, teachers and researchers about the learning levels of students, probable determinants and variations in learning among diversified groups.

Large-scale assessment surveys linked to learning outcomes are being increasingly done in many countries. International Assessments such as the Programme for International Student Assessment (PISA) and the Trends in Mathematics and Science Study (TIMSS) are much in vogue. They collect vast amounts of data on schools, students and households. Apart from participating in international surveys, many countries are implementing national assessment surveys like National Assessment of Educational Progress (NAEP) in the USA and National Assessment Program (NAP) in Australia.

1.1 History of NAS in India

a) Background

The National Achievement Survey was originally planned and designed to be an independent project of NCERT. However, in 2000, NAS got subsumed under the Sarva Shiksha Abhiyan (SSA) of MHRD. Under SSA, the original strategy was to

administer three NAS cycles, wherein, each cycle covered classes III, V and VII/VIII. The three cycles were to be called as Baseline, Mid Term and Terminal Achievement Surveys. The Baseline Achievement Survey (BAS) was carried out during 2001-2004, followed by the Mid-term Achievement Survey (MAS) which was carried out between 2005-2008.

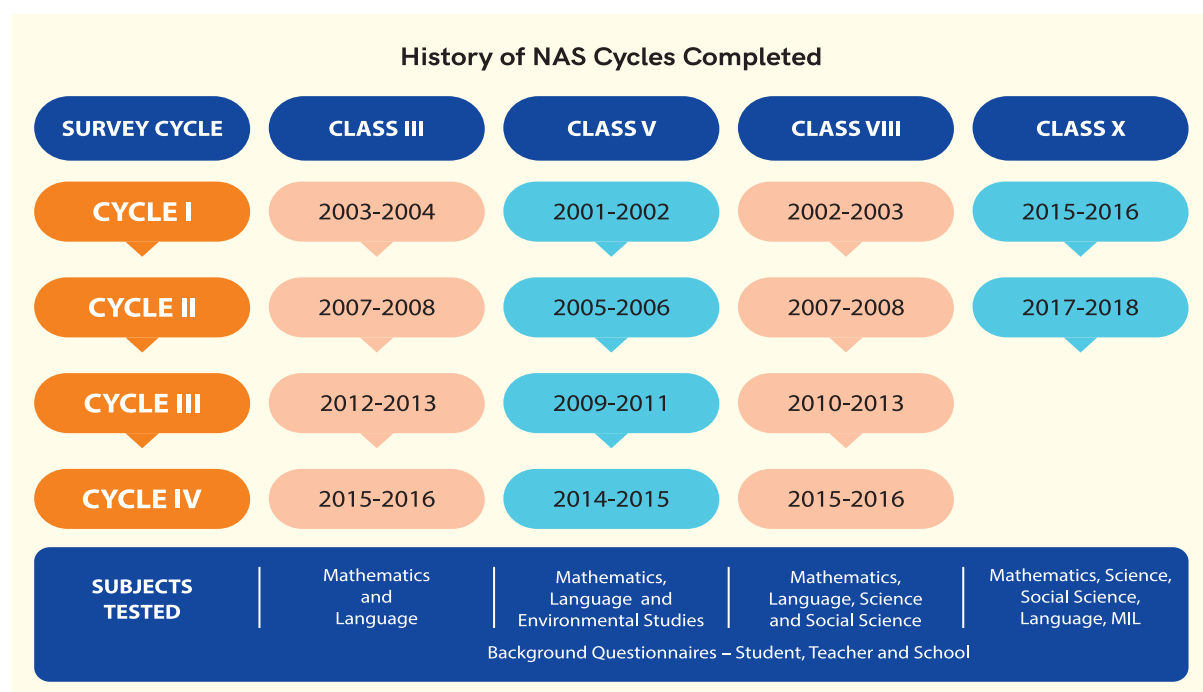
Over the last decade of SSA implementation, focus shifted from dealing with challenges around access, to improving quality of learning. Hence, NAS emerged as a tool to provide periodic feedback to the system on the health of the education in the country. NAS became a regular and ongoing feature of the Indian education system, with each round of NAS being referred to as a 'Cycle'. Therefore, the Terminal Achievement Survey (TAS) scheduled to take place between 2009 – 2013 was renamed as Cycle 3. Students of Classes III, V and VIII were tested once every three years.

During the third cycle of NAS, NCERT, made the imminent shift of analyzing NAS results through the Item Response Theory (IRT). Usage of IRT made it possible to link and thus, to compare student scores over time, even if different tests were used.

Under Rashtriya Madhyamik Shiksha Abhiyan (RMSA), NAS was conducted in Class X in 2015 to assess student learning at the end of the secondary stage. The second cycle of NAS Class X was conducted in 2018.

NAS Timeline is shown in Figure 1.1.

Figure 1.1: NAS Timeline



b) NAS 2017: The New Initiative

Up till the fourth cycle of NAS, Class III students were tested in Language and Mathematics; Class V students in EVS, Language and Mathematics; Class VIII students in Language, Mathematics, Science, and Social Sciences. Test questions were framed on the basis of common core content identified across States/ UTs in different subjects.

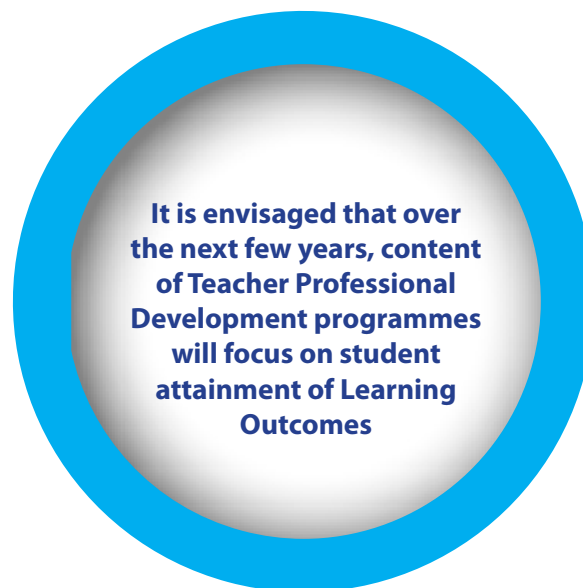
In 2017, NCERT took a quantum leap forward by defining the subject and class wise Learning Outcomes (LOs) up to the Elementary Stage.¹ The survey was designed to measure student attainment of LOs at the end of Classes III, V and VIII by assessing students through variety of items measuring skills and competencies.

It was envisaged that through post NAS interventions, the classroom teaching-learning processes would be geared towards enhancing the attainment of LOs and competencies amongst students.

Salient Features of the Survey

The salient features of NAS 2017 are given as under:

1. Student achievement was mapped against LOs.
2. Students of all the three classes i.e. III, V and VIII were assessed across the country, on a single day.
3. District was taken as the unit of reporting.



4. Technology was extensively used, e.g., data was uploaded onto a central web application for analysis and report generation.
5. District Report Cards (DRCs) were auto generated from the web application.
6. Using the findings reported in DRCs, NCERT helped districts frame post NAS interventions.
7. Reports were formally shared with Chief Minister (CM)/ Member of Parliaments (MPs) from all States/UTs.
8. Reports were put in public domain for wider dissemination.
<http://www.ncert.nic.in/programmes/NAS/SRC.html>
<http://www.ncert.nic.in/programmes/NAS/DRC.html>

Table 1.1: Key Characteristics of NAS 2017

IT IS....	IT IS NOT....
<ul style="list-style-type: none"> • Evidence for systemic feedback • A summary of Districts, States/UTs, Nation's aggregated performance against the Learning Outcomes • Identification of learning gaps at the District, State and National levels • Evidence for differential planning within District/ State • Contextual analysis of the background variables vis-a vis the performance in the learning outcomes • Inclusive in nature 	<ul style="list-style-type: none"> • An examination • Indicative of individual student's performance against Learning Outcomes • Indicative of an individual school's performance against Learning Outcomes

¹ On 20th February 2017, Central Right to Education (RTE) Rules were amended to include reference on class and subject-wise Learning Outcomes. RTE amendment has made it mandatory for State Governments to map progress in student learning against Learning Outcomes.

Table 1.2: Comparison between Previous NAS Cycles and NAS 2017

Dimensions	Previous NAS Cycles	NAS 2017
Parameters of Student Testing	<ul style="list-style-type: none"> Based on State/ UT common core curriculum 	<ul style="list-style-type: none"> Based on Learning Outcomes developed by NCERT
Objectives	<ul style="list-style-type: none"> Systemic Feedback at State/ UT level 	<ul style="list-style-type: none"> Decentralized systemic feedback on student achievement at District, State and National levels
Level of Sampling	<ul style="list-style-type: none"> State level sample 	<ul style="list-style-type: none"> District level sample
Sample Size	<ul style="list-style-type: none"> More than one lakh in Class III (cycle 3), more than one lakh in Class V (cycle 3) and nearly two lakhs in Class VIII (cycle 3) 	<ul style="list-style-type: none"> Nearly 2.2 million in Classes III, V and VIII (Combined)
Timeline	<ul style="list-style-type: none"> Implementation and reporting completed within 3 years 	<ul style="list-style-type: none"> District and State level results released within the same academic year
Administration	<ul style="list-style-type: none"> Students of Classes III, V and VIII assessed in different years 	<ul style="list-style-type: none"> Students of classes III, V and VIII tested on a single day i.e. 13 November 2017
Monitoring	<ul style="list-style-type: none"> State level officials 	<ul style="list-style-type: none"> MHRD, NCERT District Monitoring Unit (DMU) Inter-Ministerial Observers International Organizations
Survey Outcomes	<ul style="list-style-type: none"> State Reports National Report 	<ul style="list-style-type: none"> District Report Cards District level feedback for helping districts frame and implement quality interventions State Learning Reports (SLRs) National Report to inform Policy, Practice and Teaching Learning (NPPTL)
Dissemination Strategy	<ul style="list-style-type: none"> Joint Review Missions (JRM)s MHRD/NCERT website 	<ul style="list-style-type: none"> Central Advisory Board of Education (CABE Committee) MHRD/ NCERT website District level workshops Block level and cluster level personnels School leaders State level workshops MPs from Rajya Sabha and Lok Sabha Chief Ministers State Level Education Functionaries such as Principal Secretaries, SPDs and SCERT Directors NAS Mobile Application
Partners	<ul style="list-style-type: none"> MHRD NCERT Technical Partners brought in by funding agencies SCERTs DIETs 	<ul style="list-style-type: none"> MHRD NAS Steering Committee NCERT UNICEF NAS PMU SCERTs SPD SSA offices DIETs District level educational functionaries

1.2 Process

NAS 2017 provides reliable information to various stakeholders on the health of the education system, with specific reference to issues of quality, equity and efficiency. Activities undertaken during the design, implementation and reporting of NAS are shown in Figure 1.2.

It was ensured that the enlisted activities were designed, implemented and reported using international best practices and met the highest standard of technical rigour.

1.3 Objectives

NAS 2017 was designed with the following four objectives:

1. To report performance of students in different subjects and classes on specific learning outcomes
2. To compare the average performance of the following group of children:
 - a) Girls and Boys
 - b) Rural and Urban children
 - c) Students studying in Government and Government Aided schools
 - d) Students belonging to different social categories i.e. General, Scheduled Caste, Scheduled Tribes and Other Backward Classes
3. To identify key learning gaps in achievement of learning outcomes
4. To identify institutional and contextual factors that affect learning achievement of students

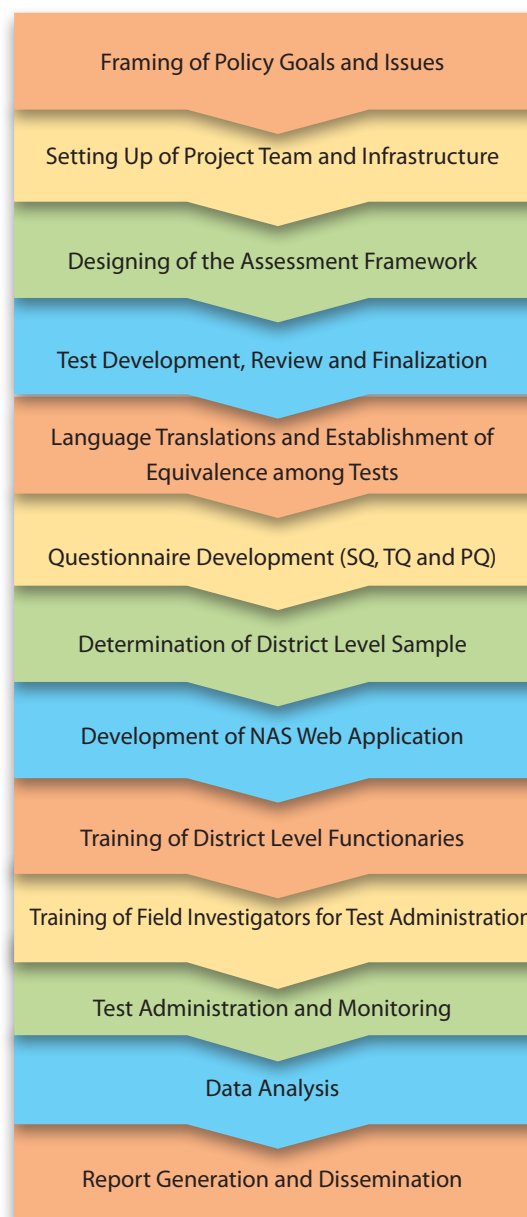
During the preparatory phase of NAS 2017, it became evident that NAS could be potentially used to give systemic level feedback on students' attainment against LOs and hence post-NAS Intervention strategy was planned to be undertaken at District and State/UT level.

Key objectives for the Post NAS Intervention are given below:

- a) Support States / UTs / Districts / Blocks / Schools to interpret and understand findings of NAS.
- b) Support States / UTs / Districts / Blocks to improve School wise attainment of LOs.
- c) Ensure academic support for design and implementation of interventions to improve the learning levels of students.

National/ State/District and Block level collaboration was made to enable schools improve their LO attainment.

Figure 1.2: NAS 2017 Processes and Steps



1.4 Research Questions

The following research questions were framed for NAS 2017:

1. How the performance of students varied in Language, Maths and EVS in Class III and V, and Language, Maths, Science and Social Science in Class VIII?
2. Is there any significant difference in performance of boys and girls in Language, Maths and EVS in Class III and V, and Language, Maths, Science and Social Science in Class VIII?

3. Is there any significant difference in students' performance belonging to rural and urban schools?
4. How does the performance of the students varies in Language, Maths and EVS in Classes III and V, and Language, Maths, Science and Social Science in Class VIII across social groups?
5. How does the performance of the students varies in Language, Maths and EVS in Classes III and V, and Language, Maths, Science and Social Science in Class VIII across school managements?

The above research questions enabled the development of a data analysis framework.

1.5 Sample

In NAS 2017, school sample drawn through the Probability Proportionate to Size (PPS) methodology. About 2.2 million children from 1,10,000 schools spread across all districts in India were selected as sample of the study.

1.6 Assessment Framework

a) Test Design

Well designed assessment provides learners with

feedback and sets standards for them to strive towards achieving learning outcomes.

The details about the test are given below:

- Paper and pencil based assessments were conducted for the students of all the classes.
- Assessments lasted for 90 minutes for Classes III and V; and 120 minutes for class VIII.
- All the items were standard multiple choice with four responses from which the students were required to select the correct option.
- Classes III and V students were tested in Language, Mathematics and Environmental Studies (EVS). However, Class VIII students were tested in Language, Mathematics, Science and Social Science.
- Two test forms were developed for each class. Each test booklet included 45 items (MCQs) for Classes III and V; and 60 items for Class VIII based on learning outcomes.

Details of the class and subject wise test forms are summarized in Table 1.3.

Table 1.3: NAS 2017 Test Details

Classes	Subjects	Test Forms (Codes)	Number of items	Question Type (MCQ)
Class III	<ul style="list-style-type: none"> • Language • Mathematics • EVS 	31, 32	<ul style="list-style-type: none"> • 45 items (15 items each on Language, Mathematics and EVS) included in test forms 31 and 32 • Duration of test: 90 minutes 	Each subject included 25 unique items. 5 items were common (anchor items) in both the test forms.
Class V	<ul style="list-style-type: none"> • Language • Mathematics • EVS 	51, 52	<ul style="list-style-type: none"> • 45 items (15 items each on Language, Mathematics and EVS) included in test forms 51 and 52 • Duration of test: 90 minutes 	
Class VIII	<ul style="list-style-type: none"> • Language • Mathematics • Science • Social Science 	81, 82	<ul style="list-style-type: none"> • 60 items (15 items each on Language, Mathematics, Science and Social Science) included in test forms 81 and 82 • Duration of test: 120 minutes 	

b) Test Content

All of the NAS items were mapped to the class and subject wise Learning Outcomes.

1.7 Administration**National Level**

Preparatory work for NAS 2017 commenced several months prior to the actual date of NAS administration. At the national level, preparatory work was led by MHRD and NCERT. A Steering Committee was established to guide and facilitate all the activities of NAS. Some of the activities performed at National Level are as enlisted below:

- Hold consultations at national level to finalize the objectives, policy decisions and design.
- Hold consultations with state institutions to reach an agreement and inform the assessment criteria and development of assessment framework.
- Build capacity at the State/UT level through training a cadre of State Level Master Trainers (SLMTs).
- Develop the survey tools – achievement tests and questionnaires – Pupil (PQ), Teacher (TQ) and School (SQ).
- Facilitate translation and linguistic control of tests in Hindi and regional languages with the help of States/UTs.
- Conduct field trial, review and quality assurance of NAS tests and questionnaires.
- Develop Operational Guidelines-cum-Training Manual.
- Design and develop a NAS web application for data collation, monitoring of NAS state implementation and timely generation of reports.
- Develop a state activity progress tracker for monitoring and reviewing the progress of NAS.
- Established Control room at NCERT to:
 - a) address all queries related to NAS within 24 hours with documentation
 - b) functional for 24 hours, five days before the Day of Assessment
- Develop District, State and National Reports and Policy Briefs
- Develop an action plan to facilitate implementation of quality interventions based on NAS findings
- Track the progress of NAS implementation at the National, State and District levels

State Level

At the State and District levels, SPD SSA, SCERTs/ SIEs, DIETs and MIS Coordinators undertook preparatory tasks for implementing NAS 2017 in their respective areas.

SPD Office

SPD office ensured availability of funds and infrastructure for NAS 2017 implementation and post NAS intervention activities. SPD office also identified, nominated and trained personnel and teams for monitoring the survey.

SCERTs

Academic activities of the survey were spearheaded by SCERTs. Tasks such as translations of tests, designing and framing of post NAS interventions were led by SCERTs.

SCERTs also nominated the District Coordinators.

District Coordinators (DCs)

DCs led the school related communication and activities. DCs assured quality trainings of Field Investigators (FIs). Some of the activities performed by DCs are enlisted below:

- Verify the existence of sample schools, medium(s) of instruction in Classes III, V and VIII in the school and number of students in the sample school with the school's Unified District Information System for Education (UDISE) code and report discrepancy, if any.
- Ensure that a confidentiality agreement letter was signed by the head teacher before handing over the NAS test material.
- Provide printed copy of duly signed letter of introduction to each Field Investigator.
- Organize training workshops for the Field Investigators.

Field Investigators (FIs)

District Institute of Education and Training (DIET) students were appointed as FIs. FIs administered the survey on 13 November 2017.

Personnel not involved in the state government's education system were trained as Field investigators for administration of the survey to introduce the element of third party administration. To maintain confidentiality, at all levels an undertaking was asked for, specially during the activities of translation, printing, and transporting.

Successful completion of NAS activities required the above mentioned organizations and personnel to work in collaboration with each other.

1.8 Monitoring

NAS 2017 was monitored and quality assured at various levels. At the national level, MHRD and NCERT supervised the completion of the NAS preparatory activities. Control unit was set up at NCERT, one month prior and at SCERT one week before the administration of the test. At the District level, the Monitoring Unit oversaw and reviewed the NAS preparatory activities.

NAS, on the day of its administration was monitored by Independent Observers. One Observer per Block was nominated for the survey. Each Observer was to fill a Monitoring Proforma and submit it to the SPD office.

1.9 Reporting

Under NAS 2017, for the first time, results have been reported in the same academic session, as the conduct of the survey. Auto generated District Report Cards (DRCs) were put in public view within two months of conducting the survey. Subsequently, State Learning Reports (SLRs) were also released. National Report to inform Policy, Practice and Teaching Learning (NPPTL) is the final report in the series of reports for NAS 2017.

The reports at all levels i.e. District, State and National focus on student attainment against Learning Outcomes (LOs).

Each LO was measured by one or more items. For each district, 10 District Report Cards were autogenerated. These DRCs pertained to the students' attainment of LOs in different classes and subjects. In the DRCs, the attainment of LOs by the students in the district in a particular class and in a subject is given in percentages. Example of few LOs Class and Subject wise are given in Table 1.4.

Table 1.4: Class and Subject wise LO Exemplars

Class	Subject	Learning Outcomes
III	EVS	Identifies relationship with and among family members
V	Mathematics	Estimates the volume of a solid body in known units
VIII	Language	Reads textual/non-textual materials with comprehension and identifies the details, characters, main idea and sequence of ideas and events while reading

LO wise performance is shown in the DRCs, for example, a District recorded a performance of 46% on a Class III EVS LO (identifies relationships with and among family members). This meant that 46% of correct responses were received in the District for the question/group of questions which measured the LO.

This helps districts in developing interventions for LOs in which districts support the differential planning at the District level.

Low performance in specific LOs could help trigger a relook at the availability and quality of existing Teaching Learning Material (TLM) and Trainings.

Achievement against the tested LOs have been aggregated at the district level in the DRCs. Similar aggregation has been shown at the State level in the SLRs. Analysis of pupil, teacher and school questionnaires have been included in SLRs and the National Report to inform Policy, Practice and Teaching Learning (NPPTL).

With collaboration and support of NCERT, States and Districts are encouraged to design and frame interventions.

1.10 Dissemination and Post NAS Interventions

Several regional workshops are being organized to disseminate and discuss the findings of the DRCs and SLRs. The objectives of these workshop are as follows:

1. To sensitize the participants on how assessment helps to transform education system.
2. To share the experiences of the States/UTs in the conduct of the NAS.

3. To develop a common understanding on how NAS data will be used in policy, planning and improving pedagogical interventions.

NCERT in collaboration with UNICEF also developed a Data Visualization Application, which helps viewers to see the complex NAS data analytics in a simple and user friendly manner.

NCERT has also developed a document on Post NAS Interventions: Communication and Understanding of the DRCs, which clearly articulates the way to interpret and understand the DRCs. The document also lays down the actions which NCERT would take as a follow up of NAS. Follow up steps have been classified under short, mid and long term interventions, as summarized below in Table 1.5.

1.11 Limitations

- As the purpose of NAS was to assess the achievement of Government and Government Aided schools, private schools were excluded from the sample
- Languages across India have differences in Grammar. This leads to difficulty in standardizing the procedures for scoring. Thus, only reading comprehension was tested across classes in the language subject.

Table 1.5: Short, Mid and Long Term NAS Interventions

Duration	Interventions
Short Term	<ul style="list-style-type: none"> • Training of State Level Master Trainers (SLMTs) in communication and understanding of the DRCs
Mid Term	<ul style="list-style-type: none"> • Development of a District level intervention plan • Introducing child centric pedagogy for achievement of the learning outcomes e.g. art and games integrated learning, experiential learning etc. • Strengthening of State Annual Work Plan Budget (AWPBs) by using NAS data • Development of ICT based Learning Resources/Material • Data Sharing with States/UTs
Long Term	<ul style="list-style-type: none"> • Development of National Policy Perspectives • Curriculum Review and Reform



2. Methodology

Well designed and rigorous methods are essential to collect reliable, valid and useful data. NAS data were collected and analyzed using technically robust psychometric standards and procedures, internationally accepted.

This section of the report provides an overview of the activities carried out during the design, administration, analysis and reporting of NAS 2017. Details are provided on test and questionnaire development, sampling, administration and monitoring, data management and analysis, reporting and dissemination.

Figure 2.1: NAS Activities



2.1 NAS Tools Development

a) Development of Assessment Framework

Development of an assessment framework precedes the development of tests and questionnaires in a large scale assessment. Assessment frameworks explicitly define the aim/objectives of the assessment, and what it will cover in terms of content, skills and knowledge.

The assessment framework for NAS 2017 was based on assessing the learning levels of students against class and subject specific Learning Outcomes¹ (LOs). In the year 2017, the union government amended Rule 23(2) under the Right to Education (RTE) Act making it compulsory for all state governments to codify expected levels of learning which students in Classes I to VIII should achieve in different subjects. The present NAS generates detailed report at the district level on the percentage of students achieving these learning outcomes. The district reports helps to develop evidenced based programmes for improving the quality of education. A framework of intervention was suggested to improve the quality of teaching and learning at the schools. The designing and implementation of these interventions included in its ambit the school leaders, teachers and the whole network of officials at clusters, blocks, DIETs, SCERT and the directorate of education at different levels in the States/UTs.

The learning outcome oriented assessment not only helped to make the shift in the focus of student learning from content to competencies. It also helped the teachers to divert their teaching-learning in the desired manner and make responsible and alert for ensuring quality education of other stakeholders especially the parents/guardians, School Management Committee (SMC) members,

community and the state functionaries. The NAS assessment based on learning outcomes helped to guide and ensures the responsibility and accountability of different stakeholders.

The assessment was followed by provision of prompt feedback to all Districts and States/UTs regarding the status of their students' attainment of LOs. States and Districts develop short and medium term interventions on the basis of the obtained feedback. NCERT facilitated the States and Districts to develop short term interventions.

In NAS 2017, achievement of students in relation to gender, location, social category and school management was measured and computed. In addition, questionnaires were administered to students, teachers and school principals to cull out relevant background factors which could be associated with student learning levels.

Both tests and questionnaires comprised Multiple Choice Questions (MCQs). Students of each class were assessed through two test forms. While, each test form of classes III and V comprised of 45 questions, each form of class VIII comprised of 60 questions. Each question was associated with the measurement of one LO. Class III and V students were tested on Language, Mathematics and EVS. Class VIII students were tested on Language, Mathematics, Science and Social Science.

The assessment framework was developed for each subject on the basis of input and feedback received from educationists, teachers, domain experts, item writers, data analysts and assessment experts.

Some exemplar LOs assessed in NAS 2017 are given in Table 2.1.

Table 2.1: Exemplar LOs assessed in NAS 2017

Subject	Learning Outcomes		
	Class III	Class V	Class VIII
Language (Reading Comprehension)	Reads small texts with comprehension i.e., identifies main ideas, details, sequence and draws conclusions	Reads and comprehends independently the storybooks, news items/ headlines, advertisements etc.	Reads textual/non-textual materials with comprehension and identifies the details, characters, main idea and sequence of ideas and events while reading
Mathematics	Reads and writes numbers up to 999 using place value	Applies operations of numbers in daily life situations	Solves problems involving large numbers by applying appropriate operations
Environmental Studies (EVS)	Identifies simple features (e.g. movement, at places found/ kept, eating habits, sounds) of animals and birds in the immediate surroundings	Identifies relationship with and among family members in extended family	
Science			Classifies materials and organisms based on properties/characteristics
Social Science			Explains preventive actions to be undertaken in the event of disasters

¹ For the complete list of tested LOs refer Appendix A

(b) Development of Tools : Tests and Questionnaires

Test development, Review and Finalization

The tools for carrying out any large survey need to be simple, understandable, valid and reliable. To measure the learning levels of classes III, V, and VIII students reliably, the construction of the achievement tests in key curricular subjects was a critically important activity. The tests needed to be pegged at a level wherein these activities measured the abilities of children across all the States. For this assessment frameworks were developed in different subjects. These frameworks described the competencies covered in the tests, the number and type of items used for testing each competency, the structure of the test forms and number of test forms used.

In order to measure each learning outcome with sufficient precision, two test forms were constructed for each class subject wise. A three dimensional grid for indicating the learning outcomes, competencies tested and the difficulty level of items, was prepared.

Item Writing

The item writing process included plenary sessions on subject-specific workshops for writing and reviewing/editing test items.

The general principles followed during the item development workshop are as follows:

- Characteristics of sample-based achievement surveys (national and international)
- Test specifications and their role in test development
- Item writing rules and guidelines
- Procedures and checklists for reviewing the quality of items
- Introduction to classical item statistics
- Filling of three dimensional grid

Item Development Process

Item Development Process calls upon many constituents to guide the process and review the items created. The process for item development consisted of the following steps:

- Writing of Items
- Carrying out Pilot Tests of Items

- Conducting an extensive field trial
- Producing final source versions of all items in regional languages
- Preparing coding guides and coder training material, and
- Selecting and preparing items for the main survey

During the process of item development, focus was placed on the following common rules of item development, such as:

- All options of the item are plausible and mutually exclusive to each other
- Only one option is the correct answer (the key)
- Item dependencies need to be avoided

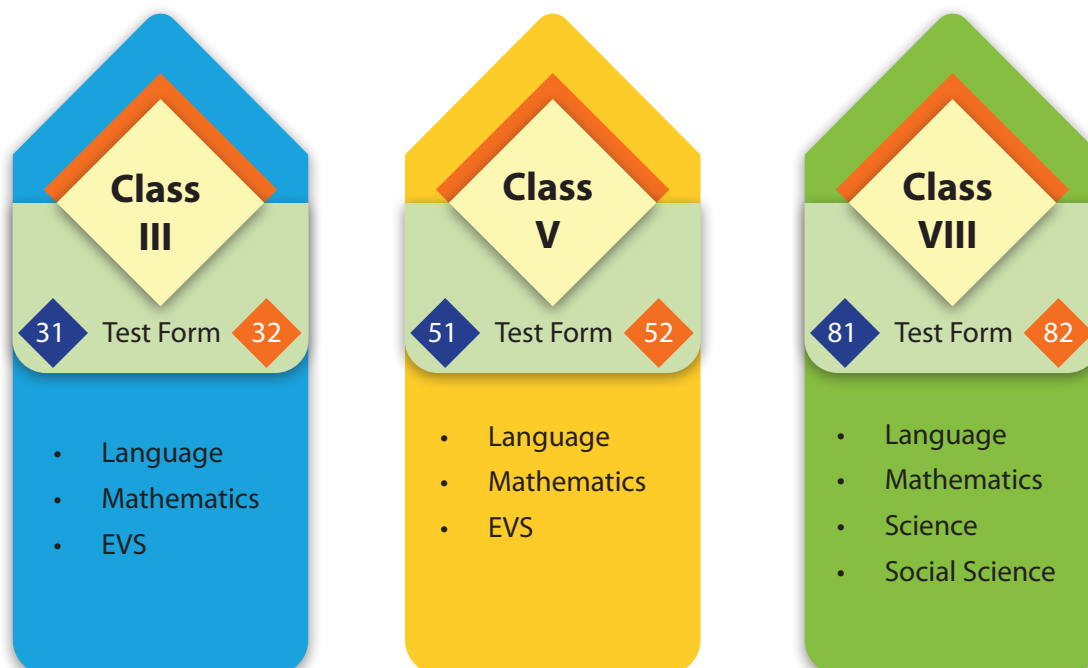
Test items were developed through workshop mode, in consultation with teachers, subject experts and faculty/personnel from different departments of NCERT and assessment agencies. List of workshops for item development are appended in Appendix I.

All test items were written in English, and thereafter translated in Hindi and other regional languages. MCQs were developed for the intended classes and subjects. Each item/MCQ consisted of stem (question) and four options (distractors). The options included only one key (correct answer).

Efforts were made to develop items of varying difficulty levels and complexities, for as many LOs as possible. Illustrations/diagrams were used in a few items to break the monotony of answering the questions for students.

Developed tests were translated and field tested in 6 languages. Optical Mark Recognition (OMR) sheets were used during the field test for recording the responses. Based on the field test results, test questions were extensively reviewed and improved upon. The result of the field tryouts are appended in Appendix H.

Two test forms were developed for each class. Test forms were numbered 31 and 32 for class III, 51 and 52 for class V and 81 and 82 for class VIII. Each test form for classes III and V consisted of 45 items. 15 test items were in each subject Language, EVS and Mathematics. Class VIII test forms consisted of 60 items each. 15 test items in each subject Language, Mathematics, Science and Social Science. For each

Figure 2.2: Details of Test forms

subject, first 5 items were kept common across both the test forms e.g. in test forms 31 and 32, first five items for each subject were common¹. (Figure 2.2)

Classes III and V students were given 90 minutes to complete the test. Class VIII students were provided 120 minutes for test completion.

Questions with appropriate difficulty level (0.20 to 0.80) and discrimination index (more than 0.25) were included in the final test forms.

Questionnaire Development

Three Questionnaires were developed for NAS 2017 – Pupil Questionnaire (PQ), Teacher Questionnaire (TQ) and School Questionnaire (SQ).

PQ consisted of 21 questions pertaining to the home background of students including questions on parents' level of education and occupation; help available at home for studies from parents and liking of subjects and participation in classroom activities etc. (www.ncert.nic.in/programmes/NAS/pdf/Pupil_Questionnaire.pdf)

TQ comprised of 20 questions covering information related to the age of teachers, educational and professional qualifications, experience, training programmes attended, classroom transaction

practices affecting students absenteeism, classroom indiscipline etc. (www.ncert.nic.in/programmes/NAS/pdf/Teacher_Questionnaire.pdf)

SQ sought information on 9 questions regarding awareness and sharing of the LO document amongst teachers, presence and usage of school library, monitoring of school activities etc. (www.ncert.nic.in/programmes/NAS/pdf/School_Questionnaire.pdf)

Translation and Vetting of Tests and Questionnaires

NCERT developed the test items in English, which was the source language. In order to collect nationally comparable data, the equivalence of regional language versions was required. This means that the translation of materials met the stringent quality standards in each of the state language. Tests were translated in 20 languages. List of languages in which the test got translated is given in Appendix B.

States translated the tests and questionnaires in different languages. A comprehensive translation guidelines were provided to States by NCERT for carrying out translation.

The guidelines laid out general translation rules such as those used to adapt fictional and non-fictional names, mathematical expressions, adapting scientific terms, etc.; item-specific translation rules

¹ The process of including common/same questions across test booklets is called anchoring. Under Item Responses Theory (IRT) anchoring helps to link different forms.

e.g. maintaining a pattern of synonym, dealing with idioms/phrases, dealing with situations where an adaptation should/should not be made for example using local names, etc.

Translated tests were vetted by NCERT. State officials had to physically carry the tests to NCERT, where each page of test was ratified by NCERT and officially approved. Only NCERT approved tests were sent for printing by the States/ UTs.

2.2 Sample

Sample frame of NAS 2017 consisted of government and government aided schools. District was the unit of reporting.

Nearly 2.2 million children studying across classes III, V and VIII of government and government aided schools were tested under NAS 2017.

School samples were drawn in each district using the Probability Proportional to Size (PPS) sampling procedure. Selection of students was done through random sampling procedure. District wise school lists were provided to States/ UTs by NCERT one month before the test administration. The details of school sample design and student selection procedure are provided in the Operational Guidelines-cum-Training Manual. (www.ncert.nic.in/programmes/NAS/pdf/Operational_Guidelines_Training_Manual.pdf)

2.3 Data Management

A web application was developed by NCERT to collect and collate NAS 2017 data and subsequently produce DRCs. Preliminary levels of cleaning prior to the DRC generation was also done through the web application.

Optical Mark Recognition (OMR) sheets were used to record achievement and questionnaire data in NAS 2017. OMR sheets were scanned and uploaded at District level. Upon completion of the survey, OMR sheets were scanned and converted into .CSV files. These files were cleaned using an offline tool and uploaded into the web application by the Districts and States/ UTs.

Database generated through the web application were cleaned before merging and analysis. Completely cleaned files from different sources (student responses, and response of students, teachers, and schools on questionnaires) were later merged together for analysis using both Classical Test Theory (CTT) and Item Response Theory (IRT).

An in-depth Data Capture Manual was also shared with Districts and States/UTs to facilitate the process of scanner procurement, OMR design and printing, scanning and processing of data etc.

2.4 Trainings

A State level orientation of State Coordinators was provided by NCERT. For the first time NCERT trained District and MIS Coordinators on NAS procedures between 31st August to 18th September 2017. Eight regional workshops were organized across the country to train the DCs and MIS Coordinators.

Training was provided on the following aspects of NAS administration:

- Roles and responsibilities of different personnel involved in NAS administration.
- Sampling of section and students.
- Administration of test and questionnaires.
- Test monitoring.
- Data cleaning and uploading etc.

Sessions on all the above aspects were conducted in an interactive and activity-based mode, with the use of demonstration and group work as facilitation techniques. A comprehensive set of training material was shared with training personnel prior to the trainings for an enhanced understanding of NAS processes. Training material consisted of Power Point Presentation on NAS administration and videos on roles and responsibilities of stakeholders.

Upon being trained, DCs further trained FIs using the material shared with them during the District Level Workshops. List of District-level workshops are appended in Appendix I. DCs were also instructed to use interactive methods to train the FIs. (www.ncert.nic.in/programmes/NAS/Training.html)

2.5 Data Analysis

Within the domain of psychometric theory, two approaches are used for analyzing test data i.e. Classical Test Theory (CTT) and the Item Response Theory (IRT).

Under CTT, raw percentages of correct responses are used to measure students' abilities and item difficulties. However, the linkages between students scores and item difficulties are not clear in CTT.

IRT models emphasize on estimating each student's ability and make inferences about each student's ability level on an underlying construct being tested.

A construct is a latent trait such as intelligence, motivation or language ability, which can be indirectly measured through scores on tests and questionnaires.

Unlike CTT, where student ability is expressed within the boundaries of 0 - 100% correct responses on a test, a latent trait in IRT is measured on an infinite continuum, where the measurement unit is denoted as a logit.

IRT uses a mathematical model to link a student's probability of responding correctly to a particular item, thus taking care of the two main factors, i.e. the student's level of ability and the item's level of difficulty. Therefore, analysis in IRT is more complex than traditional methods like CTT. IRT uses the concept of an Item Characteristic Curve (ICC) to show the relationship between students' ability and performance on an item.

In Table 2.2, students' responses on 5 items have been indicated.

First student answers all five items correctly and is tentatively considered as possessing 100% proficiency. Similarly, second and third student are attributed to have 80% and 60% proficiency levels. However, under IRT, the above assertions are considered tentative.

Student's abilities cannot be judged based on the number of correct items alone. For accurate ability estimation, item attributes such as discrimination/difficulty also need to be taken into account. For example, two children (student 6 and 8) get the same raw scores on a test (shown in Table 2.3). However, it is difficult to state that, whether both the students have the same level of proficiency attainment. The eighth student may have answered two easy items correctly and the sixth student may have answered two difficult items correctly. Hence, both the item attributes and the examinee proficiency need to be measured before estimating student performance.

CTT can help us get estimate only 'tentative item difficulty' and 'tentative student proficiency levels'. In IRT, tentative proficiency and item difficulty levels are used to fit a model, which is then employed to predict the data. Given the proficiency level of a student, the probability of answering a particular item correctly is computed by the following equation:

$$P_{ij} = \frac{1}{1 + \exp[-(\theta_i - b_j)]}$$

Where P_{ij} is the probability of the examinee, i^{th} ability θ_i and item difficulty is given by b_j (being successful on the j^{th} item)

Table 2.2: Item wise Raw Responses of Students

	Item 1	Item 2	Item 3	Item 4	Item 5	Average
Student 1	1	1	1	1	1	1
Student 2	0	1	1	1	1	0.8
Student 3	0	0	1	1	1	0.6
Student 4	0	0	0	1	1	0.4
Student 5	0	0	0	0	1	0.2
Average	0.8	0.6	0.4	0.2	0	

Table 2.3: Item wise Raw Responses of Students

	Item 1	Item 2	Item 3	Item 4	Item 5	Average
Student 6	0	0	0	1	1	0.4
Student 7	0	0	0	0	1	0.2
Student 8	1	1	0	0	0	0.4

Advantages of IRT over CTT

IRT has many advantages over CTT. Few advantages are given below: -

- IRT measures the learning ability of students regardless of the different levels of tests difficulty, by calculating the probability of a student to respond to an item correctly
- IRT analysis places students and test items on the same numerical scale and this helps us to create meaningful 'maps' of item difficulties and student abilities
- In IRT, the difficulty of an item does not depend on the group of test takers
- Multiple test booklets can be used in IRT to increase the measurement points in any subject and the booklets can also be linked
- Use of IRT in NAS 2017 will help to compare scores across tests which will be used in different NAS cycles. This will help in monitoring progress of the health of the Indian education system over time.

Use of IRT in NAS 2017

The IRT scaling approach used for NAS has been similar to that used in the international survey Trends in Mathematics and Science Study (TIMSS). This was originally developed in the US by Educational Testing Service (ETS) for use in the National Assessment of Educational Progress (NAEP) and in the UK by the National Foundation for Educational Research for the Assessment of Performance Unit (Beaton [ed.], 1987; Foxman, Hutchison and Bloomfield, 1993). The psychometric model was used in scaling the Classes III, V and VIII (NAS) data and for this commercially available software was used in order to apply IRT models.

In order to calibrate the test items, the 2-PL model was used in NAS. Under assumptions of the 2-PL model, the probability of a response to an item is modeled based on the examinee's ability, the item difficulty and the item discrimination. This model was chosen over the 1-PL or Rasch Model because the inspection of the item characteristics showed that the item discriminations were not comparable across the pool of items (an assumption of the Rasch model). Furthermore, the 2-PL was chosen over the 3-PL model because the 3-PL model has stricter assumptions over the other models, and also has higher requirements with respect to sample size and coverage of the ability distribution for obtaining reliable estimates of item parameters, in particular the guessing parameter. This results in unstable and

For district and state level reporting, the learning achievement data are analyzed using Classical Test Theory (CTT) where average scores are reported simply as the percent of correct answers/responses. While at national level, data are analyzed by using IRT.

often inestimable parameters for some of the test items. Considering these limitations, the 2-PL offered a widely acceptable compromise between the lesser and the more restrictive IRT models available.

The following section includes details on the major types of IRT models, item fit, reliability and the key IRT procedures followed to analyze NAS 2017 data:

a) IRT Models

Owing to the highly complex nature of an IRT analysis, it is beyond the scope of this report to include in detail all the steps taken to analyze NAS 2017 data through IRT.

Item response models are classified on the basis of item parameter(s) used in it. Some of them are described as under:

- One- parameter model: It includes only the item difficulty parameter (b)

The expression for P_{ij} the probability of the examinee, i^{th} ability θ_i , being successful on the j^{th} item, difficulty b_j is given by

$$P_{ij} = \frac{\exp(\theta_i - b_j)}{1 + \exp(\theta_i - b_j)}$$

$$= \frac{1}{1 + \exp[-(\theta_i - b_j)]}$$

There is only one parameter for each item, namely the difficulty b_j . The one parameter logistic model is mathematically equivalent to the Rasch model (Andrich, 1988).

- ii. Two-parameter model: It includes difficulty (b) and discrimination (a) of the item. The expression for P_{ij} the probability of the i^{th} examinee, ability θ_i , being successful on the j^{th} item, difficulty b_j is given by (Thissen and Wainer, 2002)

$$P_{ij} = \frac{\exp[a_j(\theta_i - b_j)]}{1 + \exp[a_j(\theta_i - b_j)]}$$

$$= \frac{1}{1 + \exp[-a_j(\theta_i - b_j)]}$$

This is comparable to the 1-PL model with the addition of a scaling or slope parameter a_j which varies between items. (This parameter is related to the item's power of discrimination across the ability scale.)

- iii. Three-parameter model: It includes item difficulty (b), item discrimination (a), and guessing (c).

The expression for P_{ij} the probability of the i^{th} examinee, ability θ_i , being successful on the j^{th} item, difficulty b_j is given by (Thissen and Wainer, 2001)

$$P_{ij} = c_j + (1 - c_j) \frac{\exp[a_j(\theta_i - b_j)]}{1 + \exp[a_j(\theta_i - b_j)]}$$

$$= c_j + (1 - c_j) \frac{1}{1 + \exp[-a_j(\theta_i - b_j)]}$$

Where a_j is a scaling parameter which varies between items, and c_j is the lower asymptote, or 'pseudo-guessing' parameter.

Generally, two important functions are derived from IRT parameters that are used to explain how well a test is functioning. These functions are as follows:

- Test Characteristic Function: It represents the average of all ICCs on the test,
- Test Information Function: It reflects the test's reliability by providing the overall test precision information.

Both test characteristic function and test information function play a critical role in test development and test evaluation.

b) Model Adoption

Different IRT models are used for analyzing test data. Each model is based on a particular parameter.

The 1PL model also called the Rasch model links student's ability to a single item parameter i.e. item difficulty. The 2PL model associates student's ability to both item difficulty and item discrimination. The 3PL model links student's ability to item difficulty, item discrimination and a guessing parameter for each item.

2PL and 3PL models are also called the Birnbaum models. The general form of the Birnbaum models is given below:

$$P_{in}(O_n, \delta_i) = c_i + (1 - c_i) \frac{e^{a_i(\theta_n - \delta_i)}}{(1 + e^{a_i(\theta_n - \delta_i)})}$$

The 2PL IRT model has been used to analyze NAS 2017 data.

c) Item Fit

The fit of the 2-PL model to the items was examined graphically using a chi-squared fit index and this was done on a state to state basis. Items identified as problematic were investigated to see if there were any faults and these were rectified wherever possible. Moreover, if it proved impossible to make changes in the item, then that item was dropped from the scoring for the state concerned.

d) Reliability

Reliability of the test score scales was estimated from the IRT scaling BILOG (Zimowskiet al, 1996) runs. For simplicity and familiarity the marginal reliability coefficient is quoted here, rather than showing test information graphs (Thissen and Wainer, 2001). This is given by

$$\bar{\rho} = \frac{\sigma_{\theta}^2 - \sigma_e^2}{\sigma_{\theta}^2}$$

Where σ_{θ}^2 is the variance of the test score scale in the sample and σ_e^2 is the mean error variance of scores; both available from BILOG output.

e) Item Parameters

Item parameters such as item difficulty and discrimination are computed both within CTT and IRT.

Table 2.4 shows a common interpretation of discrimination values with respect to quality of an item.

Item Discrimination (The a Parameter)

A good test item should elicit more correct answers from high-ability children than lower-ability children

Table 2.4: Discrimination Values and Interpretation

Discrimination Value	Interpretation
>0.40 (>40%)	Strong, positive discrimination
0.25–0.40 (25%–40%)	Moderate, positive discrimination
0.10–0.25 (0%–25%)	Weak discrimination
=0.00 (0%)	No discrimination
<0.00 (<0%)	Negative discrimination

As a precursor to scaling, item statistics were reviewed specifically for difficulty, discrimination and bias towards any particular group/language (i.e. Differential Item Functioning). Item person maps were used to assess whether tests were aligned/ targeted to the ability of the students (i.e. test targeting). The fit of the 2-PL model to the items was examined graphically using a chi-squared fit index on a state to state basis.

Test Reliability was estimated using the following formula

$$\bar{\rho} = \frac{\sigma_{\theta}^2 - \sigma_e^2}{\sigma_{\theta}^2}$$

σ_{θ}^2 is the variance of the test score scale in the sample and σ_e^2 is the mean error variance of scores.

i.e. an item should discriminate between high and low ability children. The a parameter expresses how well an item differentiates among children with different ability levels. It is computed by studying the correlation between the right/wrong scores that children receive when their scores are summed up across the remaining items. Good items usually have discrimination values ranging from 0.5 to 0.7.

An ICC, with a steep slope represents a high discrimination value which further indicates that

higher-scoring students tend to answer the item correctly, while lower-scoring students tend to answer it incorrectly.

Item Difficulty (The b Parameter)

Item difficulty is measured by calculating the percentage of students who answer an item correctly. e.g. if, out of 100 students only 30 students were able to correctly respond to an item, then the item difficulty is adjudged to be 0.3 (30/100). Item difficulty is denoted by letter p.

Table 2.5: P-Values and Interpretation for dichotomous items

P-Value	Interpretation for dichotomous items
1.00	Items are extremely easy (everyone gets it right)
0.80	Items are easy (80% get it right)
0.50	Items are of medium difficulty (half get it right; half get it wrong)
0.30	Items are difficult (70% get it wrong)
0.00	Items are very difficult (everyone gets it wrong)

f) Test Linking and Test Equating

The process of placing two or more tests forms on a common scale is called linking. Linking can also be done to different test forms of the same test. Linking can be carried out following any of the procedures given below:

- Single-group design: This design links two tests by administering each test to the same group of students
- Equivalent-groups design: This design links two tests by giving the tests to equivalent but not identical groups of students who have been randomly chosen
- Common-person design: This design links two tests by giving each test to two groups of students, where there is a common group of students taking both tests.
- Anchor-test design: This design links tests by having a set of common items in each test. The two tests are administered to different groups of students.

In NAS 2017, tests were linked by placing common items across the two forms of each class. Tests were also equated. Items were calibrated using the strategy that centers the mean of item difficulties to zero and evaluates the distribution of ability estimates in relation to the mean of item difficulties.

Test forms are equated to adjust for differences in difficulty levels. This process is called test equating. Both, separately developed tests/test forms or alternate forms of the same test can be equated. However, different tests/forms should be measuring the same constructs. Raw scores on a different test form are adjusted to consider the differences in form difficulty from a base or reference form.

If different groups of students are administered different test forms either simultaneously or at different times, then the difference in average performance on the two forms could be both due to differences in group abilities or form difficulties. To isolate and quantify the difference in form difficulty, a common set of test questions called anchor items are included in all the test forms. Children in different groups answer the same set of anchor items. Difference in average performance on these anchor items indicate differences in group abilities. When the difference in group abilities is quantified and removed from the difference in children's average performance on different forms, the remaining figure for average performance indicates the difference in form difficulty.

g) Student Ability Estimation

Post adjustment for item difficulty levels, student ability scores are computed. Two types of commonly used student ability estimates in IRT are point estimates and plausible values.

Point Estimates

The process of producing a single ability estimate based on the score obtained on a particular set of items is called the Maximum Likelihood Estimation (MLE). Another type of point estimate which is frequently used is called the Weighted Maximum Likelihood Estimate (WLE). WLE corrects some bias in the MLE.

Plausible Values (PVs)

The most likely range in which a student's true ability lies is called the posterior distribution. PVs are random draws from the posterior distribution of scores. Usually a set of 5 PVs, are drawn for each student for each scale or subscale and then average to provide an estimate of student ability.

In NAS 2017, student scores were determined by means of the IRT 'pattern-scoring' approach, where a pattern of student responses to items is used to estimate the latent ability (i.e., knowledge and competencies) underlying students' test performance. The techniques used for ability estimation was based on the Weighted Maximum Likelihood (WML) method, which is widely supported in research literature

h) Scaling

For computing comparable scores across various test forms, a process known as Scaling is used. In scaling, raw scores are transformed into a new set of scores by using either linear or nonlinear method. The converted scores are called as Scaled Scores. In IRT, results are reported using scaled scores.

Scaled scores are computed by statistically adjusting and converting raw scores into a common scale to account for differences in difficulty across different test forms.

For example, on an easier test form, a student needs to answer slightly more items correctly to get a particular scaled score. But in case of a difficult test form, a student will get the same scaled score, if the student has answered slightly less number of questions correctly.

In NAS 2017, the IRT ability estimates are independent of any set of items, which means that, when the item parameters of multiple test forms (item sets) are calibrated to the same scale, the scores from multiple test forms obtained by pattern-scoring are directly comparable. The IRT scores were initially generated in the logit metrics, and then they were linearly converted into a meaningful and publicly communicable scale that facilitates score interpretation. The reporting scale was set to the range of 100-500 with a mean of 300 and standard deviation of 50. Thus, the linear transformation from ability estimates expressed on the logit scale to the reporting scale scores was conducted using the expression: $\text{Scale Score} = \text{Logit Score} * 50 + 300$.

Tests are equated and thereafter 'scaled'.

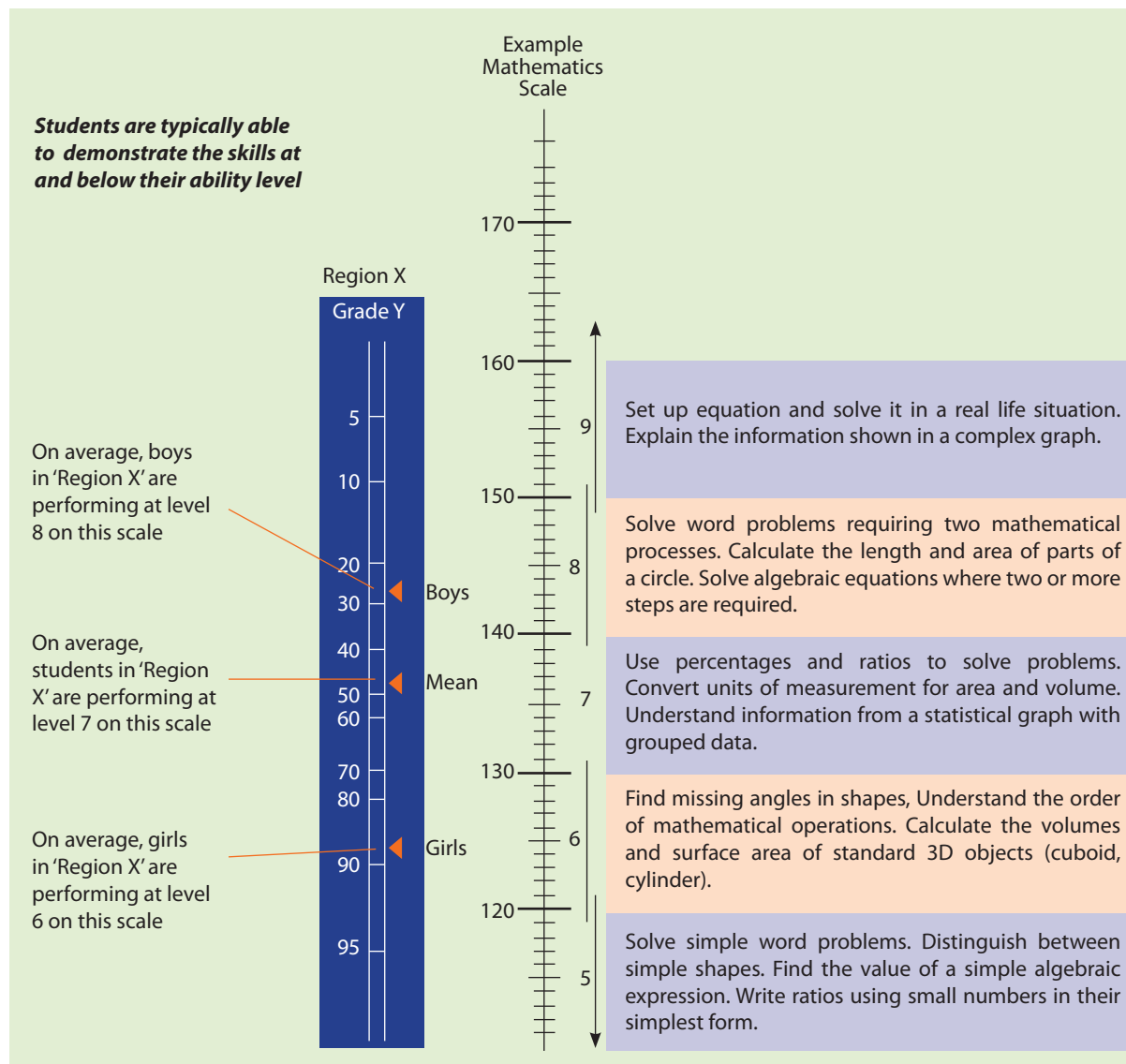
Scaled scores are used internationally in large scale assessments. They help to meaningfully interpret large scale assessment data, specifically when multiple tests forms are used.

Various IRT specific software packages place items on a continuous scale measured in logits. After the equating and scaling processes, the scores in logits are transformed to a scale with a chosen mean and standard deviation by applying a linear transformation.

i) Proficiency Band Development

Large scale assessment results can help to monitor trends in student performance over time. Proficiency bands are created by using the metric (numeric score) established by the scale and adding qualitative

Figure 2.3: Proficiency Bands (Exemplar)



descriptions to the same. The descriptions synthesize the item contents within each level. A proficiency scale can be used to make comparisons between different sub-groups of students across states. Proficiency bands provide a convenient way to describe profiles of student achievement. Children whose results are located within a particular level of proficiency are expected to understand the competencies and skills associated with that and lower levels.

An exemplar proficiency band is given in Figure 2.3.

Proficiency bands and levels have been determined in NAS 2017

j) Associating Achievement with Background Factors

Associations between children, teacher and school related background factors with student achievement have been explored using multiple regression models. Indices and indicators developed using the questionnaires were regressed upon student achievement.

Regression analysis refers to a set of techniques for predicting an outcome variable using one or more explanatory variables.

In NAS 2017, student achievement was the outcome variable and indices derived from questionnaires were the explanatory variables.

Student Achievement has been associated with student, teacher and school background factors in NAS 2017

k) Weights, Standard Errors and Replications

On several occasions, samples do not accurately represent the population and therefore increase the chances of producing biased population estimates. To reduce the bias in the sample a correction technique called weighting is used.

Weights may need to be applied in situations where there is over or under representation of certain types of schools, high non response rates and over sampling of some explicit strata etc.

Accuracy of a sample statistic as an estimate of an unknown population parameter is assessed through standard errors. Standard errors are computed through the following formula:

$$\sigma_{(\hat{\theta})} = \sqrt{\sigma^2_{(\hat{\theta})}}$$

This formula assumes use of Simple Random Sampling (SRS). Large scale assessments including NAS use complex sampling procedures. To ensure unbiased estimates of Standard Errors (SE) are generated, SEs are computed using the Jackknife Repeated Replication technique (JRR).

The general application of JRR entails systematically assigning pairs of schools to sampling zones. Following this, while one of the schools is selected at random to have its contribution doubled, the other school in the pair has its contribution set to zero. This constructs a number of 'pseudo-replicates' of the original sample. Conclusively, the statistic of interest (e.g. the state's mean achievement score) is computed once for the entire original sample and once again for each jackknife pseudo-replicate sample. The resultant variation between the estimates for each of the jackknife replicate samples and the original sample is the jackknife estimate of the sampling error of the statistic.

The jackknife sampling estimate for the sampling variance is given by the following equation:

$$V_{jrr}(t) = \sum_{h=1}^H [t(J_h) - t(S)]^2$$

where H is the total number of sampling zones in the sample of the State/UT under consideration. The term t(S) corresponds to the statistic of interest for the State/ UT computed with the overall sampling weights unchanged.

Data has been weighted in NAS 2017. SEs and necessary replications have been applied.



3. Sample Design and Procedures

In any research study, sampling plays a crucial role in providing reliable estimates of population parameters. There were three Classes namely III, V and VIII for which NAS was conducted. The descriptions in this chapter are confined to Class III, however the same procedure was followed for Classes V and VIII. In this section of the report, details are provided on defined and desired target population at national and district level, the construct of stratification, national sampling plan, school sampling frame, sampling of schools and sampling of students.

3.1 Target Population: Definition

National Desired Target Population

National *desired* target population includes all students enrolled in Class III, V and VIII in Government and Government aided schools. In simple terms, the national *desired* target population includes full coverage of all eligible students studying in Classes III, V and VIII in Government and Government aided schools as part of Indian education system.

National Defined Target Population

The national *defined* target population is the national desired target population minus certain exclusions. The schools having enrolment less than 5, invalid school categories and invalid medium of instruction were removed from the district sampling frame for all districts in Class III. Similar exclusions were carried out separately for Classes V and VIII.

District Desired Target Population

District *desired* target population includes all students enrolled in Classes III, V and VIII in Government and

Government aided schools in a particular district.

The District *desired* target population is described in Appendix C. In cases, where this population deviates from the full District coverage of all eligible students, the deviations were described and enrolment data was provided to measure the extent of the reduced coverage. Any deviations, in terms of reduced coverage, from the national target population are presented in this national report.

District Defined Target Population

The District *defined* target population is essentially the school sampling frame. Any differences between the District *desired* and *defined* target populations that arose out of practical considerations were kept to a minimum. It was ensured all exclusions must not exceed 5% of the District *desired* target population. Districts that exceeded this limit are annotated in the National Report.

Exclusions

The District Defined Target Population represented a subset of the District Desired Target Population. All

Example 1: District Desired Target Population and Defined Target Population

Desired Target Population	
Total No. of Schools	Total Enrolment
911	67194

Defined Target Population

Exclusion Category	Values to be Excluded	Total number of Schools	Total Enrolment excluded	% of Exclusions	Comments
Invalid School Category	7,8,10	0	0	0.00	
<5		5	21	0.031	
Total Exclusion		5	21	0.031	It Should be less than or equal to 5%
Total Inclusion		906	67173	100%	

The Total Defined Target Population is 906 schools with enrolment of 67173 students

the excluded schools and students from the District Desired Target Population form the District Defined Target Population and are referred to as the excluded population.

Usually, practical reasons are involved for excluding schools and students, such as increased survey costs, increased complexity in the sample design and difficult test conditions. Exclusions can occur at the school-level, i.e. entire schools are excluded, or within schools, i.e. specific students within sampled schools, or sections, are excluded.

School Level Exclusions

School-level exclusions are documented in Appendix C. The schools were excluded for the following reasons:

- They were geographically inaccessible
- They were of extremely small size
- They offered a curriculum or school structure, radically different from the mainstream educational system

Note: The target population was limited to schools that contained the target class. Schools that did not contain the target class were therefore not considered part of the excluded population.

Coverage and Exclusions

The distinctions among the National Target Population, District Desired and District Defined Target Population can be nebulous. Example 2 and 3 illustrate District Defined Target Population and State Defined Target Population respectively.

Example 2: District Defined Target Population

The following is a fictitious example of a District Defined Target population.

In this example, State A has chosen to exclude the South Island because of its remote location and very small schools because of its reduction in sample yield. These school level exclusions accounted for 3.1% of eligible students in the District Desired Target Population.

Example 3: State Defined Target Population

The following is an example of a State Defined Target Population using the data for the State.

In this example, the State has chosen to exclude very small schools (schools with less than 5 students), because of its reduction in sample yield and schools with invalid management. These school-level exclusions account for 0.1% of eligible students in the State Desired Target Population.

No anticipated within-school exclusions were reported.

In this survey, it was aimed to achieve full coverage of the National Target Population among all participating Districts and strived to keep all exclusions to minimum. The difference between the National Target Population and District Desired Target Populations is labelled as “exclusions from District coverage”. As a guiding principle, only a sizeable exclusion of the target population, whereby the remainder could be succinctly described and in a coherent manner was considered.

All other sources of exclusions would constitute exclusions from the District Desired Target Population. Exclusions therefore, describe the difference between the District Desired and District Defined Target Population. Ultimately, the District Effective Target population is the population that the sample of participating students effectively represents, after all sources of exclusions have been taken into account.

The term “within-sample exclusions” is used to describe exclusions found among the sampled schools, sections and students. All within-school exclusions will fall in this category. The sizes of the District Effective Target population and within-sample exclusions were estimated from the weighted sample.

3.2 Stratification

Overview

Prior to sampling, schools were ordered or stratified, in the sampling frame. Stratification consisted of grouping schools into strata according to some grouping or stratification variables. Stratification is generally used to improve the efficiency of the sample design, thereby making survey estimates more reliable. Stratification variables using District data are explained in Example 4.

Example 4: Stratification using District Data

The following is an example of the stratification variables using a District’s data.

‘District’ was defined as explicit stratification variable and five implicit stratification variables and their levels are listed in order of importance:

1. Block- This variable refers to the 17 blocks within this District.
2. School Management- This variable refers to the two major school management groups in the District: Government and Government aided.
3. Location- This variable refers to the two main locations of schools: Rural and Urban.
4. Medium of Instruction- This variable refers to two medium of instruction, namely Hindi and Urdu across schools of this District.
5. School Type- This variable refers to the gender composition of schools in the District, i.e., co-educational, all boys and all girls schools.

The District defined a total of one explicit stratum and five implicit strata with various levels per explicit stratum, for a total of 408 implicit strata.

There are two types of Stratification: Explicit and Implicit.

Explicit Stratification

Explicit stratification consisted of building separate school lists or sampling frames, according to the set of explicit stratification variables under consideration. For example, District as an explicit stratification variable was considered, thereafter separate school sampling frames were constructed for each District. A

constant sample size was then applied to each school sampling frame to select the sample of schools.

In this survey, the major reason for considering explicit stratification was to implement a disproportionate allocation of the school sample to the explicit strata. For example, the same number of schools were sampled from each explicit stratum, regardless of the relative size of each stratum. The objective in this situation was to produce equally reliable estimates for each District.

Another important reason for defining explicit strata was to deal with specific sample design issues. For example, explicit strata might be required to deal with very large schools (very large schools are discussed in following section).

Implicit Stratification

Implicit stratification consisted of sorting the schools uniquely by a set of implicit stratification variables. It is a very simple way of ensuring a strictly proportional sample allocation of schools across all implicit strata. It also leads to improved reliability of survey estimates, provided the implicit stratification variables being considered are known to have a significant between-strata variance component. The details are shared in Table 3.1 below :

Table 3.1: Stratification Parameters

Explicit Stratification	Implicit Stratification
District	<ul style="list-style-type: none"> • Block • Area • Management • Type of School • Medium of Instruction

3.3 The National Sampling Plan

Introduction

NAS Class III, V and VIII has set high standards for sampling precision, participation rates and implementation of sampling plans. These standards resulted in samples of the highest quality and consequently survey estimates which are unbiased, accurate and nationally comparable.

Effective Sample Size

The NAS Class III, V and VIII standard for sampling precision required that all District samples achieved an effective sample size, for the main criterion variables, of at least 500 students. In other words, all District samples should yield sampling errors that are no greater than the sampling errors that would be obtained from a simple random sample of 500 students.

Since, NAS Class III, V and VIII also produce data at the school and section levels, a minimum of 61 schools for class III and V and 51 schools for class VIII were selected from each participating District.

The NAS Class III, V and VIII sample design is a two-stage stratified cluster sample, which is far more efficient than a simple random sample. The actual sample sizes were therefore much larger than 500 students.

Participation Rates

The NAS Class III, V and VIII required maximum participation rates for schools and students. This requirement minimised the potential for response biases.

Schools

NAS Class III, V and VIII required a minimum participation rate of 85% of sampled schools. Non-participating sampled schools were substituted with "replacement schools" to meet sample size requirements. The use of replacement schools did not guarantee that potential response biases have been reduced. Districts were encouraged to persuade as many sampled schools as possible to participate in the Main Survey. The criteria for selection and use of replacement schools is described later.

Sections

Section participation rates were not computed, since generally only one section per school was sampled and a non-participating section resulted in the non participation of school itself. It is important to mention, however, that the substitution of sampled sections was not allowed.

Students

NAS Class III, V and VIII also required a minimum participation rate of 85% of students among participating schools. Student participation rates were calculated over all participating schools, whether sampled schools or replacement schools. The student participation rate requirement of 85% was met at the District level.

Reporting Participation Rates

District participation rates are presented in the NAS Class III, V and VIII report. They include:

- Weighted and unweighted school participation rates with and without replacement schools (minimum 85% required without replacement schools)
- Weighted and unweighted student participation rates (minimum 85% required)
- Weighted and unweighted combined school and student participation rates, i.e., the product of the school participation rate and the student participation rate

Sample Design Framework

The sampling design used for NAS 2017 classes III, V and VIII survey is a two-stage stratified cluster sample design. District sampling plans relied on sound and defensible sampling methods. These methods are briefly described in the following points:

- For the first stage of sampling, schools were stratified, explicitly and/or implicitly, and selected with probabilities proportional to size (PPS). The sampling method used is called a PPS systematic sampling method
- The second stage of sampling consisted of the selection of section, if there are more than one section, from each sampled school

3.4 School Sampling Frame

School Measure of Size

A suitable school measure of size (MOS) is a critical component of a school sampling frame, since school selection probabilities are based on this MOS. Possible school MOS, in decreasing order of suitability, are:

1. Student enrolment in the medium of instruction;
2. Student enrolment in the target class;
3. Average student enrolment per section, i.e., total student enrolment divided by the number of sections in the school;
4. Number of sections in the target class;
5. Total student enrolment.

In NAS 2017, we have used Total student Enrolment as Measure of Size (MOS). The enrolment data used was of DISE 2015-16.

The Sampling Frame

The sampling frame consisted of a comprehensive list of schools from the District. Each school entry in the frame included the following:

- a unique national school ID i.e. UDISE Code
- school contact information such as name, physical address, email address, phone number, etc.
- all explicit stratification variables
- all implicit stratification variables
- a school measure of size

School Sample Allocation

For the Main Survey, a minimum of 61 schools for class III and V and 51 schools for class VIII were sampled from each participating District.

Excluding Schools From the Sampling Frame

Based on the information reported in Example 1 (National Defined Target Population), some schools were excluded from the school sampling frame.

Sorting the Sampling Frame

Each school in the sampling frame was assigned a value for each implicit stratification variable. For example, if location (rural or urban) and school management (government and government aided) are used, each school was classified as either rural or urban and as either government and government aided.

The school sampling frame was then sorted by the implicit stratification variables. The schools were first sorted by the first implicit stratification variable, then by the second implicit stratification variable, and so on, until all the implicit stratification variables had been exhausted. The result was a cross-classification structure that represented the implicitly stratified school sampling frame.

Very Large Schools

The District sampling frame contained schools wherein MOS was greater than the calculated sampling interval. In theory, this would mean that some of these very large schools are sampled more than once. This situation could be problematic during survey operations as this would require sampling more sections in those schools. It also complicates the data base design and computation of sampling weights. In order to avoid these problems, an explicit stratum of very large schools was constructed. This stratum contained all schools wherein MOS was greater than the calculated sampling interval.

Identifying Replacement Schools

It is not always possible to obtain the participation of all sampled schools. In order to avoid the resulting sample size losses, a mechanism of Field verification of Schools was adopted to identify a priori replacement schools for non-participating sampled schools. Another, perhaps more important, reason for identifying replacement schools a priori was to avoid the haphazard use of alternate schools as replacements, which may amplify response biases. Although this approach does not necessarily avoid non-response bias, it tends to minimise the potential for bias. Furthermore, it is conceptually more palatable than over-sampling to accommodate a low participation rate.

The Districts were asked to make every effort to get as many of the sampled schools to participate as possible. In some cases, however, districts needed to consider the use of replacement schools. To allow for this, wherever possible, each sampled school in the Main Survey was assigned two replacement schools in the sampling frame.

3.5 Sampling of Schools

Overview

This section describes how to select the sample of schools. It is presented as a series of operational steps leading to the selection and identification of

all sampled schools. The school sampling method is described as a PPS systematic sampling method.

For each sampled school, where possible, up to two replacement schools were identified. Although the replacement schools serve as possible substitutes for non-cooperating schools, Districts were asked to keep their use to a minimum by ensuring the highest possible participation rate for sampled schools.

Schools were selected once the school sampling frames were sorted, according to the implicit stratification variables and had been constructed for each explicit stratum. School samples were selected separately for each explicit stratum, with each explicit stratum having its own sampling frame. Each school entry in the sampling frame contained:

- a unique national school ID (this should be numerical),
- school contact information such as name, physical address, email address, phone number, etc.,
- all implicit stratification variables
- a suitable school measure of size

☞ BEFORE progressing further, It was ensured that sampling forms 1 to 3 had been completed (Appendix C). The sampling forms were used as a reference to indicate the implicit stratification variables, their order of importance and their levels. The information outlined in the sampling forms was reflected in the sampling frame and sample selection process.

Sampling Steps

Overall, there are seven key steps described in this section to successfully prepare, draw and check the sample of schools. Within seven of these steps, four involved the use of pre-written Excel macros. The seven key steps are:

1. Preparation of the sampling frame file
2. Identification of certainties, i.e.; identification of those schools which are certain to get selected
3. Determine sample selections, i.e.; to determine the random start and obtain the selection numbers of those schools which will be selected after the procedure is done

4. Sorting the frame and sample selection
5. Checking the assigned replacement schools
6. Generating a school participation file to hand over to the States/UTs for the final physical verification of the selected schools
7. Populating population and sample summary statistics

3.6 Sampling of Students

Student selection procedures in the main study were the same as those used in the field trial.

The desired student sample size per class was 30. If the number of students in the sampled section was less than 30, the FI were asked to continue to test the students. However, if there were more than 30 students in the sampled section in a class, then only 30 students were selected as per procedure given below :

Step 1: The students of the sampled section/class as per school register were listed.

Step 2: The Sampling Interval (SI) was calculated by using formula given below:

$$\text{Sampling Interval} = \frac{\text{Total number of students enrolled in sampled section or class in the school}}{30}$$

Example: Suppose the total enrollment in the sampled section/class in the school is 58, then

$$SI = 58/30 = 1.93 (\text{rounded to } 2)$$

Example: Suppose the total enrollment in the sampled section/class in the school is 44, then

$$SI = 44/30 = 1.46 (\text{rounded to } 1) \ 30$$

Note: If the value after decimal is more than or equal to 0.50, then it would be rounded to the next whole number and if the value after decimal is less than 0.50 then it would be rounded to the preceding whole number.

Step 3: In order to select the student by Random Start (RS) method, a procedure that led to the summation of individual digits of district code and school code were used:

For example: If the **District Code = 12**

School Code = 13

District code + School Code = 1+2+1+3

Then, **Random start (RS) = 7**

Step 4: Thus, first student was selected from serially arranged students' list at respective serial numbers i.e 7, determined by the random Start (RS) value. The next student was selected as per following method:

RS+SI; RS+2SI; RS+3SI; RS+4SI

For example: If SI is 2, then the selected students would be at serial number 7, 9, 11, 13, 15, 17, 19 demonstrated below:

RS	+	SI	=	9	;	RS	+	2SI	=	11	;	RS	+	3SI	=	13
7		2				7		4				7		6		

Step 5: If list ended before getting 30 students, process was repeated from the beginning until count of selected 30 students was reached.

Step 6: Student ID were allotted against each selected student.

3.7 Sampling of Section

The procedures followed for sampling of section for schools which had sections more than one are given below:

If there are **more than one section** in the selected school in a class, then only one section through random sampling method as specified below was selected:

Following information was collected before selection:

S.No. of Section	Section Name	Number of Students Enrolled	No. of Students Present on the Day of Assessment	Selected Section (Please tick ✓ mark)
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
Total Students				

UDISE Code System

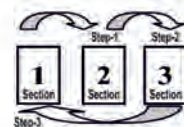
0	1	1	2	0	3	1	2	3	1	3
State Code	District Code	Block Code	Village Code	School Code						

Stage-1: Add together the two digits of the district code and the two digits of the school code. Write down the result.

Example:

$$\text{District code '12' and School code '13'} \\ \text{Result} = 1 + 2 + 1 + 3 = 7$$

Stage-2: Write down the serial numbers of the sections in a line as shown in the figure. Starting from section '1', move to next section at a time in a cyclic fashion, and continue till you get to the number calculated at Stage-1 above as a result. The section where you stop is the section selected.



Starting at section sr. no. '1' to 7 steps bring us to section sr. no. '2' i.e. Section-B. Test the students in section 'B'.

3.8 Random sample drawn at the District level

Coverage of Sampled Schools and Students at District level is as follows:

Table 3.2: Number of Schools and Students for Class III, V and VIII (Andaman & Nicobar Islands)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Andamans	70	739	83	1137	51	990
Middle and North Andamans	70	507	100	963	55	923
Nicobars	40	343	36	524	20	267

Table 3.3: Number of Schools and Students for Class III, V and VIII (Andhra Pradesh)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Anantapur	60	793	60	861	51	1289
Chittoor	60	574	60	880	51	1218
East Godavari	54	809	58	996	51	1333
Guntur	59	828	61	887	51	1158
Kadapa	59	738	52	798	51	1273
Krishna	61	839	60	835	50	1158
Kurnool	61	1076	61	1052	51	1154
Nellore	61	670	61	738	51	1204
Prakasam	61	932	61	971	51	1266
Srikakulam	60	814	60	853	51	1296
Visakhapatnam	54	821	61	946	50	1170
Vizianagaram	61	702	61	929	51	1236
West Godavari	58	763	59	890	51	1252

Table 3.4: Number of Schools and Students for Class III, V and VIII (Arunachal Pradesh)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Anjaw	35	199	31	238	17	206
Changlang	60	883	61	1037	50	1204
Dibang Valley	6	63	6	70	3	59
East Kameng	58	704	56	607	38	557
East Siang	55	815	56	830	50	942
Kra Daadi	57	382	59	330	38	290
Kurung Kumey	45	374	30	250	23	350
Lohit	48	616	45	636	30	585
Longding	56	902	56	814	13	321
Lower Dibang Valley	49	731	42	699	30	604
Lower Subansiri	55	354	50	371	38	447

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Namsai	61	714	60	806	55	968
Papum Pare	58	849	60	1108	53	852
Siang	35	270	23	226	16	351
Tawang	44	384	41	621	29	308
Tirap	58	525	52	475	37	570
Upper Siang	34	307	32	322	22	385
Upper Subansiri	52	600	53	505	47	603
West Kameng	61	790	59	747	46	772
West Siang	61	732	59	769	45	867

Table 3.5: Number of Schools and Students for Class III, V and VIII (Assam)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Baksa	61	769	60	703	51	1011
Barpeta	61	1165	60	1096	51	1210
Bongaigaon	61	1116	59	1129	51	1249
Cachar	61	1034	61	1094	51	1295
Chirang	58	889	55	836	40	1015
Darrang	61	1160	61	1215	50	1255
Dhemaji	61	800	60	703	43	908
Dhubri	61	1174	61	1115	51	1151
Dibrugarh	60	940	61	916	51	1237
Dima Hasao	52	514	52	522	39	660
Goalpara	60	1080	56	1030	49	1093
Golaghat	61	819	61	895	51	1218
Hailakandi	60	797	61	863	51	1085
Jorhat	61	796	60	781	51	1140
Kamrup-Metro	58	1128	56	1022	49	1175
Kamrup-Rural	61	897	60	803	51	1146
Karbi Anglong	59	858	60	951	50	1123
Karimganj	61	991	61	999	51	1179
Kokrajhar	59	853	61	1014	51	1193
Lakhimpur	60	920	61	983	50	1073
Morigaon	61	1144	61	1095	51	1206
Nagaon	59	1220	61	1263	51	1256
Nalbari	60	889	55	774	51	1186
Sibsagar	61	730	61	768	51	1175
Sonitpur	61	1011	61	995	50	1154
Tinsukia	61	1106	61	1058	51	1321
Udalguri	61	959	61	883	43	940

Table 3.6: Number of Schools and Students for Class III, V and VIII (Bihar)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Araria	60	1337	61	1410	51	1162
Arwal	61	1183	60	1195	51	1116
Aurangabad (Bihar)	60	1188	61	1302	51	1192
Banka	61	1083	56	1074	51	1150
Begusarai	61	1464	60	1415	50	1307
Bhagalpur	57	1305	60	1377	51	1209
Bhojpur	60	1047	61	1246	51	1107
Buxar	60	1226	61	1240	51	1213
Darbhanga	58	1197	15	293	51	1138
Gaya	61	1246	61	1443	51	1289
Gopalganj	59	1198	61	1325	51	1236
Jamui	61	1252	61	1279	50	1108
Jehanabad	60	1106	61	1166	51	1192
Kaimur (Bhabua)	61	1381	61	1341	51	627
Katihar	61	1296	59	1368	50	1112
Khagaria	61	1307	60	1353	51	1220
Kishanganj	46	963	61	1227	50	1088
Lakhisarai	61	1363	61	1434	51	1293
Madhepura	61	1297	59	1313	50	1081
Madhubani	61	1401	61	1499	50	1235
Munger	55	1038	53	1074	49	1110
Muzaffarpur	61	1309	61	1402	51	1309
Nalanda	58	1127	60	1204	51	1182
Nawada	61	1179	61	1062	51	1046
Pashchim Champaran	60	1433	61	1483	51	1250
Patna	58	1212	59	1198	51	1184
Purba Champaran	61	1275	60	1309	47	1080
Purnia	59	1259	61	1336	51	1045
Rohtas	61	584	60	1249	51	1096
Saharsa	60	1347	61	1370	51	1135
Samastipur	59	1386	59	1365	51	1268
Saran	60	1251	60	1303	50	1208
Sheikhpura	61	1174	60	1119	51	1140
Sheohar	60	1449	59	1501	49	1225
Sitamarhi	61	1422	53	1169	50	1172
Siwan	58	1180	58	1236	51	1306
Supaul	61	1187	61	1304	51	1230
Vaishali	61	1298	61	1331	51	1259

Table 3.7: Number of Schools and Students for Class III, V and VIII (Chandigarh)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Chandigarh	113	2853	113	2955	107	2888

Table 3.8: Number of Schools and Students for Class III, V and VIII (Chhattisgarh)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Balod	61	980	60	988	51	1337
Balodabazar	61	1218	61	1272	51	1305
Balrampur	41	608	61	914	45	1171
Baster	57	711	58	741	51	1118
Bemetara	61	1333	60	1286	51	1398
Bijapur	61	1111	58	1047	44	930
Bilaspur (Chhattisgarh)	61	1363	61	1334	51	1432
Dantewada	58	807	54	709	48	870
Dhamtari	60	936	59	934	51	1290
Durg	61	1419	61	1433	51	1461
Gariaband	60	835	59	795	51	1136
Janjgir - Champa	60	946	60	1053	51	1307
Jashpur	58	853	59	765	51	1276
Kanker	55	551	53	585	49	1043
Kawardha	61	1826	60	1187	50	1341
Kondagaon	60	704	61	699	51	1120
Korba	61	793	61	811	51	1264
Koriya	44	536	59	635	51	1089
Mahasamund	58	881	57	908	51	1352
Mungeli	61	1269	61	1384	51	1474
Narayanpur	53	572	52	666	49	1005
Raigarh (Chhattisgarh)	58	752	57	816	51	1107
Raipur	61	1362	61	1388	51	1404
Rajnandgaon	61	1131	60	945	51	1313
Sukma	57	743	52	686	41	796
Surajpur	61	692	61	764	51	1150
Surguja	52	720	58	755	51	1200

Table 3.9: Number of Schools and Students for Class III, V and VIII (Dadra and Nagar Haveli)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Dadra and Nagar Haveli	253	3967	244	3492	117	2758

Table 3.10: Number of Schools and Students for Class III, V and VIII (Daman & Diu)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Daman	30	534	33	642	26	587
Diu	14	263	13	296	12	286

Table 3.11: Number of Schools and Students for Class III, V and VIII (Delhi)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Central Delhi	61	1043	61	1136	50	998
East Delhi	56	959	60	1017	50	1067
New Delhi	56	1462	54	1417	49	1261
North Delhi	58	1186	58	1265	51	1186
North East Delhi	58	1031	61	1199	51	1100
North West Delhi	58	1178	60	1253	50	1210
South Delhi	59	1035	58	1128	50	1013
South West Delhi	61	1199	61	1268	51	1139
West Delhi	60	1168	61	1262	51	1092

Table 3.12: Number of Schools and Students for Class III, V and VIII (Goa)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
North Goa	141	2995	148	3862	43	895
South Goa	104	2419	109	2847	110	2930

Table 3.13: Number of Schools and Students for Class III, V and VIII (Gujarat)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Ahmedabad	61	1443	61	1504	51	1306
Amreli	61	1267	61	1321	51	1152
Anand	61	1395	61	1440	51	1359
Aravalli	61	1015	61	971	51	1235
Banas Kantha	61	1370	61	1477	51	1394
Bharuch	61	1054	61	1165	51	1224
Bhavnagar	61	1511	61	1466	51	1273
Botad	61	1545	61	1620	51	1375
Chhotaudepur	61	992	61	1079	51	1249
Devbhoomi Dwarka	61	1241	61	1222	51	1164
Dohad	61	1416	61	1400	51	1306
Gandhinagar	61	1378	61	1380	51	1319
Gir Somnath	61	1409	61	1404	51	1195
Jamnagar	61	1101	61	1150	51	1107
Junagadh	61	1104	61	1116	51	1072

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Kachchh	61	1266	61	1300	51	1201
Kheda	61	1387	61	1359	51	1358
Mahesana	61	1324	61	1440	51	1344
Mahisagar	61	961	61	1133	51	1263
Morbi	61	1356	61	1339	51	1161
Narmada	61	918	61	1000	51	1251
Navsari	61	1192	61	1181	51	1283
Panch Mahals	61	1166	61	1231	51	1261
Patan	61	1404	61	1354	51	1310
Porbandar	61	1160	61	1238	51	1137
Rajkot	61	1328	61	1329	51	1143
Sabar Kantha	61	1225	61	1206	51	1237
Surat	60	1521	61	1523	50	1330
Surendranagar	61	1351	61	1390	51	1211
Tapi	60	1014	61	1060	51	1229
The Dangs	61	1020	61	1023	51	1304
Vadodara	61	1260	61	1319	51	1312
Valsad	61	1225	59	1233	51	1328

Table 3.14: Number of Schools and Students for Class III, V and VIII (Haryana)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Ambala	61	946	60	1031	50	1012
Bhiwani	61	1048	61	1127	51	1023
Faridabad	61	1200	61	1313	51	1199
Fatehabad	61	1105	61	1140	51	1127
Gurgaon	61	1071	60	1143	49	931
Hisar	61	1082	61	1268	51	1199
Jhajjar	61	962	61	965	51	1007
Jind	61	1102	60	1161	51	1147
Kaithal	61	1167	61	1286	51	1257
Karnal	61	1226	61	1282	51	1158
Kurukshetra	61	852	61	1009	51	1028
Mahendragarh	54	645	55	819	44	921
Mewat	61	1446	61	1551	51	1233
Palwal	61	1196	61	1353	51	1153
Panchkula	60	1258	61	1279	51	1170
Panipat	61	1131	61	1176	51	1190
Rewari	60	823	61	945	51	1038
Rohtak	58	1018	59	1165	51	989
Sirsa	61	1162	61	1267	51	1210

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Sonipat	48	930	49	1035	43	1017
Yamunanagar	61	826	61	935	51	1086

Table 3.15: Number of Schools and Students for Class III, V and VIII (Himachal Pradesh)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Bilaspur (H.p.)	61	517	61	571	51	968
Chamba	61	614	60	620	51	1000
Hamirpur (H.p.)	61	674	61	628	51	923
Kangra	61	577	61	540	51	901
Kinnaur	60	326	61	349	51	600
Kullu	61	605	61	660	51	1153
Lahul & Spiti	10	34	19	79	16	120
Mandi	60	520	60	541	50	982
Shimla	61	531	61	538	51	896
Sirmaur	61	772	57	792	51	1241
Solan	61	862	61	809	50	1115
Una	59	796	61	822	51	1104

Table 3.16: Number of Schools and Students for Class III, V and VIII (Jammu and Kashmir)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Anantnag	50	431	59	455	51	519
Badgam	59	539	61	510	51	651
Bandipora	60	572	61	528	49	652
Baramula	55	520	58	485	43	563
Doda	61	523	61	536	51	710
Ganderbal	43	385	52	449	48	625
Jammu	61	470	61	527	51	784
Kargil	26	157	32	228	41	366
Kathua	59	451	60	460	51	775
Kishtwar	61	392	60	438	51	688
Kulgam	59	223	61	431	50	569
Kupwara	41	360	42	361	45	672
Leh (Ladakh)	13	81	14	93	26	206
Pulwama	58	358	59	405	51	482
Punch	61	598	61	537	51	905
Rajauri	61	571	60	554	51	842
Ramban	60	591	61	631	51	942
Reasi	61	444	61	498	50	851
Samba	61	457	60	450	51	661

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Shopian	50	326	51	388	45	355
Srinagar	39	300	57	431	48	441
Udhampur	61	444	61	519	51	893

Table 3.17: Number of Schools and Students for Class III, V and VIII (Jharkhand)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Bokaro	56	898	61	1150	49	1216
Chatra	61	959	61	985	51	1136
Deoghar	61	1082	61	1018	49	1326
Dhanbad	60	1123	61	1149	49	1329
Dumka	61	865	61	845	49	986
Garhwa	61	1015	59	946	51	1223
Giridih	61	927	60	899	49	1149
Godda	60	1116	61	1052	47	1012
Gumla	61	1011	61	1135	49	1242
Hazaribag	58	1107	61	1244	48	1284
Jamtara	61	945	60	921	49	1038
Khunti	60	961	61	1043	49	1148
Kodarma	61	1171	61	1221	49	1203
Latehar	61	902	61	946	51	1135
Lohardaga	60	1072	59	1102	46	1160
Pakaur	61	1187	60	1120	49	1056
Palamu	61	959	60	1038	49	1128
Pashchimi Singhbhum	61	998	61	1025	49	1258
Purbi Singhbhum	61	903	61	991	50	1185
Ramgarh	59	1165	54	1163	49	1324
Ranchi	61	1097	58	1016	49	1214
Sahibganj	61	1216	60	1198	49	1106
Saraikela-Kharsawan	61	702	60	832	48	1063
Simdega	59	1009	61	1042	49	1064

Table 3.18: Number of Schools and Students for Class III, V and VIII (Karnataka)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Bagalkot	61	1427	61	1462	51	1451
Ballari	61	1595	61	1525	51	1470
Belagavi	61	1573	61	1425	51	1403
Belagavi Chikkodi	61	1431	59	1506	51	1503
Bengaluru Rural	56	829	58	922	50	1388

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Bengaluru U North	61	1444	60	1484	49	1336
Bengaluru U South	60	1313	59	1448	51	1373
Bidar	59	1186	61	1300	51	1284
Chamarajanagara	61	1133	61	1279	51	1391
Chikkaballapura	59	862	57	813	51	1420
Chikkamagaluru	59	869	56	800	51	1326
Chitradurga	61	1047	59	1018	49	1360
Dakshina Kannada	60	993	61	1254	51	1349
Davanagere	61	1089	61	1256	51	1435
Dharwad	61	1535	61	1578	51	1399
Gadag	61	1446	61	1419	50	1352
Hassan	58	802	57	758	51	1341
Haveri	61	1295	61	1436	51	1416
Kalaburgi	61	1404	61	1400	51	1313
Kodagu	59	965	60	1034	51	1329
Kolar	58	761	58	810	51	1349
Koppal	60	1458	61	1539	50	1450
Mandya	59	836	58	834	51	1410
Mysuru	61	1138	61	1111	51	1332
Raichur	61	1426	61	1433	51	1432
Ramanagara	56	792	58	874	51	1396
Shivamogga	60	963	60	986	51	1326
Tumakuru	58	776	59	839	51	1445
Tumakuru Madhugiri	61	788	59	818	51	1444
Udupi	56	957	57	1039	51	1330
Uttara Kannada	56	705	58	805	51	1460
Uttara Kannada Sirsi	59	1013	59	1058	51	1401
Vijayapura	61	1464	61	1477	50	1345
Yadagiri	61	1444	61	1482	51	1411

Table 3.19: Number of Schools and Students for Class III, V and VIII (Kerala)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Alappuzha	61	1185	61	1185	51	1342
Ernakulam	61	1333	60	1342	51	1339
Idukki	61	1143	61	1231	51	1226
Kannur	61	1243	61	1414	51	1308
Kasaragod	61	1211	61	1398	51	1318
Kollam	61	1114	61	1293	51	1307
Kottayam	61	1161	61	1252	51	1277
Kozhikode	61	1302	61	1444	51	1333

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Malappuram	61	1357	61	1511	50	1298
Palakkad	61	1275	61	1426	49	1252
Pathanamthitta	61	1002	61	1048	51	1266
Thiruvananthapuram	61	1159	61	1251	51	1335
Thrissur	51	1160	45	941	40	1089
Wayanad	61	1261	60	1313	51	1179

Table 3.20: Number of Schools and Students for Class III, V and VIII (Lakshadweep)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Lakshadweep	33	928	28	464	15	870

Table 3.21: Number of Schools and Students for Class III, V and VIII (Madhya Pradesh)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Agar Malwa	60	604	60	691	51	1047
Alirajpur	61	563	61	592	50	1043
Anuppur	61	666	61	764	51	1199
Ashoknagar	61	794	61	903	51	1333
Balaghat	61	855	61	831	51	1315
Barwani	60	604	61	590	49	1006
Betul	60	698	61	838	51	1186
Bhind	59	789	59	798	51	1020
Bhopal	61	1160	61	1150	51	1247
Burhanpur	61	1178	61	1169	51	1292
Chhatarpur	61	906	61	1021	51	1201
Chhindwara	61	777	61	762	51	1229
Damoh	61	856	61	982	51	1187
Datia	60	784	61	988	51	1163
Dewas	59	745	61	874	50	1146
Dhar	59	620	60	755	51	1147
Dindori	60	628	61	648	51	1469
Guna	60	641	61	745	51	1130
Gwalior	60	850	61	1034	51	1178
Harda	61	941	61	1044	51	1149
Hoshangabad	59	769	61	817	51	1166
Indore	59	919	61	1057	51	1142
Jabalpur	61	810	61	997	51	1247
Jhabua	61	783	61	812	51	1106
Katni	60	843	61	1012	51	1080
Khandwa	60	1015	61	1000	51	1231

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Khargone	59	666	61	712	51	1100
Mandla	60	616	60	670	51	1249
Mandsaur	61	829	61	744	51	1106
Morena	59	915	59	877	51	1200
Narsimhapur	60	732	60	930	51	1266
Neemuch	61	644	60	641	51	967
Panna	61	693	58	713	51	978
Raisen	60	723	61	871	51	1082
Rajgarh	58	721	59	830	51	1144
Ratlam	61	745	60	744	51	1184
Rewa	60	634	61	895	51	1317
Sagar	60	982	61	1011	51	1291
Satna	61	655	61	806	51	1135
Sehore	60	724	61	914	51	1000
Seoni	61	603	59	703	51	1174
Shahdol	61	692	61	765	51	1315
Shajapur	61	729	60	765	51	1134
Sheopur	61	796	60	894	51	1168
Shivpuri	61	894	61	1041	51	1301
Sidhi	61	692	61	922	51	1218
Singrauli	61	800	61	1019	51	1408
Tikamgarh	61	845	61	654	51	1295
Ujjain	57	705	60	759	51	1189
Umaria	60	897	61	997	51	1112
Vidisha	52	714	57	853	51	1044

Table 3.22: Number of Schools and Students for Class III, V and VIII (Maharashtra)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Ahmadnagar	61	1369	61	1617	51	1471
Akola	61	1271	61	1397	51	1354
Amravati	60	1164	61	1392	51	1314
Aurangabad (Maharashtra)	61	1329	61	1531	51	1411
Bhandara	61	1160	61	1425	51	1362
Bid	60	1255	61	1592	51	1386
Buldana	61	1389	61	1426	51	1378
Chandrapur	61	1056	61	1274	51	1327
Dhule	61	1346	61	1604	49	1507
Gadchiroli	61	1017	61	1242	51	1422
Gondiya	61	1085	61	1426	51	1363

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Hingoli	61	1363	61	1501	51	1359
Jalgaon	61	1428	61	1526	50	1360
Jalna	60	1349	61	1375	51	1407
Kolhapur	61	1407	61	1526	51	1439
Latur	61	1442	61	1432	51	1411
Mumbai (Suburban)	61	1516	61	1349	50	1204
Mumbai II			61	1628	51	1356
Nagpur	61	1311	61	1508	51	1317
Nanded	61	1248	61	1369	51	1322
Nandurbar	61	1277	61	1444	50	1352
Nashik	61	1457	61	1580	51	1423
Osmanabad	60	1282	61	1372	50	1291
Palghar	61	1291	61	1569	51	1425
Parbhani	61	1433	60	1406	51	1362
Pune	61	1383	61	1558	51	1390
Raigarh (Maharashtra)	59	1086	61	1443	51	1426
Ratnagiri	58	844	61	1112	51	1418
Sangli	61	1402	61	1521	51	1411
Satara	61	1158	61	1393	51	1388
Sindhudurg	60	739	60	1089	51	1450
Solapur	61	1337	61	1621	51	1418
Thane	61	1452	60	1253	51	1416
Wardha	61	1008	61	1258	51	1294
Washim	61	1206	61	1446	51	1397
Yavatmal	61	1188	61	1249	51	1272

Table 3.23: Number of Schools and Students for Class III, V and VIII (Manipur)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Bishnupur	51	385	60	536	43	456
Chandel	59	425	56	400	13	163
Churachandpur	58	678	60	766	31	459
Imphal East	58	651	58	819	51	729
Imphal West	42	303	45	413	44	643
Senapati	61	608	56	526	50	578
Tamenglong	40	350	43	356	21	259
Thoubal	57	581	54	577	64	877
Ukhrul	55	376	31	293	25	213

Table 3.24: Number of Schools and Students for Class III, V and VIII (Meghalaya)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
East Garo Hills	59	671	57	700	50	390
East Jaintia Hills	61	868	61	963	51	940
East Khasi Hills	61	938	61	1143	51	1021
North Garo Hills	60	561	57	480	50	809
Ri Bhoi	59	680	59	810	50	969
South Garo Hills	60	549	53	413	51	607
South West Garo Hills	57	469	59	535	51	841
South West Khasi Hills	57	539	56	615	49	722
West Garo Hills	60	739	55	678	51	901
West Jaintia Hills	60	869	56	860	48	1035
West Khasi Hills	60	807	60	920	51	815

Table 3.25: Number of Schools and Students for Class III, V and VIII (Mizoram)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Aizawl	59	612	60	793	50	709
Champhai	57	740	61	965	54	866
Kolasib	56	569	43	577	44	656
Lawngtlai	56	572	62	893	47	590
Lunglei	50	488	54	765	48	708
Mamit	52	586	51	672	44	574
Saiha	55	437	47	596	41	449
Serchhip	30	246	40	518	49	651

Table 3.26: Number of Schools and Students for Class III, V and VIII (Nagaland)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Dimapur	52	907	41	938	47	972
Kiphire	46	359	27	259	13	156
Kohima	41	499	48	695	15	164
Longleng	37	236	17	169	13	186
Mokokchung	54	439	54	659	54	651
Mon	55	808	53	884	19	248
Peren	53	609	33	534	22	359
Phek	51	424	46	515	45	634
Tuensang	58	827	52	845	32	444
Wokha	25	161	22	197	21	250
Zunheboto	34	217	30	227	25	288

Table 3.27: Number of Schools and Students for Class III, V and VIII (Odisha)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Angul	61	978	51	832	50	1235
Balasore	61	1071	60	1173	47	1302
Bargarh	59	931	59	996	50	1230
Bhadrak	60	920	61	1066	51	1318
Bolangir	55	822	58	1017	33	517
Boudh	61	663	61	693	44	914
Cuttack	60	889	60	1021	51	1312
Deogarh	45	525	41	485	47	1107
Dhenkanal	59	901	58	1040	48	1361
Gajapati	31	696	41	999	50	1453
Ganjam	61	1010	61	1034	50	1303
Jagatsinghpur	12	215	12	248	36	875
Jajpur	36	639	39	840	48	1126
Jharsuguda	8	137	39	665	50	1055
Kalahandi	58	808	61	998	49	1158
Kandhamal	52	811	54	829	50	980
Kendrapara	61	894	61	922	51	1281
Keonjhar	61	921	61	951	43	1144
Khordha	61	971	61	1062	51	1342
Koraput	26	668	28	714	50	1254
Malkangiri	46	892	40	763	51	1178
Mayurbhanj	61	934	61	1053	51	1437
Nabarangpur	27	635	26	639	50	1247
Nayagarh	59	787	61	958	47	1181
Nuapada	47	532	50	888	48	1119
Puri	55	729	50	846	48	1194
Rayagada	44	455	35	857	50	1353
Sambalpur	34	572	24	437	51	1294
Sonepur	60	728	61	895	50	1338
Sundergarh	56	823	61	1079	51	1136

Table 3.28: Number of Schools and Students for Class III, V and VIII (Puducherry)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Karaikal	65	780	64	843	22	460
Mahe	10	210	10	240	6	154
Pondicherry	194	2970	190	3373	51	1307
Yanam	16	306	16	302	8	221

Table 3.29: Number of Schools and Students for Class III, V and VIII (Punjab)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Amritsar	61	960	61	1052	51	1044
Barnala	61	1113	59	1343	36	830
Bathinda	61	1419	61	1546	51	1398
Faridkot	61	855	61	1016	51	967
Fatehgarh Sahib	61	755	61	875	51	1119
Fazilka	60	1112	61	1348	51	1211
Firozpur	61	864	61	1137	51	1258
Gurdaspur	61	785	61	857	51	999
Hoshiarpur	61	676	61	782	51	1029
Jalandhar	61	840	61	1050	51	1100
Kapurthala	61	760	61	997	51	1047
Ludhiana	60	1005	61	1425	51	1389
Mansa	61	1335	61	1440	51	1426
Moga	61	1015	61	1212	51	1104
Mohali	60	1091	61	1113	51	1254
Muktsar	61	989	61	1169	51	1023
Nawanshahr	61	822	61	904	51	1168
Pathankot	61	621	61	747	48	990
Patiala	60	764	60	970	51	984
Rupnagar	61	762	60	722	51	1085
Sangrur	61	950	61	1173	51	1339
Taran Taran	61	1007	61	1168	51	1156

Table 3.30: Number of Schools and Students for Class III, V and VIII (Rajasthan)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Ajmer	59	1138	59	1082	50	1215
Alwar	58	1010	60	829	51	1153
Banswara	59	962	61	911	51	1317
Baran	61	922	61	868	51	1143
Barmer	61	994	60	959	51	1216
Bharatpur	61	1099	59	972	49	1115
Bhilwara	60	922	61	944	51	1159
Bikaner	60	1086	61	1029	51	1283
Bundi	61	915	61	787	51	1123
Chittaurgarh	617	718	59	676	51	1022
Churu	61	1181	61	1050	51	1150
Dausa	58	867	60	854	49	1136
Dhaulpur	61	1302	60	1114	51	1280
Dungarpur	61	953	61	913	50	912

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Ganganagar	59	927	59	810	50	1093
Hanumangarh	61	1016	59	1147	50	1195
Jaipur	57	851	56	809	51	1205
Jaisalmer	61	812	59	800	50	1082
Jalor	59	937	59	930	51	1212
Jhalawar	61	1004	61	838	50	1122
Jhunjhunu	59	719	60	751	49	1018
Jodhpur	61	887	60	941	50	1173
Karauli	61	1402	60	1061	51	1360
Kota	61	980	57	786	51	1107
Nagaur	61	1099	60	928	51	1117
Pali	61	1008	60	908	51	1210
Pratapgarh (Raj.)	55	820	52	729	49	1227
Rajsamand	59	815	61	823	51	1177
Sawai Madhopur	60	924	61	959	51	1242
Sikar	59	824	59	816	51	1146
Sirohi	54	955	55	977	48	1229
Tonk	59	783	54	703	51	982
Udaipur	61	995	59	851	51	1319

Table 3.31: Number of Schools and Students for Class III, V and VIII (Sikkim)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
East Sikkim	59	847	52	909	92	2035
North Sikkim	40	269	50	407	27	469
South Sikkim	59	567	59	667	48	1077
West Sikkim	46	394	46	451	63	1402

Table 3.32: Number of Schools and Students for Class III, V and VIII (Tamil Nadu)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Chennai	60	1014	61	1206	51	1076
Coimbatore	39	607	34	596	30	629
Cuddalore	60	811	58	861	50	1077
Dharmapuri	61	796	61	858	51	1117
Dindigul	60	972	60	1075	50	1138
Erode	58	877	61	936	51	1020
Kancheepuram	60	942	58	1054	48	1090
Kanniyakumari	61	947	60	920	51	968
Karur	60	900	60	897	51	1085
Krishnagiri						

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Madurai	61	1068	61	1134	50	1226
Nagapattinam	61	840	61	931	51	1064
Namakkal	61	921	60	1005	50	1198
Perambalur	61	1045	61	1026	51	1214
Pudukkottai	61	845	61	969	50	1086
Ramanathapuram	57	838	58	821	51	1159
Salem	60	989	61	1080	51	1137
Sivaganga	56	761	57	771	50	1123
Thanjavur	61	811	61	972	51	1146
The Nilgiris	59	762	56	790	51	949
Theni	61	956	61	1074	51	1068
Thiruvallur	61	940	60	926	49	1137
Thiruvarur	60	834	61	828	51	1142
Thoothukkudi	60	936	60	953	51	1235
Tiruchirappalli	61	1104	60	1028	51	1200
Tirunelveli	60	1040	61	1164	51	1255
Tiruvannamalai	61	937	61	1046	51	1190
Vellore	61	970	58	1023	51	1234
Viluppuram	60	1053	60	1161	51	1335
Virudhunagar	61	1075	61	1132	51	1265

Table 3.33: Number of Schools and Students for Class III, V and VIII (Telangana)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Adilabad	58	813	57	1074	51	1301
Bhadradr	53	587	59	696	51	1241
Hyderabad	61	1198	61	1229	51	1172
Jagtial	59	809	59	848	51	1159
Jangaon	58	787	60	916	51	1132
Jayashankar	58	676	58	788	51	1160
Jogulamba	61	1214	61	1143	51	1247
Kamareddy	61	848	61	980	51	1350
Karimnagar	51	636	58	807	51	962
Khammam	61	858	61	963	51	1267
Komaram Bheem	60	714	60	869	51	1306
Mahabubabad	58	710	58	983	51	1231
Mahabubnagar	61	1091	61	1094	51	1372
Mancherial	60	591	58	794	50	1164
Medak	61	819	61	975	51	1294
Medchal-Malkajgiri	61	1197	61	1290	51	1338
Nagarkurnool	61	922	61	963	51	1272

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Nalgonda	58	776	58	893	51	1281
Nirmal	60	813	60	923	51	1340
Nizamabad	61	882	61	909	51	1161
Peddapalli	59	635	60	775	51	1047
Rajanna	61	828	59	985	51	1077
Rangareddy	61	1064	61	1153	50	1207
Sangareddy	60	899	61	1074	51	1393
Siddipet	61	854	61	919	51	1262
Suryapet	59	761	59	748	51	1159
Vikarabad	60	875	58	1020	51	1313
Wanaparthy	61	868	61	1062	51	1245
Warangal Rural	60	673	59	852	51	1073
Warangal Urban	56	861	59	1084	51	1028
Yadadri	60	651	61	900	51	1105

Table 3.34: Number of Schools and Students for Class III, V and VIII (Tripura)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Dhalai	49	598	55	811	50	895
Gomati	59	847	59	989	49	953
Khowai	59	810	54	781	48	928
North Tripura	55	469	61	1070	50	892
Sepahijala	58	970	57	1008	51	1039
South Tripura	55	696	57	912	51	1069
Unakoti	60	943	59	1037	51	983
West Tripura	60	1191	61	1204	51	1039

Table 3.35: Number of Schools and Students for Class III, V and VIII (Uttar Pradesh)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Agra	60	1054	61	1042	51	873
Aligarh	50	997	61	1004	51	1009
Allahabad	58	1006	58	953	51	856
Ambedkar Nagar	60	1300	60	1468	51	1415
Amethi - CSM Nagar	61	866	61	852	51	990
Auraiya	54	985	57	816	49	1035
Azamgarh	59	1063	61	1099	51	1040
Baghpat	61	1155	61	1012	51	1066
Bahraich	612	1282	59	1166	47	963
Ballia	53	862	57	1027	48	899

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Balrampur	61	1007	58	899	49	935
Banda	60	1113	60	1202	51	1077
Barabanki	61	1167	61	1155	51	1198
Bareilly	61	1097	61	852	51	1027
Basti	56	899	56	885	49	1000
Bhadoi	61	1215	58	878	48	1119
Bijnor	61	968	61	928	51	1094
Budaun	59	992	59	984	50	854
Bulandshahr	61	1094	59	1054	48	1002
Chandauli	61	1507	61	1442	49	1249
Chitrakoot	61	958	60	1011	50	969
Deoria	53	765	61	823	51	1105
Etah	59	853	57	716	44	782
Etawah	60	910	59	836	50	1001
Faizabad	60	896	58	842	48	1113
Farrukhabad	50	919	58	929	46	1028
Fatehpur	54	893	61	1012	48	701
Firozabad	61	938	58	906	51	1014
Gautam Buddha Nagar	61	1252	61	1147	51	1082
Ghaziabad	58	953	58	975	50	1000
Ghazipur	60	1071	60	1089	49	891
Gonda	61	1101	61	1014	51	1014
Gorakhpur	61	965	61	856	49	908
Hamirpur (U.p.)	61	1501	60	1408	51	1707
Hapur (Panchsheel Nagar)	61	1003	60	1066	50	998
Hardoi	59	842	61	571	51	802
Hathras	61	1010	61	989	48	943
Jalaun	61	987	56	949	51	1138
Jaunpur	60	1320	60	1123	49	1157
Jhansi	61	898	61	986	51	1132
Jyotiba Phule Nagar (Amroha)	61	1008	61	935	51	1000
Kannauj	59	985	57	752	42	373
Kanpur Dehat	57	863	60	798	51	937
Kanpur Nagar	59	702	58	738	48	918
Kanshiram Nagar	61	1011	59	810	49	882
Kaushambi	61	1238	60	1161	51	1009
Kheri	61	1078	59	1018	51	1524

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Kushinagar	57	881	57	653	48	802
Lalitpur	60	1031	61	1127	51	1120
Lucknow	61	1042	61	959	51	1077
Maharajganj	61	1007	61	973	51	1012
Mahoba	61	1101	61	1073	51	1090
Mainpuri	58	763	60	843	49	505
Mathura	61	968	60	869	51	901
Mau	59	1160	60	1133	49	1195
Meerut	61	1172	60	1072	49	1004
Mirzapur	61	1215	61	1186	51	1209
Moradabad	59	234	59	413	51	297
Muzaffarnagar	60	922	61	596	50	638
Pilibhit	58	909	60	1046	48	818
Pratapgarh	53	633	46	327	31	390
Rae Bareli	59	994	60	951	50	950
Rampur	61	1264	59	900	49	942
Saharanpur	59	380	49	237	47	434
Sambhal (Bhim Nagar)	60	265	60	72	48	173
Sant Kabir Nagar	59	960	61	1018	51	1128
Shahjahanpur	61	787	61	904	51	834
Shamli (Prabudh Nagar)	60	731	60	638	48	519
Shrawasti	52	827	51	822	45	695
Siddharthnagar	56	1002	61	1027	50	1005
Sitapur	21	381	59	1023	49	893
Sonbhadra	61	1170	60	1039	51	950
Sultanpur	61	846	60	892	51	1108
Unnao	58	1029	61	1093	49	1114
Varanasi	61	1193	58	1175	50	1161

Table 3.36: Number of Schools and Students for Class III, V and VIII (Uttarakhand)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Almora	61	409	61	471	51	1147
Bageshwar	61	453	60	544	51	1074
Chamoli	61	507	60	506	51	903
Champawat	56	538	61	734	50	1120
Dehradun	61	936	61	969	51	1168
Garhwal	61	534	61	505	51	889

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Hardwar	60	1283	61	1318	51	1287
Nainital	59	876	60	841	51	1153
Pithoragarh	61	455	61	456	51	947
Rudraprayag	60	472	61	509	51	1099
Tehri Garhwal	61	572	60	508	51	1021
Udham Singh Nagar	60	1100	61	1116	51	1202
Uttarkashi	61	605	61	574	51	988

Table 3.37: Number of Schools and Students for Class III, V and VIII (West Bengal)

District	Class III		Class V		Class VIII	
	Sampled Schools	Students	Sampled Schools	Students	Sampled Schools	Students
Alipurduar	56	910	61	1214	50	940
Bankura	61	1050	61	1255	51	1154
Birbhum	61	1127	61	1290	49	1037
Dakshin Dinajpur	61	1006	60	1149	51	1011
Darjiling						
Haora	61	1150	61	1206	51	1083
Hugli	60	1109	61	1330	51	1224
Jalpaiguri	54	899	61	1271	50	944
Jhargram	61	714	61	1204	51	1164
Koch Bihar	61	1069	61	1247	51	1151
Kolkata	59	1011	59	1235	49	1173
Maldah	60	1281	60	1345	51	1112
Murshidabad	61	1335	59	1244	51	1112
Nadia	61	1153	61	1534	51	1338
North Twenty Four Pargana	58	1157	55	1228	50	1097
Paschim Bardhaman	59	1132	59	1216	51	1091
Paschim Medinipur	61	861	61	1307	51	846
Purba Bardhaman	61	1165	61	1262	51	1172
Purba Medinipur	61	1065	61	1424	51	1216
Puruliya	60	927	61	1179	51	1100
Siliguri	51	741	56	1196	49	1028
South Twenty Four Pargan	61	1219	61	1475	50	1212
Uttar Dinajpur	61	1055	61	1189	51	973



4. Data Management

NAS 2017 was a paper pencil based test which was administered in all 36 states/UTs across India, following uniform and systematic procedures. Post data collection, the OMR sheets were scanned using a software and converted into .csv files. Cleaned .csv files were uploaded into a web application which was developed specifically for NAS 2017. Use of a single web application to collate, carry out preliminary analysis and generate District Report Cards (DRCs) was a novel feature of NAS 2017.

URL of the NAS 2017 web application was nasslo.ncert.gov.in. Figure 4.1 shows the snapshot of the home page of the NAS 2017 Web application.

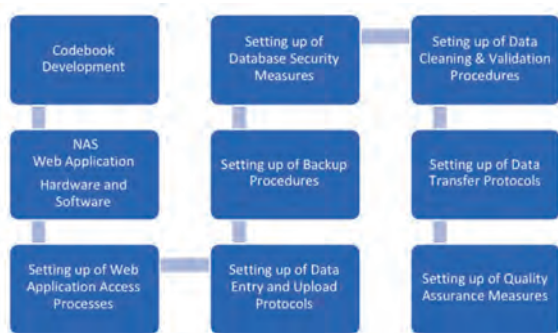
Figure 4.1: NAS 2017 Web Application



4.1 Data Management Activities in NAS 2017

The sequence of major preparatory activities for development of NAS 2017 web application are illustrated below:

Figure 4.2: Preparatory Activities for Development of NAS 2017 Web Application



(a) Codebook Development

A codebook includes details on all the variables mentioned in the assessment data set. Details commonly included in the codebook are related to variable definitions/ descriptions, variable codes/ values, validity parameters and codes for missing values.

For NAS 2017, an online codebook was developed and stored within the NAS web application. The codebook served as a structural database, wherein, details on NAS variables were stored. Information on Items, form numbers, LO codes and descriptions and keys were all

stored in the NAS 2017 online codebook. All the above information was saved separately for each tested subject and class.

NAS 2017 online codebook was used to analyze the uploaded raw data and auto-generate DRCs from the web application.

(b) NAS Web Application Hardware and Software

The NAS web application was hosted on a NIC cloud-based server. Details of the backend infrastructure used to configure the application are given below:

Table 4.1: Backend infrastructure for the application

Web Server:	LAMP or NGINX
Database Server:	MySQL 5.5.54
Database Cache:	Redis 2.4.10
Application Development Framework:	CodeIgniter (CI) 3.1.0
Server Side Language:	PHP 5.6.30
Programming Language:	PHP, Javascript (Jquery), HTML

Upon development, the application was put through rigorous security checks/ audits. The purpose of these checks was to ensure that the application was not susceptible to virus/malware or any other cyberattacks.

The NAS 2017 web application developed was NIC standards-compliant portal with a user-friendly interface.

(c) Setting up of Web Application Access Processes

The following 3 category of users were provided access to the web application - (i) National level Users; (ii) State level Users and (iii) District level Users.

Each level of user could access the application by logging in through a distinct username and password. A specific SMS and email system was activated to transmit the username and passwords to the web application users.

Each level of user could perform only pre-defined set of activities on the web application (details of the same are provided in Table 4.2)

Table 4.2: Categories of Users, Organizations Involved, Activities Performed

User Level	Personnel/ Organizations Involved	Activities performed on the NAS 2017 Web Application
National	NCERT	View progress in upload of data at the national level Correct/ Modify the Codebook Create State Level Users Download National Data Download DRCs
State	State Coordinator	View progress in upload of data at the State/ UT level Create District Level Users Download DRCs
District	District Coordinators	Upload District Level Data View Progress of data upload at the district level Manually enter details such as FIs number, contact details etc. Download DRCs

(d) Setting up of Data Entry and Upload Protocols

The web application supported two forms of data entry – manual and online. Manual data entry required the DCs to physically enter data into the web application. This was done when details such as FIs name, number of students present or absent on the day of assessment etc. had to be entered into the application.

Test and questionnaire data could only be uploaded or entered into the system using the non-manual/ software facilitated mode of data entry.

Detailed procedures on ways to upload test and questionnaire data were mentioned in the Data Capturing Manual (DCM) developed by NCERT. The DCM clearly specified and explained the fields which needed to be filled/completed at the time of data upload. The document also specified the validation checks for each of the above mentioned fields.

Validation checks referred to the values and its ranges which could be filled/accepted by the application.

Each district uploaded 6 .csv files – 3 .csv files for achievement tests and one each for PQ, SQ and TQ data. Each of the achievement .csv files included data on all the subjects tested for a particular Class. However, in case of questionnaires, districts uploaded all the data across Classes for a particular questionnaire in a single .csv file.

(e) Database Security Measures

Several measures were put in place to ensure that the datasets entered into the application were secure and error free. Given below are some key safety measures instituted within the application.

- Username and password based entry: A user could enter the application only after entering a preset username and password
- All passwords were encrypted: Plain text passwords were not accepted by the application
- File upload: The application rejected any other type of upload apart from .csv files
- Different captchas built: Different captchas were built into the application for login, data upload and DRC download. Users were required to correctly enter a captcha before entering the application, uploading data and downloading DRCs.
- Access to the application based on approvals: Only pre - defined users could access the application. The application accepted only 3 levels of users: National Level Users (NLUs), State Level Users (SLUs) and District Level Users (DLUs). NLUs could only create SLUs, SLUs could only create DLUs.
- Same right users could not change/update or modify the data of other users

(f) Provisions of Backup Procedures

Within the application, the NAS 2017 database, was set up in a table format and had the following functionalities: -

- A Login tracker which tracked the user ID which logged into the web application along with the date and time of the login
- A .csv upload tracker which tracked the user ID that uploaded the file along with the format of the file and the time of modification (if any)
- LO code book along with number and times of modification
- National/State/District Response Master Trackers which tracked and created back up of all the achievement and questionnaire data, along with the number and date of modifications. Information on the IDs through which the modifications were made was also stored.

A copy of the database was also stored in the Redis server. The Redis server held all the versions of the uploaded data and any preliminary version of data could be retrieved from it.

(g) Data Cleaning & Validation Procedures

All efforts were taken to ensure that only clean data was uploaded into the web application. Preliminary levels of data cleaning were done by DCs, following the procedures mentioned in the DCM. While preparing files for upload, the DCs manually scrutinized the OMR sheets to correct errors and any cases of duplication.

Post this initial round of manual correction, the data files were scanned and converted into .csv files using a software. The .csv files were put through an offline correction tool, which helped to identify errors, specifically, in fields which were preset as mandatory. Mandatory fields were defined as fields for which entry in a specified format was needed and essential. Fields which required details on UDISE Code, Student ID, Social Group, Area Code, School Management, Gender, Medium (Language) and Test forms codes were defined as mandatory.

Data collected in the mandatory fields were crucial to the analysis of NAS 2017.

A short guideline was also developed to help users understand the procedures of cleaning the data using

the tool. Prior to data upload, the offline tool along with its guideline was hosted on the web application.

The NAS 2017 offline tool was a simple macro-based excel sheet with in - built validations that helped users clean their data. Validation ranges for the mandatory fields were same as those mentioned in the DCM and offline tool guidelines. In addition to the above, item responses from children were restricted to 1 to 4, numbers 8 and 9 were affixed for multiple and no responses respectively. Mandatory fields and columns in which values deviated from the preset values/not filled in as expected were shown as errors in the offline tool. Upon running the .csv file through the offline tool, DCs were expected to check and correct the errors in case any. The final cleaned file was also saved as.csv file which could be uploaded into the application.

Offline cleaning tool was only developed for achievement data in NAS 2017.

Snapshot of the offline tool is given below.

Figure 4.3: Snapshot of the offline tool.

Validations Results	
Total number of errors	0
UDISE School Code	0
Student ID	0
Social Group	0
Area Code	0
School Management	0
Gender	0
Medium	0
Test Form	0
Questions Errors	0

Save File for upload

Upon completion of data upload, UDISE codes of schools included in the.csv files uploaded into the web application were matched against the UDISE codes mentioned in NCERT's verified sample school lists. This step became a precursor to DRC generation.

DRC results were computed for the number of schools which matched between the uploaded .csv file and the NCERT's verified sample school lists.

(h) Data Transfer Protocols

After all the districts had uploaded the data, and the DRC's had been auto generated, the data was handed over to Head, ESD by the technical team setup by MHRD.

(i) Quality Assurance Measures

An attempt was made to set up stringent quality control processes at every step of data collection, cleaning, verification and upload.

Listed below are few quality control measures which were set up with regards to data management:

- Prior to data upload, all achievement test data had to be screened and corrected using the data offline tool
- Only .csv files could be uploaded into the web application
- DRC generation relied completely on the list of sampled schools verified by States/ UTs and shared with NCERT making result computation a transparent and bias free process
- The web application was screened through a security audit before being put into the public domain



5. Analysis

Analysis for NAS 2017 elaborates the statistical analyses that was performed in order to produce outputs used for creation of the following types of reports:

- District Report Cards (DRCs)
- State Learning Reports (SLRs)
- National Report to inform Policy, Practices and Teaching Learning (NPPTL)
- NAS Highlights and Policy Briefs

There are two types of data sources in NAS 2017: Achievement data and Questionnaire data. The achievement data entails a total of 10 assessments targeting the following Classes and Subjects:

- **Class III:** Students were tested in three subjects Language, Mathematics, and Environmental Studies. There were 15 items for each subject arranged within a single test booklet containing a total of 45 items. Achievement test was produced in two sets with 5 anchor items per subject (total of 15 anchor items and 25 unique items across 3 subjects per Class).
- **Class V:** Students were tested in three subjects Language, Mathematics, and Environmental Studies. There were 15 items for each subject arranged within a single test booklet containing a total of 45 items. Achievement test was produced in two sets with 5 anchor items per subject (total of 15 anchor items and 25 unique items across 3 subjects per Class).
- **Class VIII:** Students were tested in four subjects Language, Mathematics, Science, and Social Science. There were 15 items for each subject arranged within a single test booklet containing a total of 60 items. Achievement test was produced in two sets with 5 anchor items per subject (total of 20 anchor items and 25 unique items across 4 subjects per Class).

The questionnaire data was collected by means of three instruments:

- **Pupil Questionnaire (PQ):** The purpose of PQ was to collect student related information (home background and study habits). It contained questions which were filled in by a Field Investigator in an interview mode.
- **Teacher Questionnaire (TQ):** The purpose of TQ was to collect information about the teacher background. It was administered to each subject teacher (Language, Mathematics, EVS/ Science and Social Science) who was teaching to the sampled students of Classes III, V and VIII. It contained questions which were filled in by a Field Investigator in an interview mode.

- **School Questionnaire (SQ):** The purpose of SQ was to collect information about the school infrastructure, teaching learning process and community involvement. The respondents were school principals (head teachers) or their deputies. This contained questions which were filled in by a Field Investigator in an interview mode.

The first step prior to carrying out the statistical analyses included the presentation and Installation of Data Management and Item Analysis System (DAMIAS). This included Data Preparation phase that entailed merging district data files, verification of data integrity, and formatting data for analysis using DAMIAS. This step was followed by a series of analyses targeting the following major purposes:

1. Evaluation of technical characteristics of achievement instruments at item and test levels. These analyses were carried out for selected languages that covered majority of population in India, that is, English, Hindi, Telugu, Bangla, Kannada, and Tamil.
2. Evaluation of student performance at national and State levels included comparisons between different categories of students such as gender, urban/rural location, social groups, and school management.
3. Analysis of contextual factors associated with student performance was collected by means of questionnaires.

In order to develop a reporting frame for achievement tests that was fully aligned with industry standards, the following was also conducted:

- a) IRT scaling and
- b) Setting Performance Standards (SPS).

Since, the IRT scaling and standard setting activity were allocated later in the project timeline, the first version of National and State reports were considered that were based on classical analysis and performance bands which were constructed using the traditional percent-correct intervals.

5.1 Evaluation of Technical Standards of Achievement Instruments

Quality of achievement instruments at item and test level was conducted using Classical Test Theory (CTT) and Item Response Theory (IRT) indices, such as:

- **Item difficulty:** The difficulty of an item was determined using CTT and IRT metrics. In CTT, item difficulty was based on the proportion of students giving a correct answer, and in IRT, difficulty was represented by the estimate of ability needed to answer an item correctly.
- **Item discrimination:** Based on the concept that an item divides learners into two groups – those who answered an item correctly and those who answered incorrectly – item discrimination indices told us how sharply an item discriminated between these two groups. Technically, we computed the measures of relationships between item scores and total scores on the test.
- **Options analysis:** Used for scrutinizing the behavior of multiple choice options to determine if they were working as expected: proportions of students choosing each option, option point-biserial correlations.
- **Differential Item Functioning (DIF):** It was used to determine if there were unexpected differences in item performance between different groups of examinees that were matched by ability level (overall performance on the test). Most typically DIF was checked to evaluate possible item bias for gender groups, but for NAS 2017, it had also been suggested to carry out DIF between groups taking selected pairs of languages (keeping Hindi as a reference and selected languages as focal).
- **Item-location:** Evaluated IRT item locations (difficulty) on the ability distribution of persons taking the test.
- **Test reliability:** Determined the degree to which the test scores were independent from non-systematic variations or errors of measurement. In CTT the estimation of reliability was mainly based on internal consistency methods (split-half and Cronbach alpha) and in IRT test reliability

was based on the concept of Test Information Function.

- **Test validity:** Determined the degree to which a test measured what it purports to measure. In educational assessments, validity was typically based on the evaluation of the alignment between content coverage of the test and curriculum standards. However, it included studies of concurrent or predictive validity in regard to some external criterion, or evaluation of construct validity using factor analysis and/or some similar methods such as cluster analysis and MultiTrait-MultiMethod analysis.

5.2 Analysis of Contextual Factors associated with Student Performance

The analysis of contextual information is important for informing policy decisions aimed at supporting improvements in the quality of instruction and student learning outcomes. Contextual data analysis were designed around the research questions which focussed on exploring the factors associated with student learning outcomes. These factors included student and parent background data (e.g. age, gender, study habits, richness of home environment, socio-economic status including parent level of education, attitudes toward school and teachers, etc.) and school level data assessed by means of subject teacher and school head questionnaires (e.g. school socio-economic status, school type, regional location, qualifications of teachers, policy support, etc.). This data analysis was carried out using SPSS software.

- Pupil Questionnaire

To what extent are the **student characteristics** associated with performance on NAS? Is the pattern different in Classes III, V and VIII?

- Teacher Questionnaire

To what extent are **teacher characteristics** and instruction-related factors associated with student performance? Is the pattern different in Classes III, V and VIII?

- School Questionnaire

To what extent are **school-related factors** (school environment) associated with student performance?

5.3 Procedure of Data Analysis

Data Cleaning

The paramount goals of data cleaning procedures were the following: (1) to ensure that the data accurately reflected the information collected; and (2) to format the data in a manner that facilitated ease of use. Data cleaning procedures which were considered important for achieving these key goals were carried out and determined the extent to which data had been appropriately cleaned and formatted to enable fluid analysis. Quality assurance checks were carried out after data had been cleaned. Item quality checks included review of the response distribution of items to ensure that the items functioned as expected and that all standard response options employed a consistent coding scheme. After the evaluation of item and test quality using both Classical Test Theory (CTT) and Item Response Theory (IRT) indices, IRT scaling was done (refer Appendix D).

IRT Scaling

The reporting scale for the National Achievement Survey (NAS) 2017 data was based on the Item Response Theory (IRT). The benefits of the IRT scale are not only in the provision of a meaningful reporting framework, but also in providing a foundation for establishing comparability between the results obtained in different administration years. The most valuable feature of the IRT models was in providing a fruitful framework that could be effectively utilized for monitoring and promoting quality of education.

The IRT model chosen for item calibration was a two-parameter logistic (2-PL) model because it utilized the two item characteristics that were most pertinent for assessing educational achievement: item difficulty and item discrimination. Items were calibrated using the strategy that centered the mean of item difficulties to zero and evaluated the distribution of ability estimates in relation to the mean of item difficulties.

Student scores were determined by means of the IRT 'pattern-scoring' approach, where a pattern of student responses to items was used to estimate the latent ability (i.e., knowledge and competencies) underlying

students' test performance. The techniques used for ability estimation was based on the Weighted Maximum Likelihood (WML) method, which was widely supported in research literature.

The IRT ability estimates were independent of any set of items, and given that the item parameters of multiple test forms (item sets) were calibrated to the same scale, the scores from multiple test forms obtained by pattern-scoring were directly comparable. The IRT scores were initially generated in the logit metrics, and then they were linearly converted into a meaningful and publicly communicable scale that facilitated score interpretation. The reporting scale was set to the range of 100 to 500 with a mean of 300 and standard deviation of 50. Thus, the linear transformation from ability estimates expressed on the logit scale to the reporting scale scores was applied using the expression: $Scale\ Score = Logit\ Score * 50 + 300$.

Sampling Weights

Sampling weights were determined using an industry standard definition of a sampling weight as an inverse of the probability of being selected into the sample. School and student weights reflect the sample design by considering the approach to cluster-based sampling and included adjustments for the different probability of a student being selected from schools of different size. Weights were also determined for each District and State based on the ratio of the respective population and sample distributions. The final weights were determined as a product of the school base weight, District weight, and State weight (refer Appendix E). The creation of sampling weights relied on the sampling frame which contained information about the schools in population and schools selected in the sample.

Developing Performance Standards

Performance Standards represented a necessary component of standards-based assessment system that was used for summative and formative evaluation of student academic performance in regard to the expectations derived from National Curriculum at each targeted Class and Subject.

NCERT's vision for providing maximally useful assessment-based support to the States, and especially at the school and District supervisory level, required setting of performance standards, that is, the development of conceptual and operational definitions of student performance levels. There were multiple benefits of establishing performance standards system:

- Performance Standards were developed using the representative panels of national experts.
- They were based on national curriculum, and designed to be internationally comparable with similar systems with regard to methodology and standards level.
- They were established for each targeted Class and Subject enabling summative and formative evaluation at each targeted Class and Subject.
- They were developed as vertically aligned prescribing student learning expectations at each targeted Class level, which enabled evaluation of student learning progress across Classes.
- They were linked to the IRT scale, which enabled horizontal equating to provide a framework for monitoring of national educational progress over multiple academic years.
- Performance Standards were aggregated over Classes and Subjects to express overall performance in different schools, Districts, or States, as well as at national level. They enabled answering the questions such as: what is the overall percentage of proficient students at the school (District or State) taken all Class and Subjects together?

The performance levels for NAS were constructed using industry standard procedure that entailed a 2-stage process: (1) development of conceptual definitions of the levels informed by the Class/Subject specific content standards, i.e., measurable learning outcomes and competencies covered at each Class/Subject; and (2) setting cut-points using the NAS 2017 instruments and data.

5.4 Assessment of Student Performance at District Level

NAS 2017 was conducted in 701 districts of the country covering all states and UTs. The performance of each district was assessed using DRCs (District Report Cards). For each district, there were 10 report cards developed subject wise (3 for Class III, 3 for Class V and 4 for Class VIII). The DRCs captured overall information about the student performance on learning outcomes in a given district. It further depicts subject specific performance by gender (boys and girls), area (rural and urban), social groups (SC, ST, OBC and general) and school management (government and government-aided). DRC also considers the number of students of different disability types i.e. Locomotor Disability (LD), Visual Impairment (VI), Hearing Impairment (HI), Speech and Language Disability (S&LD), Intellectual Disability (ID) and Other Disability (Oth). DRC thus enabled to envision the interventions required for improving the quality of education at classroom level. The complete district wise report cards are available at <http://www.ncert.nic.in/programmes/NAS/DRC.html>.

To understand these District Report Cards, a module was developed, Communication and Understanding of the DRCs, Post NAS Interventions (www.ncert.nic.in/programmes/NAS/pdf/DRC_report.pdf)

5.5 Assessment of Student Performance at State Level

The following Research Questions were framed and the analysis plan was developed accordingly:

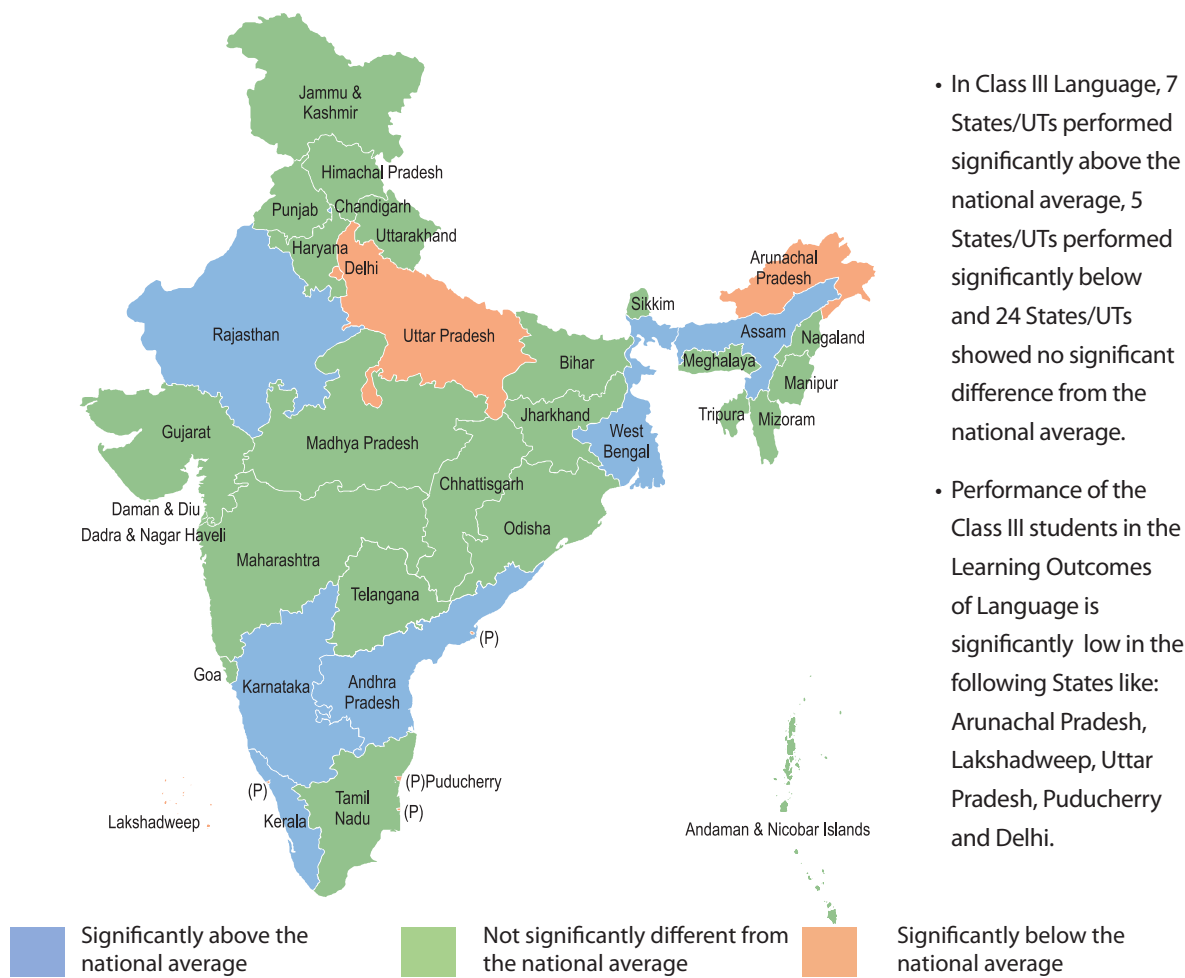
1. How the performance of students varied in Language, Maths and EVS in Class III and V, and Language, Maths, Science and Social Science in Class VIII?

For each class the following information was produced:

- Computed the means of Percentage-correct scores for the total test at National and State levels. Created a Table for each subject containing State percentage-correct means in alphabetical order (included National means at the top).
- Developed IRT scale for each subject at each class. Centered the scale to 300 with standard deviation of 50. The following options were considered:

- vertically moderated scale across class levels, and anchoring the scale to performance levels (contingent to setting performance standards). Calculated means of the IRT scale scores at National and State levels.
- Using the IRT scale scores created a Statewise map of India reporting State learning outcomes against national benchmarks. Used Cohen's D range of +/- 0.20 around the national benchmark as boundaries.
 - Computed the mean Percentage-scores for Learning Outcomes (LO) within the subject. Constructed a vertical bar-chart for each LO within the subject demonstrating State means in alphabetical order. (Box-plots were preferred over bar charts). Various options for reporting categories were considered: a) by single LOs, b) by LOs grouped in content categories, and c) by grouping LOs in competency categories.
 - Computed and generated report tables and graphs of percentages of students reaching different performance levels. These performance levels were initially based on predetermined Percentage-correct boundaries and in the later version of reports they were based on cut scores determined by standard setting.
2. Is there any significant difference between boys and girls in performance in Language, Maths and EVS in Class III and V, and Language, Maths, Science and Social Science in Class VIII?
 - a) Computed means of IRT scale scores for boys and girls at each State and at national level.
 - b) Computed Cohen's D for each comparison.
 - c) Generated table with State means for boys and girls, and corresponding Cohen's D, in alphabetical order of States.
 - d) Constructed a statewise map of India indicating whether boys or girls perform better or there is no significant difference.
 3. Is there any significant difference in students' performance belonging to rural and urban schools?
 - a) Computed means of IRT scale scores for urban and rural schools at each State and at national level.
 - b) Computed Cohen's D for each comparison.
 - c) Generated a table with State means for rural and urban schools, and corresponding Cohen's D, in alphabetical order of States.
 - d) Constructed a statewise map of India indicating whether rural or urban schools perform better or there is no significant difference.
 4. How does the performance of the students varies in Language, Maths and EVS in Class III and V, and Language, Maths, Science and Social Science in Class VIII across social groups?
 - a) Computed means of IRT scale scores for social groups at each State.
 - b) Computed ANOVA to test the differences between social groups.
 - c) Generated a table with State means for social groups, and corresponding significance levels, in alphabetical order of States.
 5. How does the performance of the students varies in Language, Maths and EVS in Class III and V, and Language, Maths, Science and Social Science in Class VIII across school managements?
 - a) Computed means of IRT scale scores for different types of school management at each State.
 - b) Computed ANOVA to test the differences between the different types of schools as per management.
 - c) Generated a table with State means for types of school management, and corresponding significance levels, in alphabetical order of States.

Figure 5.1: Performance of States in Class III: Language

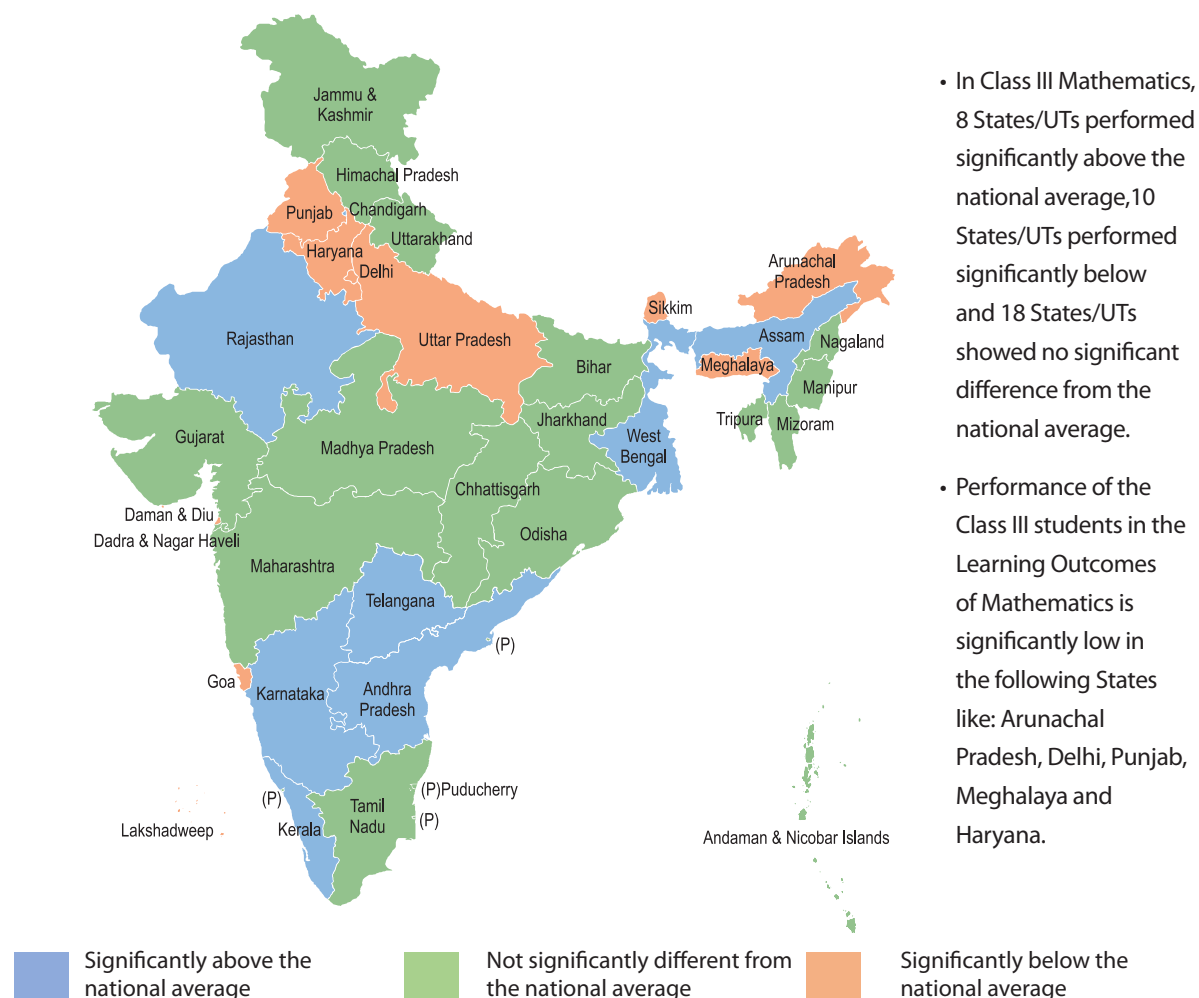


- In Class III Language, 7 States/UTs performed significantly above the national average, 5 States/UTs performed significantly below and 24 States/UTs showed no significant difference from the national average.
- Performance of the Class III students in the Learning Outcomes of Language is significantly low in the following States like: Arunachal Pradesh, Lakshadweep, Uttar Pradesh, Puducherry and Delhi.

State/UT	Mean	State/UT	Mean	State/UT	Mean
Andhra Pradesh	364	Manipur	341	Haryana	329
Karnataka	360	Himachal Pradesh	341	Meghalaya	327
Rajasthan	358	Telangana	340	Odisha	326
West Bengal	356	Madhya Pradesh	340	A & N Islands	326
Chandigarh	354	Mizoram	337	Tamil Nadu	325
Assam	350	Tripura	336	Sikkim	325
Kerala	349	National Mean	336	Delhi	316
Uttarakhand	347	Bihar	336	Puducherry	316
Gujarat	347	Goa	333	Uttar Pradesh	314
Nagaland	345	Chhattisgarh	332	Lakshadweep	313
Jharkhand	344	Jammu & Kashmir	332	Arunachal Pradesh	307
Maharashtra	344	Punjab	330		
Dadra & Nagar Haveli	343	Daman & Diu	330		

*Boundaries around the National Average were constructed using Cohen’s D measure of effect size (Cohen, 1988) equal to +/- 0.20. The differences between National Mean and State Means that are smaller than D=0.20 are considered small and practically insignificant. Similarly, differences between individual State Means that are smaller than D=0.20 can be considered as practically insignificant.

Figure 5.2: Performance of States in Class III: Mathematics

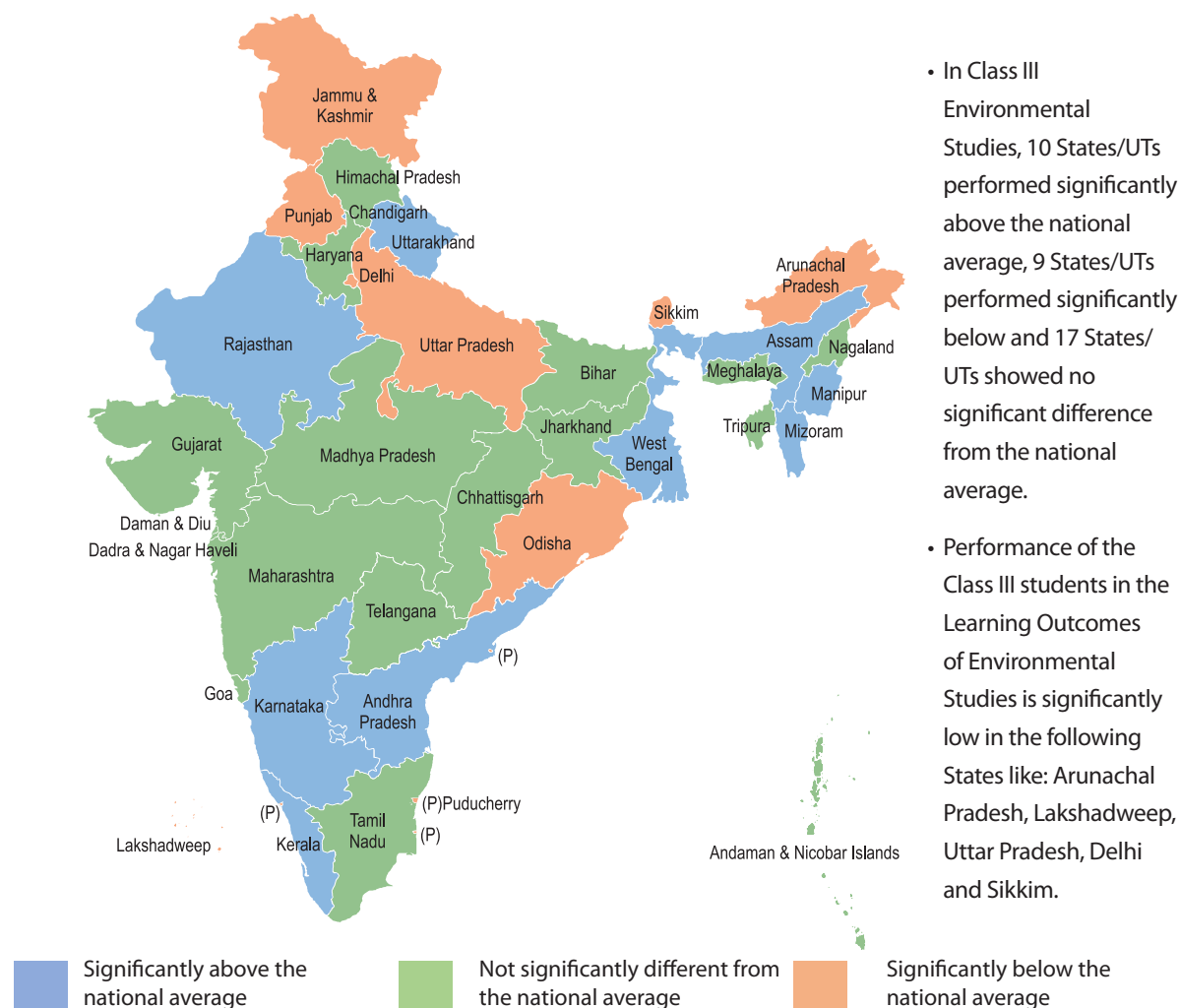


- In Class III Mathematics, 8 States/UTs performed significantly above the national average, 10 States/UTs performed significantly below and 18 States/UTs showed no significant difference from the national average.
- Performance of the Class III students in the Learning Outcomes of Mathematics is significantly low in the following States like: Arunachal Pradesh, Delhi, Punjab, Meghalaya and Haryana.

State/UT	Mean	State/UT	Mean	State/UT	Mean
Karnataka	348	Gujarat	325	Puducherry	314
Andhra Pradesh	342	Maharashtra	325	Daman & Diu	310
Kerala	340	National Mean	321	Goa	309
Rajasthan	339	Himachal Pradesh	320	Uttar Pradesh	309
Chandigarh	339	Tripura	318	Lakshadweep	308
West Bengal	337	Bihar	318	Sikkim	307
Assam	337	Jammu & Kashmir	318	Haryana	307
Telangana	332	A & N Islands	318	Meghalaya	307
Uttarakhand	330	Odisha	316	Punjab	306
Nagaland	330	Madhya Pradesh	316	Delhi	299
Manipur	329	Mizoram	315	Arunachal Pradesh	295
Dadra & Nagar Haveli	328	Tamil Nadu	314		
Jharkhand	327	Chhattisgarh	314		

*Boundaries around the National Average were constructed using Cohen’s D measure of effect size (Cohen, 1988) equal to +/- 0.20. The differences between National Mean and State Means that are smaller than D=0.20 are considered small and practically insignificant. Similarly, differences between individual State Means that are smaller than D=0.20 can be considered as practically insignificant.

Figure 5.3: Performance of States in Class III: Environmental Studies



- In Class III Environmental Studies, 10 States/UTs performed significantly above the national average, 9 States/UTs performed significantly below and 17 States/UTs showed no significant difference from the national average.
- Performance of the Class III students in the Learning Outcomes of Environmental Studies is significantly low in the following States like: Arunachal Pradesh, Lakshadweep, Uttar Pradesh, Delhi and Sikkim.

State/UT	Mean	State/UT	Mean	State/UT	Mean
Kerala	346	Nagaland	327	Haryana	313
Chandigarh	343	Telangana	327	Meghalaya	311
Karnataka	341	Jharkhand	325	Odisha	311
Rajasthan	337	Tripura	323	Jammu & Kashmir	310
Andhra Pradesh	336	Tamil Nadu	323	Puducherry	310
West Bengal	334	Himachal Pradesh	322	Punjab	308
Uttarakhand	333	National Mean	321	Sikkim	308
Assam	331	Madhya Pradesh	320	Delhi	303
Manipur	331	Goa	319	Uttar Pradesh	303
Mizoram	331	A & N Islands	318	Lakshadweep	301
Maharashtra	330	Chhattisgarh	318	Arunachal Pradesh	295
Gujarat	329	Bihar	317		
Dadra & Nagar Haveli	328	Daman & Diu	314		

*Boundaries around the National Average were constructed using Cohen's D measure of effect size (Cohen, 1988) equal to +/- 0.20. The differences between National Mean and State Means that are smaller than $D=0.20$ are considered small and practically insignificant. Similarly, differences between individual State Means that are smaller than $D=0.20$ can be considered as practically insignificant.

Figure 5.4: Performance of States in Class V: Language



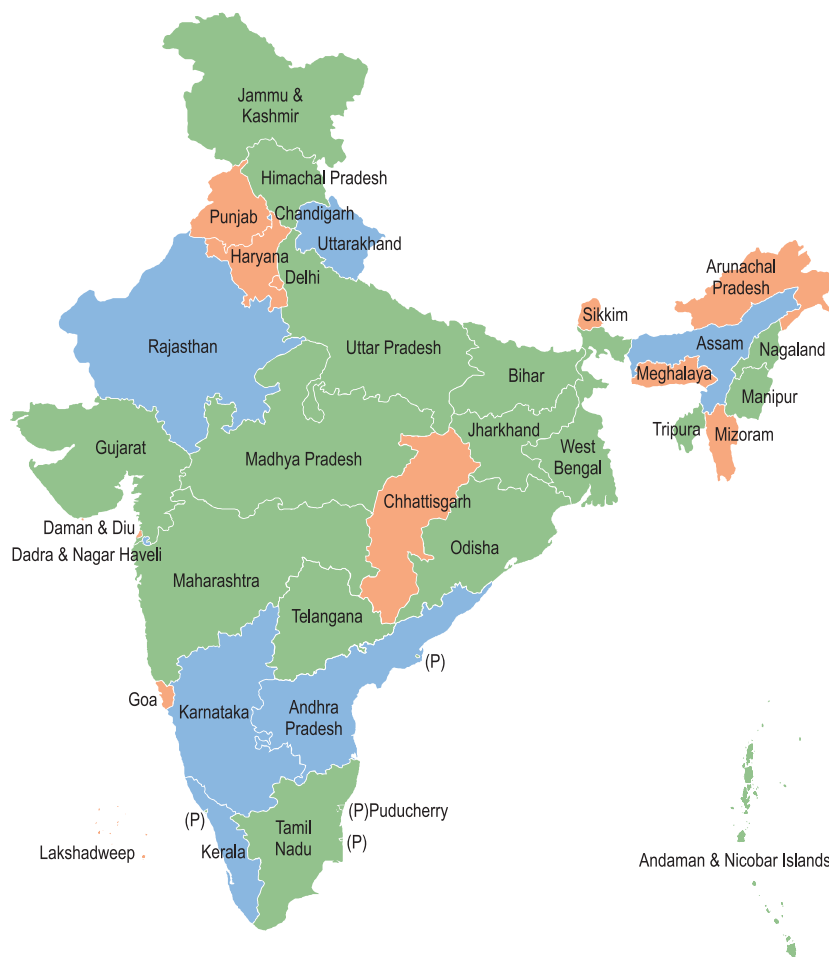
- In Class V Language, 7 States/UTs performed significantly above the national average, 11 States/UTs performed significantly below and 18 States/UTs showed no significant difference from the national average.
- Performance of the Class V students in the Learning Outcomes of Language is significantly low in the following States like: Arunachal Pradesh, Meghalaya, Sikkim, Uttar Pradesh and Puducherry.

■ Significantly above the national average
 ■ Not significantly different from the national average
 ■ Significantly below the national average

State/UT	Mean	State/UT	Mean	State/UT	Mean
Kerala	353	Manipur	320	Punjab	306
Karnataka	351	National Mean	319	Lakshadweep	304
Chandigarh	345	West Bengal	317	Odisha	304
Rajasthan	344	Tripura	316	Delhi	303
Andhra Pradesh	339	Bihar	316	Mizoram	301
Uttarakhand	338	Telangana	314	Daman & Diu	300
Dadra & Nagar Haveli	335	Madhya Pradesh	313	Puducherry	300
Himachal Pradesh	328	Goa	313	Uttar Pradesh	300
Jharkhand	326	Chhattisgarh	313	Sikkim	297
Gujarat	324	Nagaland	312	Meghalaya	296
Maharashtra	323	Haryana	310	Arunachal Pradesh	287
Assam	322	Jammu & Kashmir	310		
Tamil Nadu	321	A & N Islands	309		

*Boundaries around the National Average were constructed using Cohen’s D measure of effect size (Cohen, 1988) equal to +/- 0.20. The differences between National Mean and State Means that are smaller than D=0.20 are considered small and practically insignificant. Similarly, differences between individual State Means that are smaller than D=0.20 can be considered as practically insignificant.

Figure 5.5: Performance of States in Class V: Mathematics



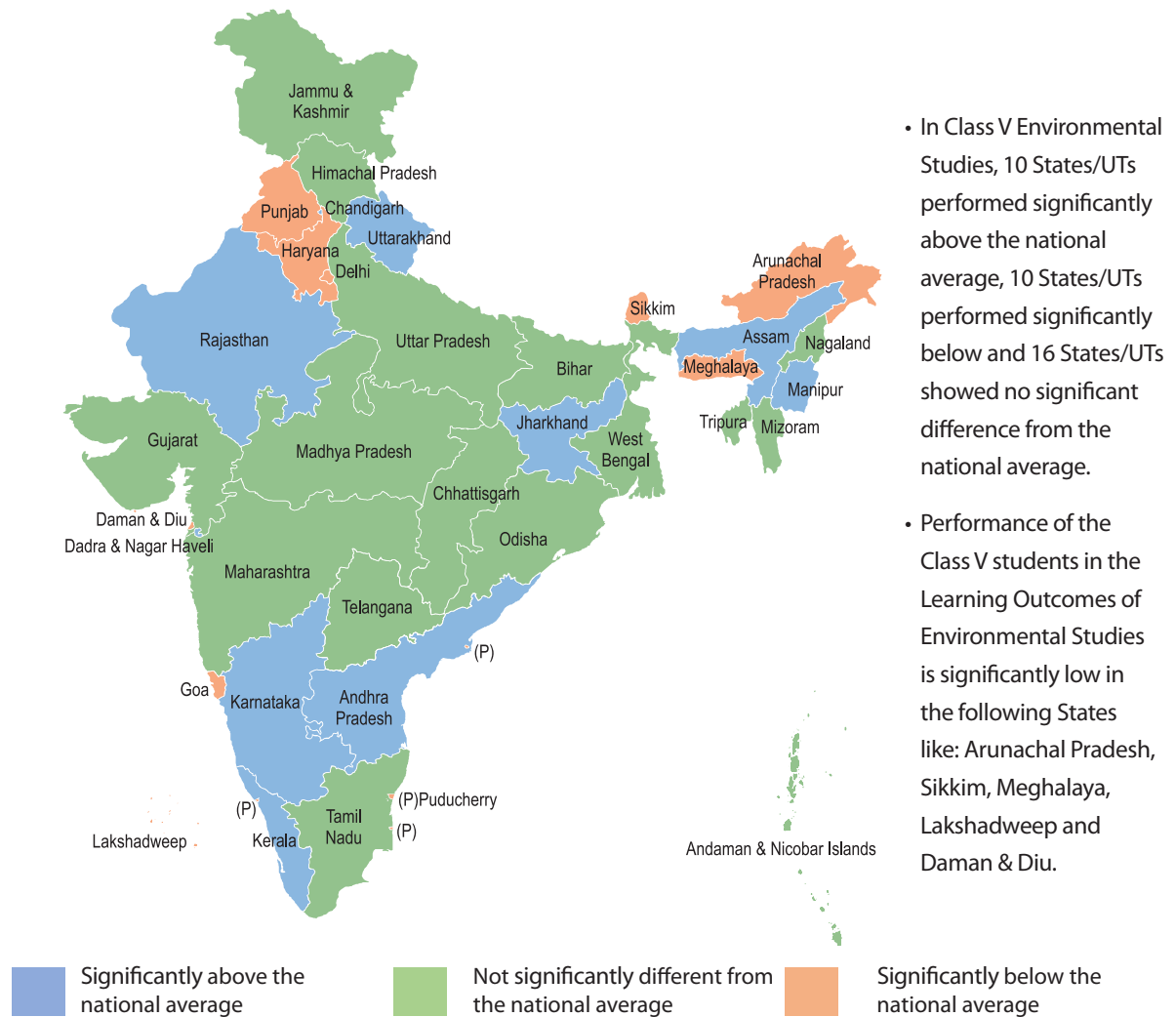
- In Class V Mathematics, 8 States/UTs performed significantly above the national average, 11 States/UTs performed significantly below and 17 States/UTs showed no significant difference from the national average.
- Performance of the Class V students in the Learning Outcomes of Mathematics is significantly low in the following States like: Arunachal Pradesh, Sikkim, Meghalaya, Delhi and Daman & Diu.

Significantly above the national average
 Not significantly different from the national average
 Significantly below the national average

State/UT	Mean	State/UT	Mean	State/UT	Mean
Karnataka	345	Jammu & Kashmir	315	Chhattisgarh	298
Kerala	342	National Mean	310	Goa	295
Rajasthan	338	Bihar	309	Haryana	294
Chandigarh	336	Himachal Pradesh	305	Mizoram	293
Andhra Pradesh	333	Maharashtra	305	Punjab	293
Assam	333	Tripura	304	Lakshadweep	291
Uttarakhand	326	Madhya Pradesh	303	Daman & Diu	290
Dadra & Nagar Haveli	325	A & N Islands	302	Delhi	287
Odisha	321	Puducherry	302	Meghalaya	284
Jharkhand	321	Uttar Pradesh	301	Sikkim	281
Gujarat	321	West Bengal	301	Arunachal Pradesh	278
Manipur	316	Tamil Nadu	300		
Telangana	316	Nagaland	300		

*Boundaries around the National Average were constructed using Cohen’s D measure of effect size (Cohen, 1988) equal to +/- 0.20. The differences between National Mean and State Means that are smaller than D=0.20 are considered small and practically insignificant. Similarly, differences between individual State Means that are smaller than D=0.20 can be considered as practically insignificant.

Figure 5.6: Performance of States in Class V: Environmental Studies

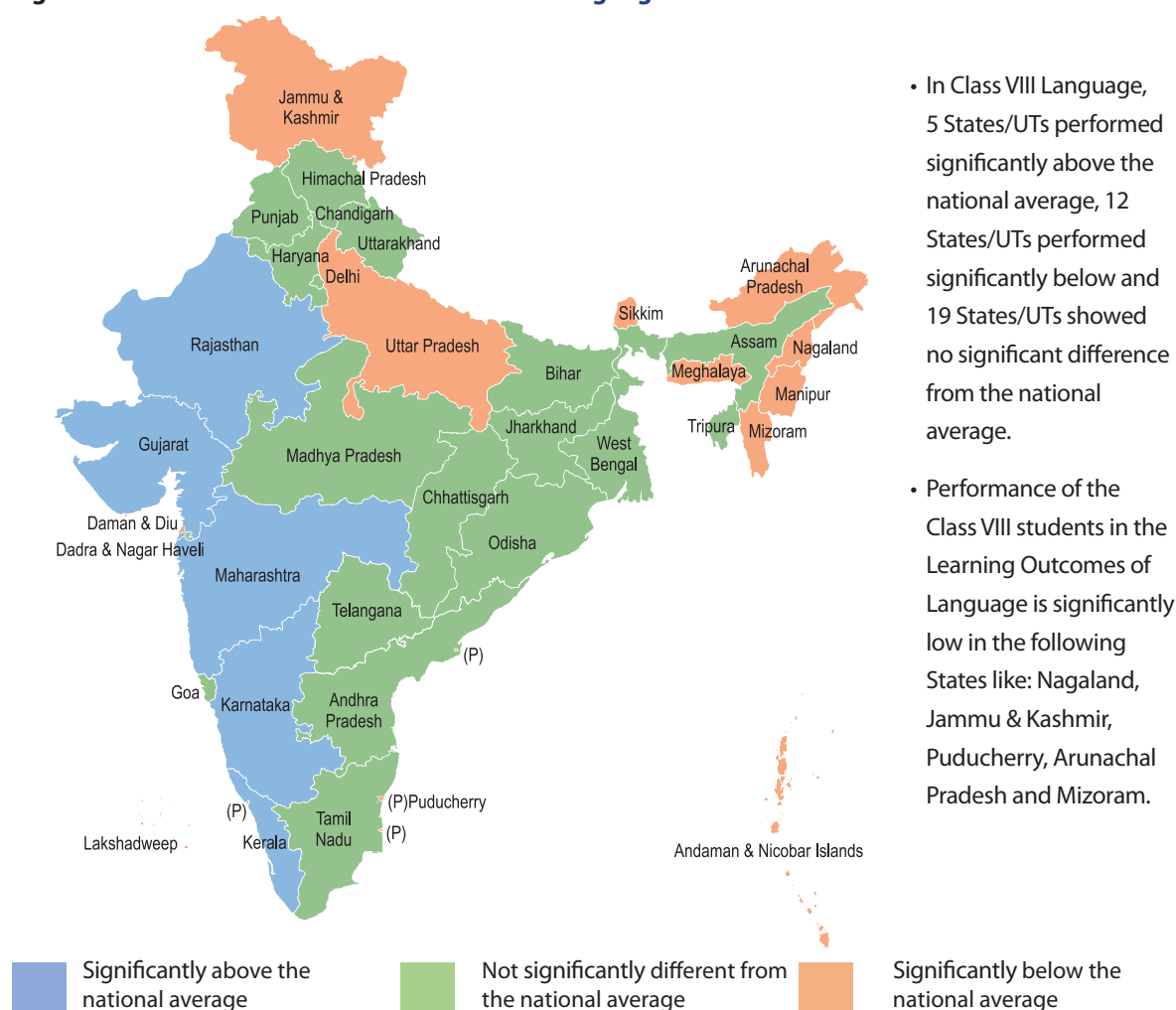


- In Class V Environmental Studies, 10 States/UTs performed significantly above the national average, 10 States/UTs performed significantly below and 16 States/UTs showed no significant difference from the national average.
- Performance of the Class V students in the Learning Outcomes of Environmental Studies is significantly low in the following States like: Arunachal Pradesh, Sikkim, Meghalaya, Lakshadweep and Daman & Diu.

State/UT	Mean	State/UT	Mean	State/UT	Mean
Rajasthan	339	Himachal Pradesh	310	Uttar Pradesh	300
Kerala	336	National Mean	310	Haryana	298
Chandigarh	335	Tripura	308	Punjab	297
Karnataka	335	Jammu & Kashmir	307	Puducherry	296
Uttarakhand	327	Madhya Pradesh	305	Goa	292
Assam	327	West Bengal	304	Delhi	292
Jharkhand	326	Maharashtra	304	Daman & Diu	288
Dadra & Nagar Haveli	325	Telangana	303	Lakshadweep	285
Andhra Pradesh	324	Chhattisgarh	303	Meghalaya	283
Manipur	321	A & N Islands	303	Sikkim	282
Gujarat	314	Mizoram	302	Arunachal Pradesh	282
Bihar	311	Nagaland	302		
Odisha	311	Tamil Nadu	300		

*Boundaries around the National Average were constructed using Cohen’s D measure of effect size (Cohen, 1988) equal to +/- 0.20. The differences between National Mean and State Means that are smaller than D=0.20 are considered small and practically insignificant. Similarly, differences between individual State Means that are smaller than D=0.20 can be considered as practically insignificant.

Figure 5.7: Performance of States in Class VIII: Language

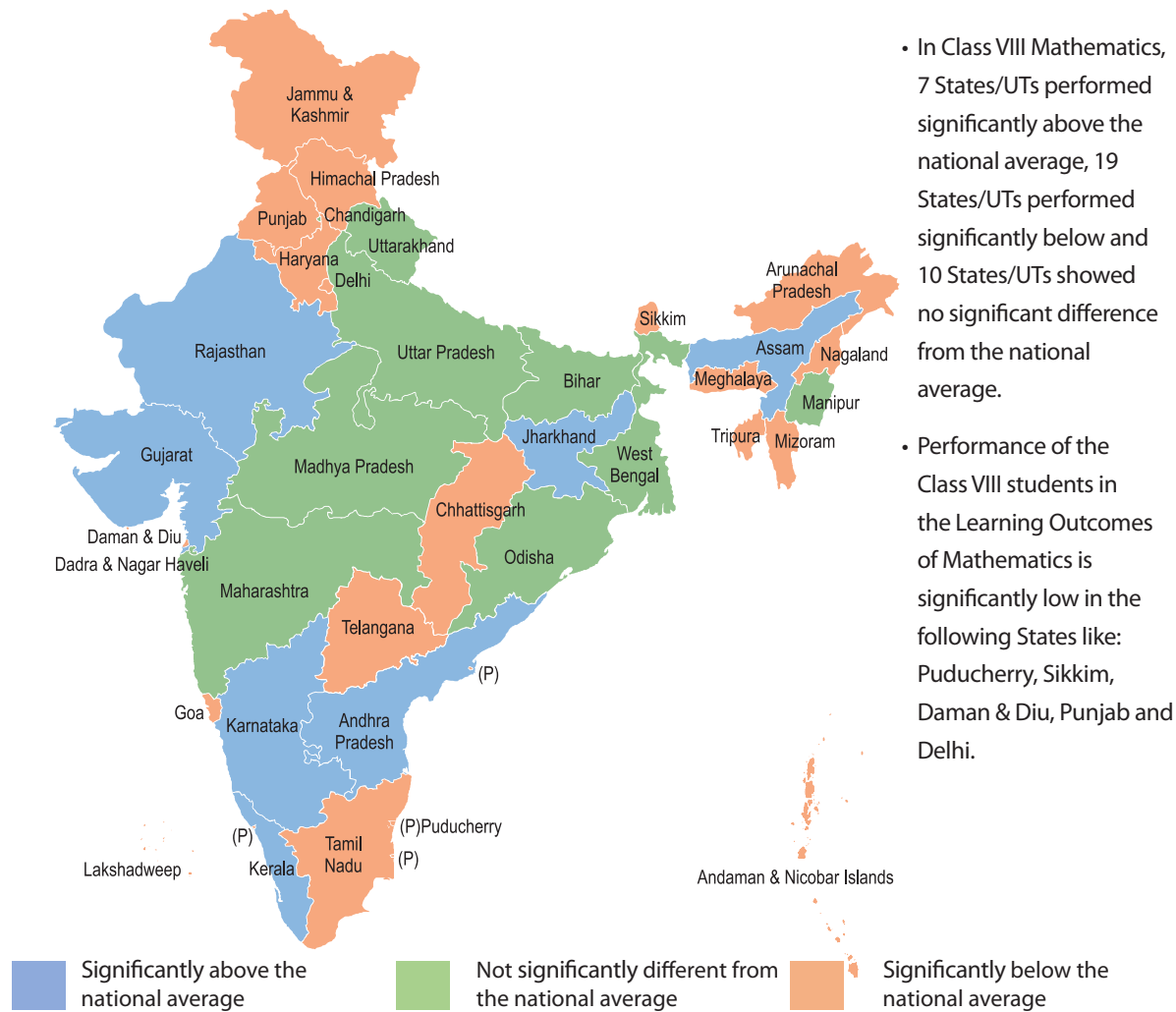


- In Class VIII Language, 5 States/UTs performed significantly above the national average, 12 States/UTs performed significantly below and 19 States/UTs showed no significant difference from the national average.
- Performance of the Class VIII students in the Learning Outcomes of Language is significantly low in the following States like: Nagaland, Jammu & Kashmir, Puducherry, Arunachal Pradesh and Mizoram.

State/UT	Mean	State/UT	Mean	State/UT	Mean
Rajasthan	329	National Mean	307	Sikkim	294
Gujarat	325	Tamil Nadu	305	A & N Islands	294
Kerala	322	Haryana	305	Uttar Pradesh	293
Maharashtra	320	Chhattisgarh	303	Manipur	293
Karnataka	318	West Bengal	303	Lakshadweep	289
Jharkhand	317	Madhya Pradesh	301	Meghalaya	288
Chandigarh	315	Tripura	300	Mizoram	284
Dadra & Nagar Haveli	314	Odisha	299	Arunachal Pradesh	280
Himachal Pradesh	312	Punjab	299	Puducherry	277
Goa	311	Delhi	299	Jammu & Kashmir	275
Uttarakhand	309	Assam	298	Nagaland	273
Andhra Pradesh	308	Telangana	297		
Bihar	307	Daman & Diu	295		

*Boundaries around the National Average were constructed using Cohen's D measure of effect size (Cohen, 1988) equal to +/- 0.20. The differences between National Mean and State Means that are smaller than $D=0.20$ are considered small and practically insignificant. Similarly, differences between individual State Means that are smaller than $D=0.20$ can be considered as practically insignificant.

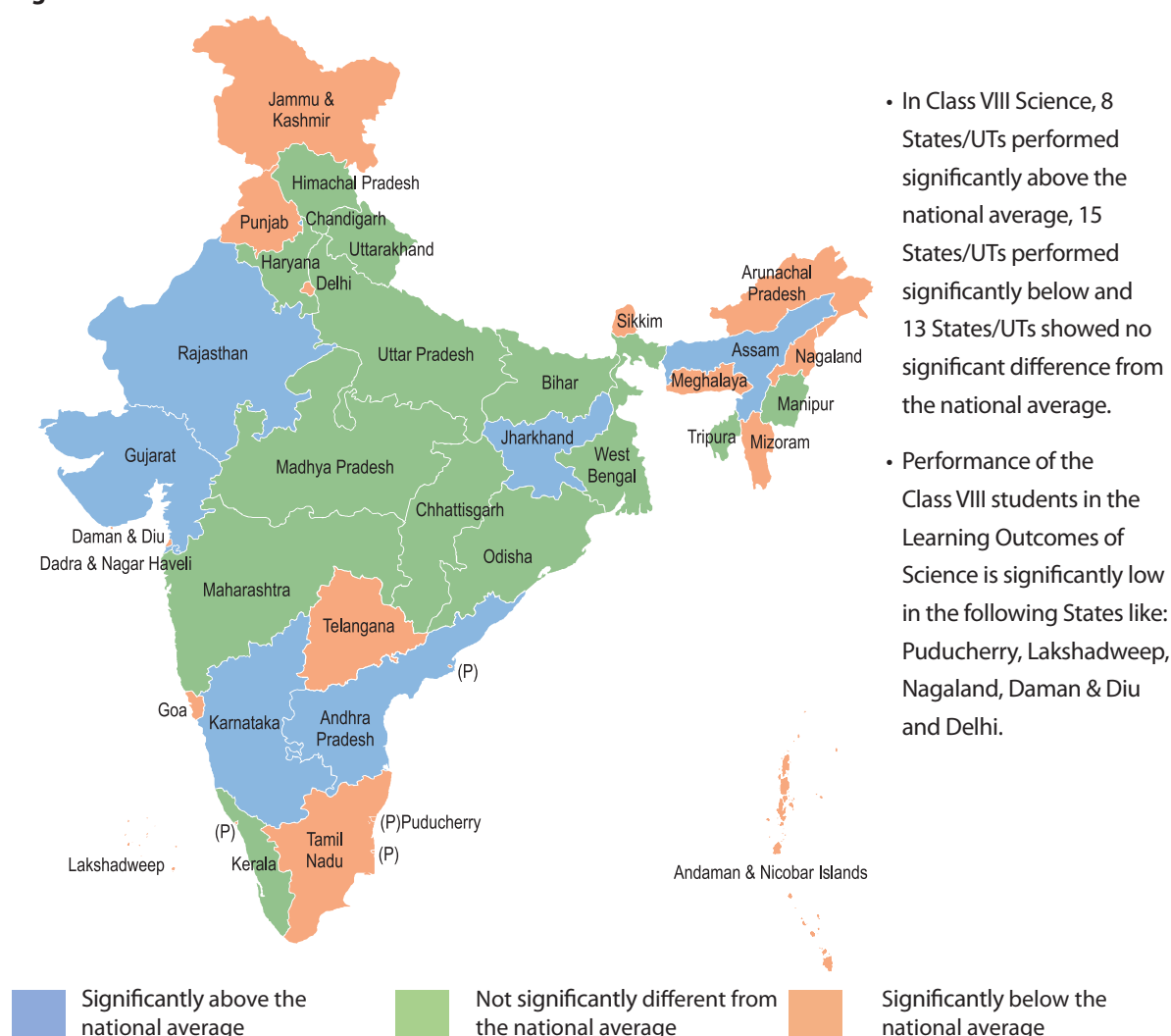
Figure 5.8: Performance of States in Class VIII: Mathematics



State/UT	Mean	State/UT	Mean	State/UT	Mean
Rajasthan	304	Madhya Pradesh	264	Meghalaya	249
Jharkhand	293	Maharashtra	263	Arunachal Pradesh	248
Karnataka	287	Uttarakhand	262	Goa	248
Kerala	286	Uttar Pradesh	262	A & N Islands	248
Andhra Pradesh	286	West Bengal	261	Lakshadweep	247
Assam	283	Tripura	258	Nagaland	246
Gujarat	281	Telangana	257	Delhi	244
Dadra & Nagar Haveli	279	Jammu & Kashmir	256	Punjab	243
Bihar	277	Mizoram	256	Daman & Diu	242
Chandigarh	277	Haryana	256	Sikkim	241
Odisha	273	Chhattisgarh	255	Puducherry	241
National Mean	269	Himachal Pradesh	254		
Manipur	267	Tamil Nadu	251		

*Boundaries around the National Average were constructed using Cohen’s D measure of effect size (Cohen, 1988) equal to +/- 0.20. The differences between National Mean and State Means that are smaller than D=0.20 are considered small and practically insignificant. Similarly, differences between individual State Means that are smaller than D=0.20 can be considered as practically insignificant.

Figure 5.9: Performance of States in Class VIII: Science

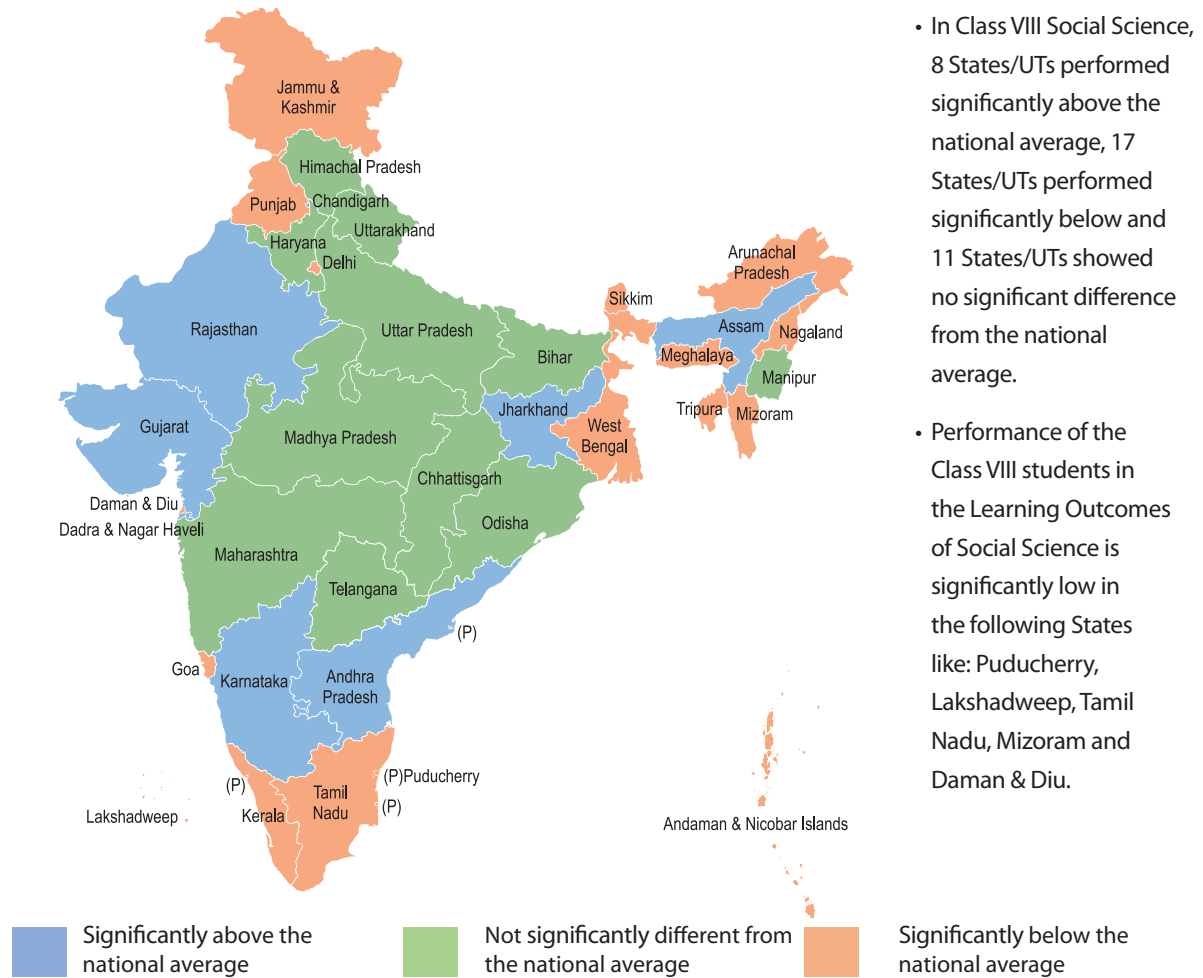


- In Class VIII Science, 8 States/UTs performed significantly above the national average, 15 States/UTs performed significantly below and 13 States/UTs showed no significant difference from the national average.
- Performance of the Class VIII students in the Learning Outcomes of Science is significantly low in the following States like: Puducherry, Lakshadweep, Nagaland, Daman & Diu and Delhi.

State/UT	Mean	State/UT	Mean	State/UT	Mean
Rajasthan	326	Madhya Pradesh	274	Punjab	257
Jharkhand	302	Himachal Pradesh	273	Tamil Nadu	256
Karnataka	297	Manipur	272	A & N Islands	254
Dadra & Nagar Haveli	296	Kerala	271	Meghalaya	252
Gujarat	295	West Bengal	269	Mizoram	250
Chandigarh	292	Haryana	268	Arunachal Pradesh	250
Assam	289	Maharashtra	266	Delhi	248
Andhra Pradesh	286	Tripura	266	Daman & Diu	248
Uttarakhand	281	Uttar Pradesh	266	Nagaland	247
Odisha	277	Telangana	259	Lakshadweep	245
Bihar	277	Goa	258	Puducherry	242
Chhattisgarh	275	Jammu & Kashmir	258		
National Mean	274	Sikkim	257		

*Boundaries around the National Average were constructed using Cohen's D measure of effect size (Cohen, 1988) equal to ± 0.20 . The differences between National Mean and State Means that are smaller than $D=0.20$ are considered small and practically insignificant. Similarly, differences between individual State Means that are smaller than $D=0.20$ can be considered as practically insignificant.

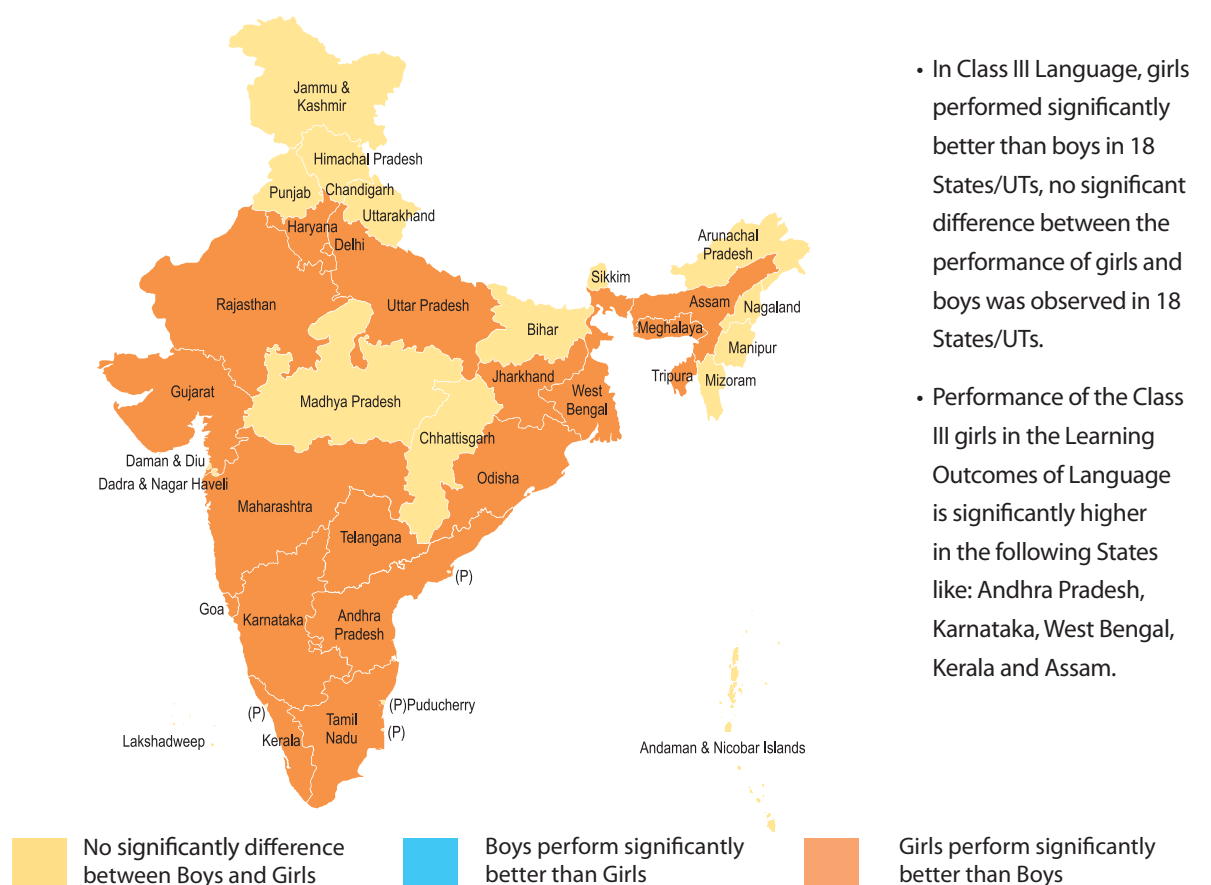
Figure 5.10: Performance of States in Class VIII: Social Science



- In Class VIII Social Science, 8 States/UTs performed significantly above the national average, 17 States/UTs performed significantly below and 11 States/UTs showed no significant difference from the national average.
- Performance of the Class VIII students in the Learning Outcomes of Social Science is significantly low in the following States like: Puducherry, Lakshadweep, Tamil Nadu, Mizoram and Daman & Diu.

State/UT	Mean	State/UT	Mean	State/UT	Mean
Rajasthan	327	National Mean	278	Meghalaya	260
Jharkhand	307	Manipur	275	Nagaland	259
Gujarat	306	Maharashtra	274	Punjab	258
Dadra & Nagar Haveli	305	Haryana	273	Jammu & Kashmir	258
Chandigarh	302	Odisha	272	Delhi	258
Karnataka	297	Uttar Pradesh	271	A & N Islands	257
Assam	294	Telangana	270	Daman & Diu	257
Andhra Pradesh	291	Tripura	265	Mizoram	257
Bihar	287	Goa	265	Tamil Nadu	256
Uttarakhand	285	West Bengal	265	Lakshadweep	247
Chhattisgarh	282	Kerala	264	Puducherry	245
Madhya Pradesh	280	Sikkim	263		
Himachal Pradesh	279	Arunachal Pradesh	261		

*Boundaries around the National Average were constructed using Cohen’s D measure of effect size (Cohen, 1988) equal to +/- 0.20. The differences between National Mean and State Means that are smaller than D=0.20 are considered small and practically insignificant. Similarly, differences between individual State Means that are smaller than D=0.20 can be considered as practically insignificant.

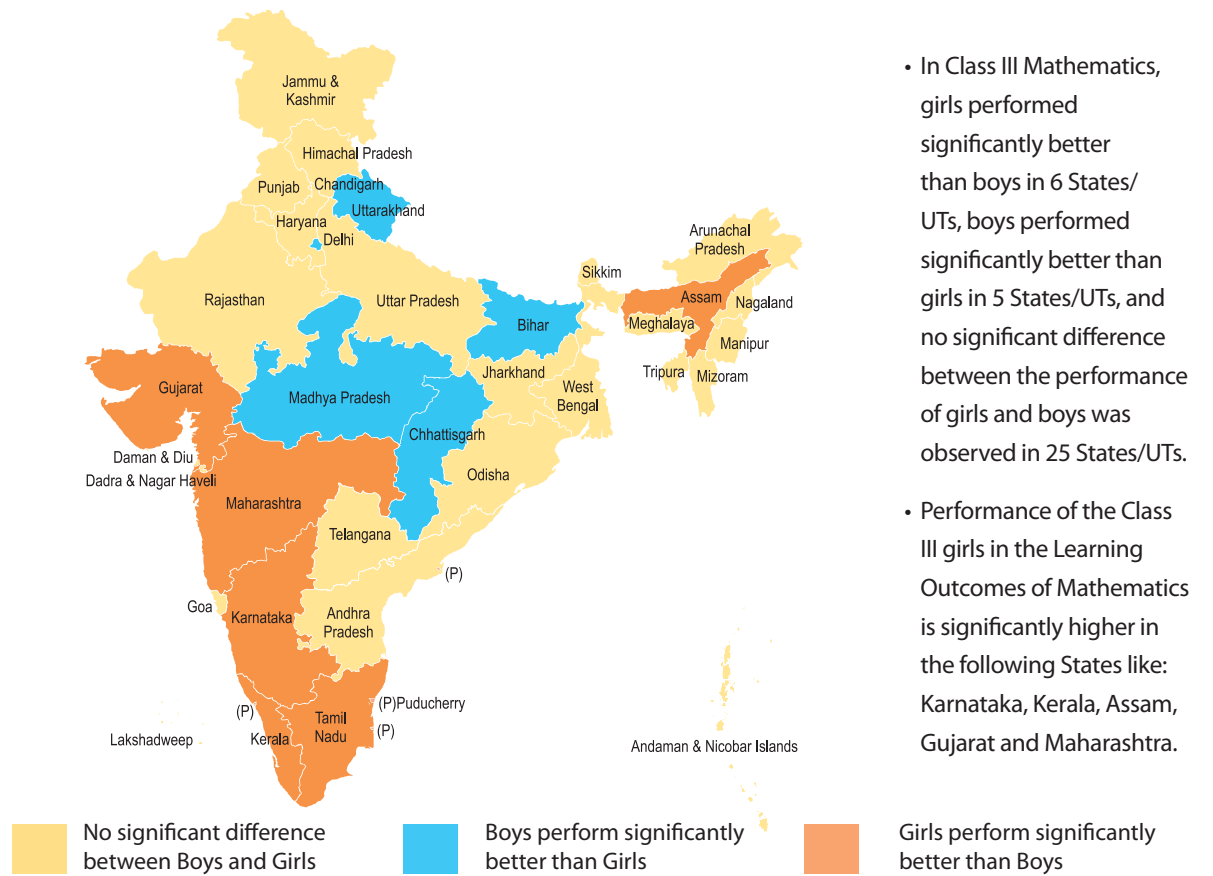
Figure 5.11: Performance of States by Gender in Class III: Language

State/UT	Boys	Girls	Sig.	D
Jammu & Kashmir	331	333		
Himachal Pradesh	341	342		
Punjab	329	331		
Chandigarh	353	354		
Uttarakhand	348	346		
Haryana	328	330	*	-0.04
Delhi	315	318	**	-0.06
Rajasthan	357	359	*	-0.03
Uttar Pradesh	311	316	**	-0.08
Bihar	336	336		
Sikkim	324	326		
Arunachal Pradesh	307	307		
Nagaland	344	345		
Manipur	341	342		
Mizoram	336	338		
Tripura	333	339	**	-0.10
Meghalaya	324	329	**	-0.09
Assam	348	351	**	-0.05

State/UT	Boys	Girls	Sig.	D
West Bengal	355	356	*	-0.03
Jharkhand	343	345	**	-0.04
Odisha	325	327	**	-0.05
Chhattisgarh	332	332		
Madhya Pradesh	339	340		
Gujarat	344	349	**	-0.08
Daman & Diu	328	332		
Dadra & Nagar Haveli	342	344		
Maharashtra	342	345	**	-0.06
Andhra Pradesh	362	365	**	-0.05
Karnataka	358	362	**	-0.08
Goa	327	339	**	-0.23
Lakshadweep	308	320		-0.29
Kerala	346	353	**	-0.13
Tamil Nadu	323	328	**	-0.11
Puducherry	314	318		
A & N Islands	324	327		
Telangana	337	342	**	-0.09

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.12: Performance of States by Gender in Class III: Mathematics

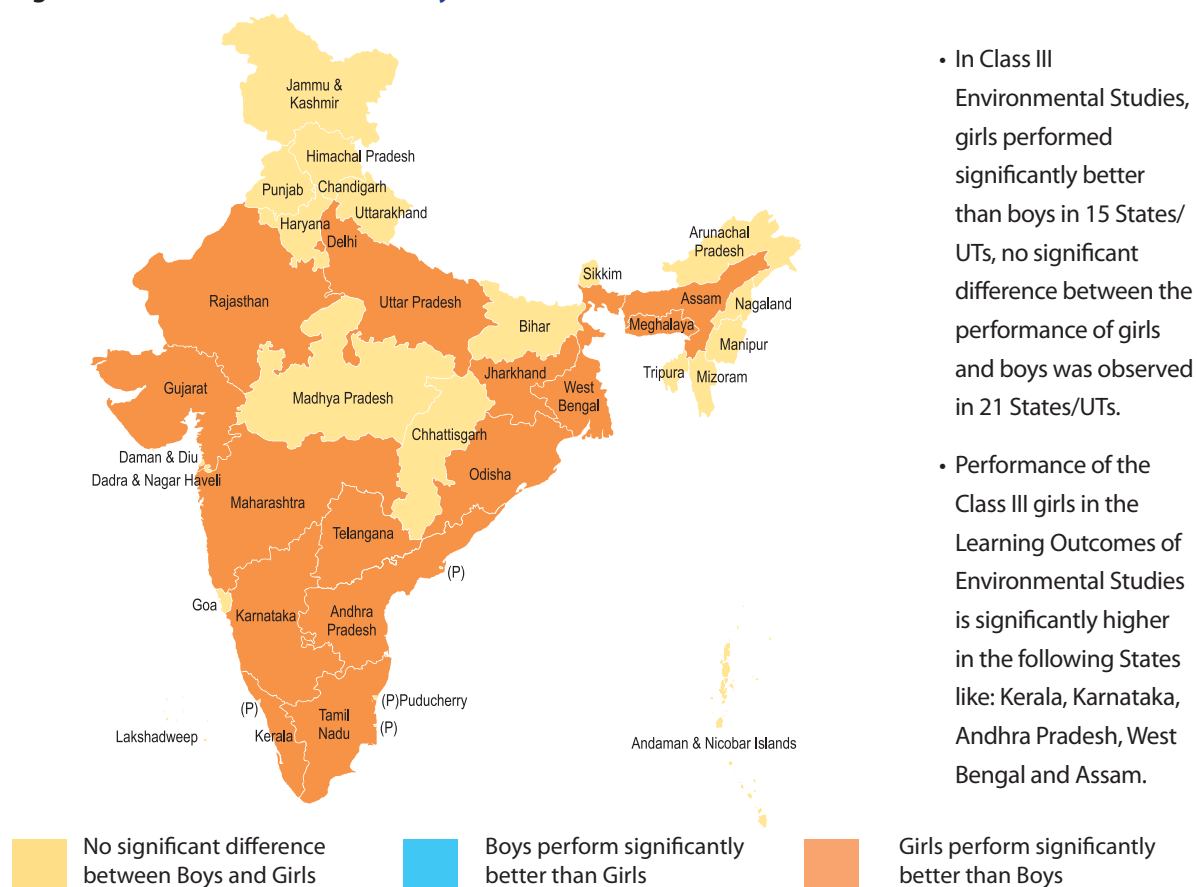


- In Class III Mathematics, girls performed significantly better than boys in 6 States/UTs, boys performed significantly better than girls in 5 States/UTs, and no significant difference between the performance of girls and boys was observed in 25 States/UTs.
- Performance of the Class III girls in the Learning Outcomes of Mathematics is significantly higher in the following States like: Karnataka, Kerala, Assam, Gujarat and Maharashtra.

State/UT	Boys	Girls	Sig.	D
Jammu & Kashmir	319	317		
Himachal Pradesh	320	321		
Punjab	305	306		
Chandigarh	341	336		
Uttarakhand	332	329	*	0.07
Haryana	307	307		
Delhi	300	298	**	0.05
Rajasthan	339	340		
Uttar Pradesh	309	308		
Bihar	319	318	*	0.01
Sikkim	310	303		
Arunachal Pradesh	295	295		
Nagaland	329	330		
Manipur	330	328		
Mizoram	316	314		
Tripura	318	319		
Meghalaya	306	308		
Assam	335	338	**	-0.04

State/UT	Boys	Girls	Sig.	D
West Bengal	337	337		
Jharkhand	327	327		
Odisha	316	317		
Chhattisgarh	315	313	*	0.04
Madhya Pradesh	317	315	*	0.02
Gujarat	324	326	**	-0.04
Daman & Diu	313	306		
Dadra & Nagar Haveli	327	329		
Maharashtra	324	325	**	-0.03
Andhra Pradesh	341	342		
Karnataka	346	349	**	-0.06
Goa	308	311		
Lakshadweep	308	309		
Kerala	338	342	**	-0.07
Tamil Nadu	314	315	**	-0.03
Puducherry	313	314		
A & N Islands	318	318		
Telangana	332	332		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

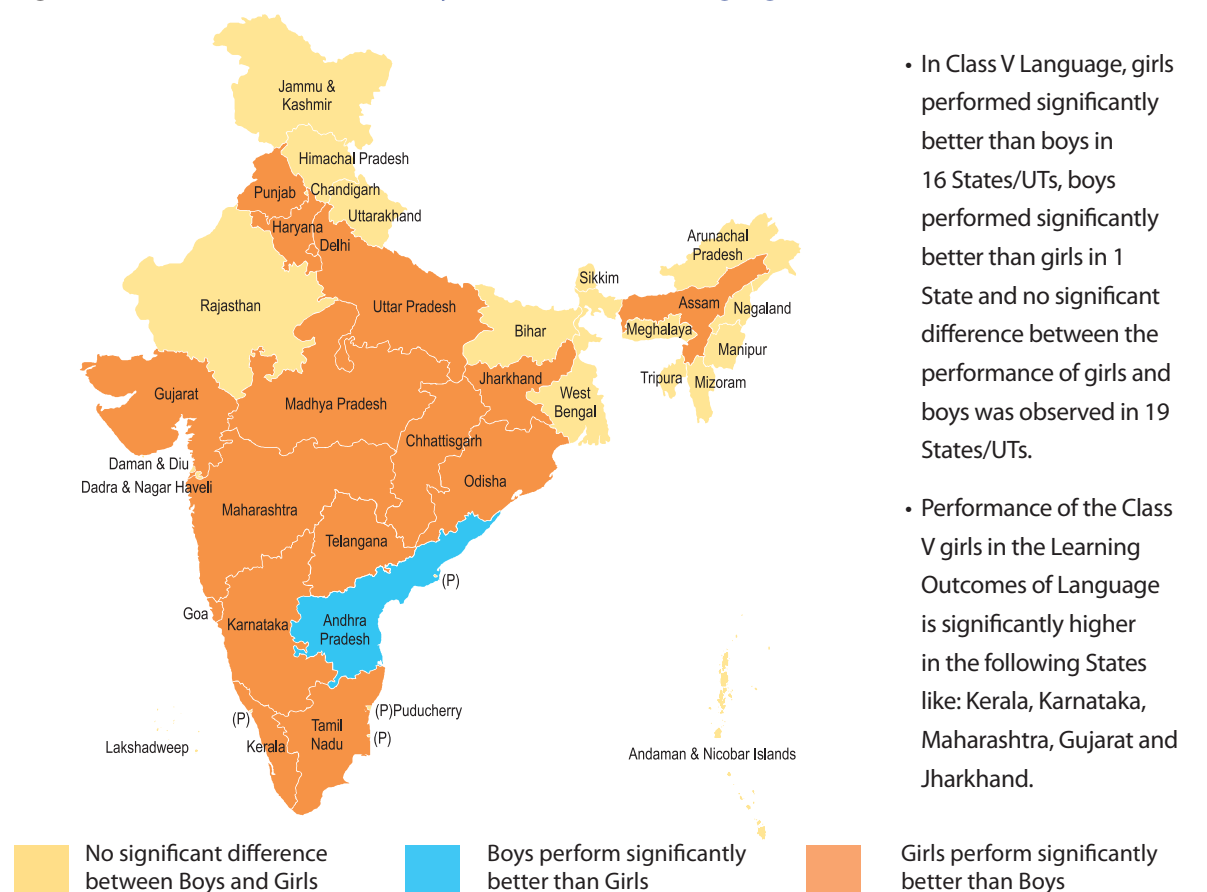
Figure 5.13: Performance of States by Gender in Class III: Environmental Studies

State/UT	Boys	Girls	Sig.	D
Jammu & Kashmir	311	310		
Himachal Pradesh	322	322		
Punjab	308	308		
Chandigarh	343	343		
Uttarakhand	334	333		
Haryana	313	314		
Delhi	302	304	*	-0.03
Rajasthan	337	337		
Uttar Pradesh	301	304	**	-0.05
Bihar	317	317		
Sikkim	310	306		
Arunachal Pradesh	295	295		
Nagaland	326	328		
Manipur	331	331		
Mizoram	330	332		
Tripura	322	325		
Meghalaya	309	313	**	-0.1
Assam	330	332	**	-0.04

State/UT	Boys	Girls	Sig.	D
West Bengal	333	335	*	-0.03
Jharkhand	325	326	**	-0.04
Odisha	310	312	**	-0.04
Chhattisgarh	318	318		
Madhya Pradesh	320	320		
Gujarat	328	331	**	-0.07
Daman & Diu	314	315		
Dadra & Nagar Haveli	326	330		
Maharashtra	329	331	**	-0.04
Andhra Pradesh	335	337	**	-0.07
Karnataka	339	343	**	-0.09
Goa	317	322		
Lakshadweep	300	303		
Kerala	344	349	**	-0.12
Tamil Nadu	322	324	**	-0.06
Puducherry	309	310		
A & N Islands	317	319		
Telangana	325	328	**	-0.06

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D = 0.20$ is considered small and practically irrelevant.

Figure 5.14: Performance of States by Gender in Class V: Language



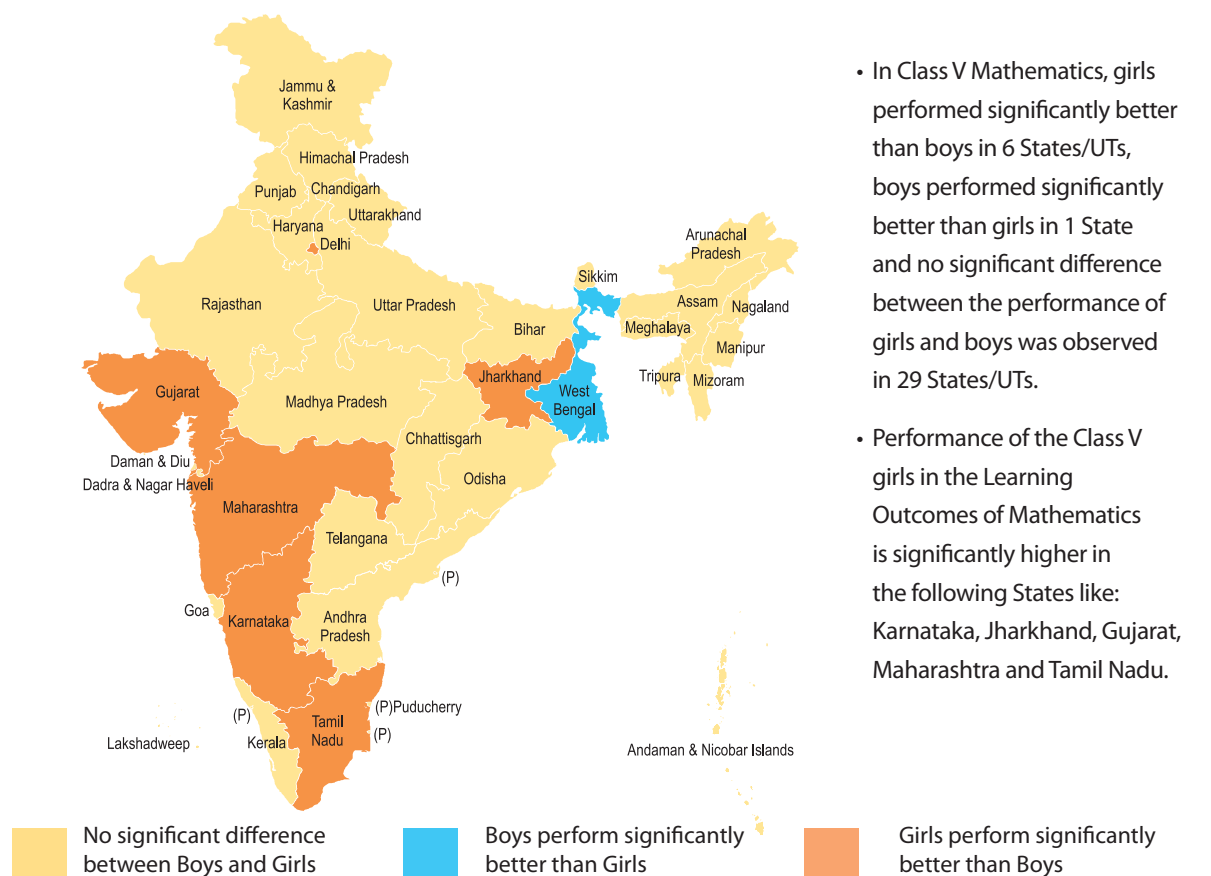
- In Class V Language, girls performed significantly better than boys in 16 States/UTs, boys performed significantly better than girls in 1 State and no significant difference between the performance of girls and boys was observed in 19 States/UTs.
- Performance of the Class V girls in the Learning Outcomes of Language is significantly higher in the following States like: Kerala, Karnataka, Maharashtra, Gujarat and Jharkhand.

State/UT	Boys	Girls	Sig.	D
Jammu & Kashmir	308	311		
Himachal Pradesh	325	330		
Punjab	305	308	**	-0.06
Chandigarh	344	346		
Uttarakhand	338	338		
Haryana	308	312	**	-0.06
Delhi	299	307	**	-0.15
Rajasthan	343	345		
Uttar Pradesh	298	301	**	-0.06
Bihar	316	316		
Sikkim	296	297		
Arunachal Pradesh	288	287		
Nagaland	314	311		
Manipur	321	319		
Mizoram	297	304		
Tripura	315	317		
Meghalaya	294	297		
Assam	321	323	*	-0.03

State/UT	Boys	Girls	Sig.	D
West Bengal	317	318		
Jharkhand	325	327	**	-0.05
Odisha	302	305	**	-0.07
Chhattisgarh	311	314	**	-0.06
Madhya Pradesh	313	314	**	-0.03
Gujarat	321	327	**	-0.09
Daman & Diu	293	308		-0.31
Dadra & Nagar Haveli	332	338		
Maharashtra	319	327	**	-0.13
Andhra Pradesh	340	338	*	0.04
Karnataka	349	354	**	-0.08
Goa	306	320	**	-0.26
Lakshadweep	302	306		
Kerala	349	357	**	-0.12
Tamil Nadu	318	323	**	-0.09
Puducherry	297	302		
A & N Islands	303	316		
Telangana	312	316	**	-0.07

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.15: Performance of States by Gender in Class V: Mathematics

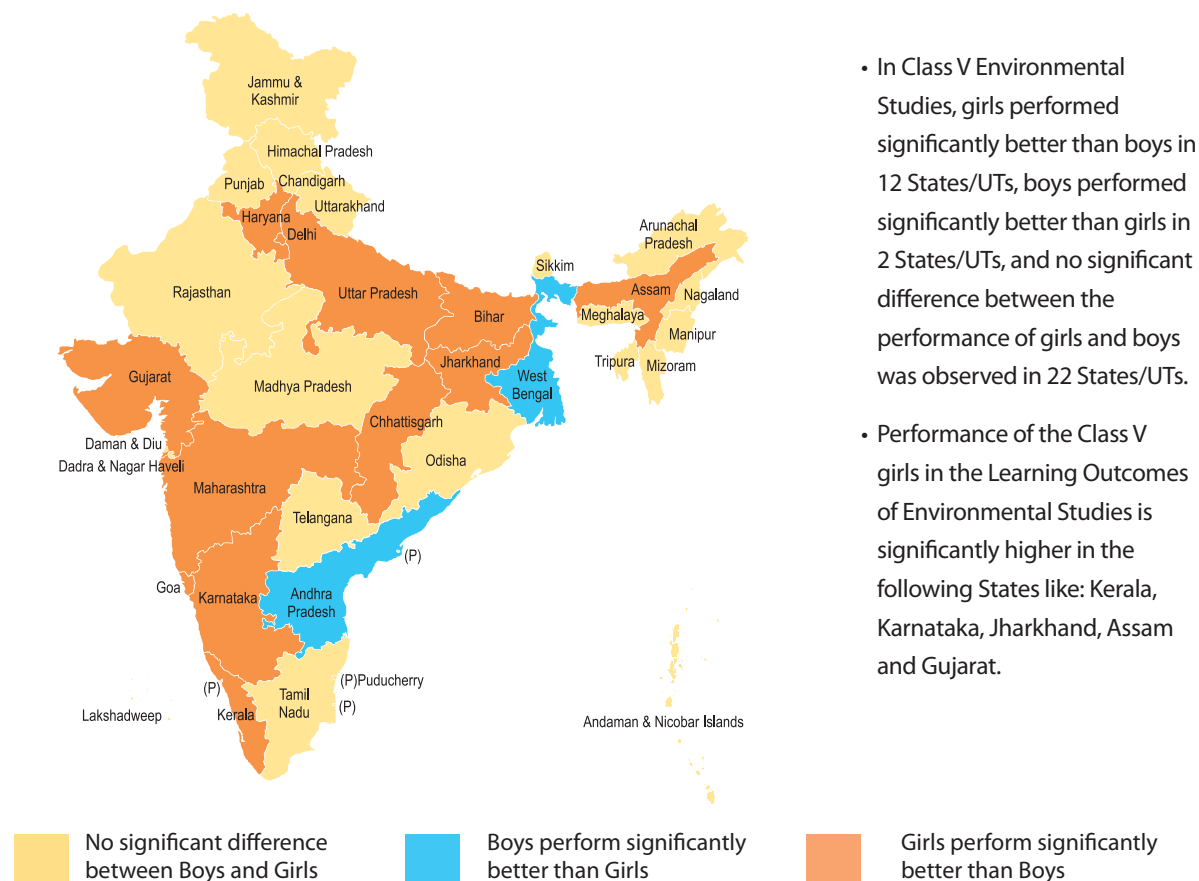


- In Class V Mathematics, girls performed significantly better than boys in 6 States/UTs, boys performed significantly better than girls in 1 State and no significant difference between the performance of girls and boys was observed in 29 States/UTs.
- Performance of the Class V girls in the Learning Outcomes of Mathematics is significantly higher in the following States like: Karnataka, Jharkhand, Gujarat, Maharashtra and Tamil Nadu.

State/UT	Boys	Girls	Sig.	D
Jammu & Kashmir	315	316		
Himachal Pradesh	303	306		
Punjab	293	293		
Chandigarh	336	336		
Uttarakhand	328	325		
Haryana	294	294		
Delhi	285	289	**	-0.08
Rajasthan	338	338		
Uttar Pradesh	302	301		
Bihar	309	309		
Sikkim	282	280		
Arunachal Pradesh	280	276		
Nagaland	302	299		
Manipur	315	317		
Mizoram	293	293		
Tripura	302	305		
Meghalaya	283	286		
Assam	333	333		
Gujarat	319	322	**	-0.05
Daman & Diu	284	297		-0.28
Dadra & Nagar Haveli	321	329		
Maharashtra	304	305	**	-0.02
Andhra Pradesh	334	333		
Karnataka	344	346	*	-0.03
Goa	294	296		
Lakshadweep	294	288		
Kerala	341	343		
Tamil Nadu	300	301	*	-0.03
Puducherry	300	304		
A & N Islands	301	303		
Telangana	317	315		

State/UT	Boys	Girls	Sig.	D
West Bengal	304	299	**	0.09
Jharkhand	319	322	**	-0.05
Odisha	321	321		
Chhattisgarh	298	298		
Madhya Pradesh	303	303		
Gujarat	319	322	**	-0.05
Daman & Diu	284	297		-0.28
Dadra & Nagar Haveli	321	329		
Maharashtra	304	305	**	-0.02
Andhra Pradesh	334	333		
Karnataka	344	346	*	-0.03
Goa	294	296		
Lakshadweep	294	288		
Kerala	341	343		
Tamil Nadu	300	301	*	-0.03
Puducherry	300	304		
A & N Islands	301	303		
Telangana	317	315		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.16: Performance of States by Gender in Class V: Environmental Studies

- In Class V Environmental Studies, girls performed significantly better than boys in 12 States/UTs, boys performed significantly better than girls in 2 States/UTs, and no significant difference between the performance of girls and boys was observed in 22 States/UTs.
- Performance of the Class V girls in the Learning Outcomes of Environmental Studies is significantly higher in the following States like: Kerala, Karnataka, Jharkhand, Assam and Gujarat.

State/UT	Boys	Girls	Sig.	D
Jammu & Kashmir	306	308		
Himachal Pradesh	309	311		
Punjab	297	298		
Chandigarh	334	336		
Uttarakhand	327	327		
Haryana	297	299	*	-0.04
Delhi	290	293	**	-0.05
Rajasthan	339	340		
Uttar Pradesh	299	300	*	-0.02
Bihar	311	312	**	-0.04
Sikkim	282	282		
Arunachal Pradesh	283	280		
Nagaland	304	299		
Manipur	321	322		
Mizoram	300	304		
Tripura	308	308		
Meghalaya	283	284		
Assam	326	328	*	-0.04

State/UT	Boys	Girls	Sig.	D
West Bengal	305	303	**	0.04
Jharkhand	324	328	**	-0.06
Odisha	311	312		
Chhattisgarh	302	304	**	-0.04
Madhya Pradesh	305	306		
Gujarat	313	315	**	-0.05
Daman & Diu	284	293		
Dadra & Nagar Haveli	321	329		
Maharashtra	302	306	**	-0.07
Andhra Pradesh	326	322	**	0.07
Karnataka	334	336	**	-0.05
Goa	290	295	*	-0.11
Lakshadweep	283	286		
Kerala	335	337	**	-0.04
Tamil Nadu	300	300		
Puducherry	294	297		
A & N Islands	299	306		
Telangana	302	304		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.17: Performance of States by Gender in Class VIII: Language



- In Class VIII Language, girls performed significantly better than boys in 18 States/UTs, boys performed significantly better than girls in 4 States/UTs and no significant difference between the performance of girls and boys was observed in 14 States/UTs.
- Performance of the Class VIII girls in the Learning Outcomes of Language is significantly higher in the following States like: Gujarat, Kerala, Maharashtra, Karnataka and Chandigarh.

State/UT	Boys	Girls	Sig.	D
Jammu & Kashmir	276	273		
Himachal Pradesh	310	314		
Punjab	295	303	**	-0.18
Chandigarh	312	319	*	-0.13
Uttarakhand	311	308	*	0.07
Haryana	303	307	**	-0.09
Delhi	295	302	**	-0.13
Rajasthan	328	329		
Uttar Pradesh	293	292	**	0.02
Bihar	310	305	**	0.09
Sikkim	291	297		
Arunachal Pradesh	280	281		
Nagaland	273	272		
Manipur	294	291		
Mizoram	280	289		-0.22
Tripura	301	300		
Meghalaya	285	289	*	-0.08
Assam	298	298		

State/UT	Boys	Girls	Sig.	D
West Bengal	305	301	**	0.07
Jharkhand	316	318	*	-0.03
Odisha	298	300	**	-0.04
Chhattisgarh	302	305	**	-0.06
Madhya Pradesh	300	302	**	-0.04
Gujarat	321	330	**	-0.16
Daman & Diu	290	299		
Dadra & Nagar Haveli	309	320		-0.2
Maharashtra	316	324	**	-0.14
Andhra Pradesh	307	310	**	-0.06
Karnataka	316	321	**	-0.11
Goa	307	315	*	-0.16
Lakshadweep	285	293		
Kerala	316	329	**	-0.27
Tamil Nadu	299	311	**	-0.24
Puducherry	271	284	**	-0.3
A & N Islands	288	300		-0.24
Telangana	294	299	**	-0.09

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.18: Performance of States by Gender in Class VIII: Mathematics



- In Class VIII Mathematics, girls performed significantly better than boys in 9 States/UTs, boys performed significantly better than girls in 3 States/UTs and no significant difference between the performance of girls and boys was observed in 24 States/UTs.
- Performance of the Class VIII girls in the Learning Outcomes of Mathematics is significantly higher in the following States like: Jharkhand, Karnataka, Gujarat, Madhya Pradesh and Maharashtra.

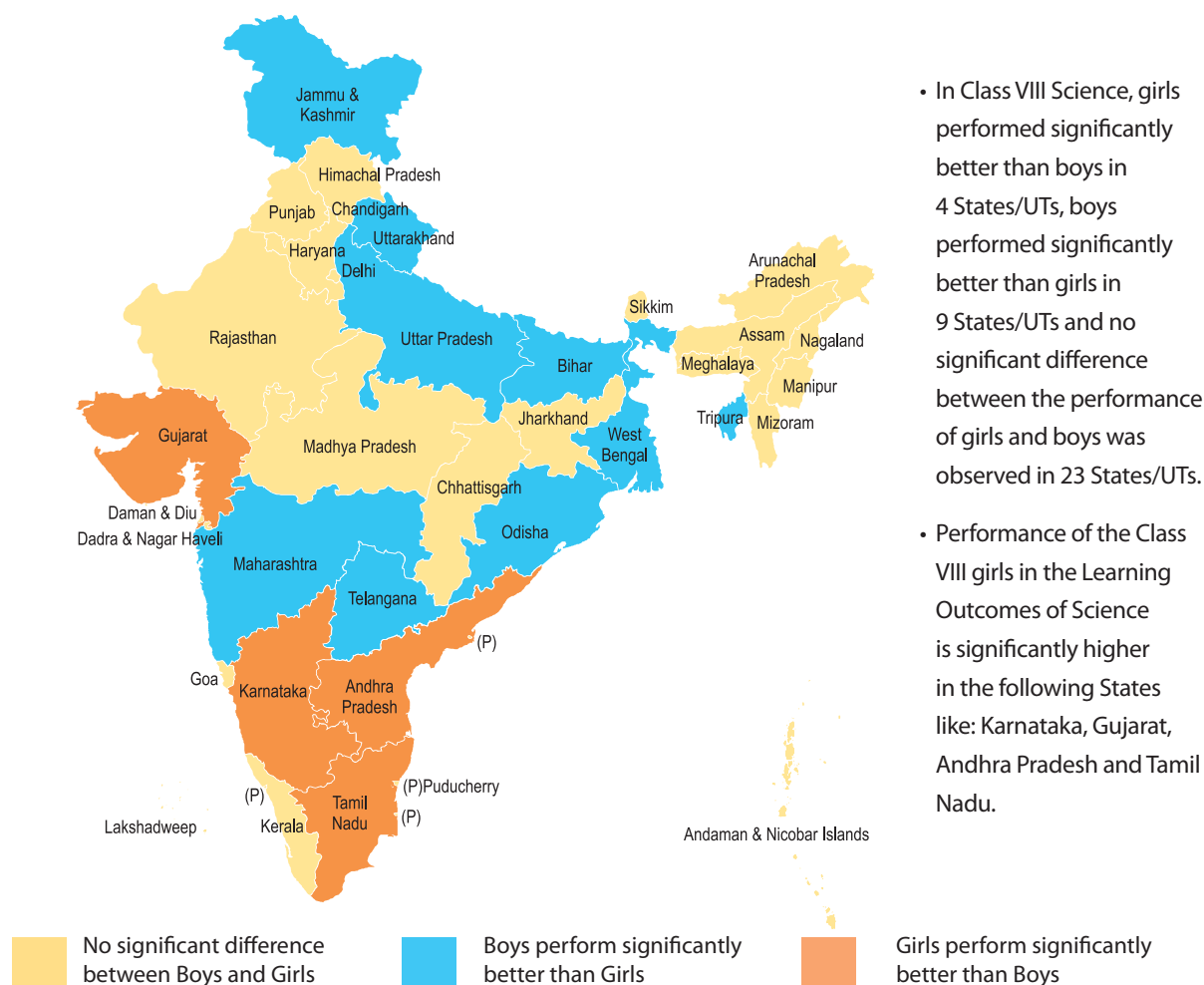
No significant difference between Boys and Girls
 Boys perform significantly better than Girls
 Girls perform significantly better than Boys

State/UT	Boys	Girls	Sig.	D
Jammu & Kashmir	257	255		
Himachal Pradesh	254	254		
Punjab	242	244	*	-0.04
Chandigarh	274	279		
Uttarakhand	267	259	**	0.18
Haryana	253	258	**	-0.1
Delhi	244	244		
Rajasthan	304	304		
Uttar Pradesh	262	262		
Bihar	278	277	**	0.03
Sikkim	240	242		
Arunachal Pradesh	247	250		
Nagaland	245	246		
Manipur	269	266		
Mizoram	252	259		-0.22
Tripura	259	256		
Meghalaya	247	250		
Assam	283	283		
Daman & Diu				
Dadra & Nagar Haveli				
Maharashtra	262	263	**	-0.02
Andhra Pradesh	286	286		
Karnataka	285	290	**	-0.08
Goa	248	248		
Lakshadweep	247	246		
Kerala	286	286		
Tamil Nadu	249	252	**	-0.09
(P) Puducherry	239	242		
(P) Andaman & Nicobar Islands	246	250		
(P) Telangana	257	256		

State/UT	Boys	Girls	Sig.	D
West Bengal	264	259	**	0.1
Jharkhand	292	294	*	-0.03
Odisha	274	273		
Chhattisgarh	254	256	**	-0.04
Madhya Pradesh	263	264	**	-0.04
Gujarat	278	284	**	-0.1
Daman & Diu	243	241		
Dadra & Nagar Haveli	276	281		
Maharashtra	262	263	**	-0.02
Andhra Pradesh	286	286		
Karnataka	285	290	**	-0.08
Goa	248	248		
Lakshadweep	247	246		
Kerala	286	286		
Tamil Nadu	249	252	**	-0.09
Puducherry	239	242		
A & N Islands	246	250		
Telangana	257	256		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.19: Performance of States by Gender in Class VIII: Science



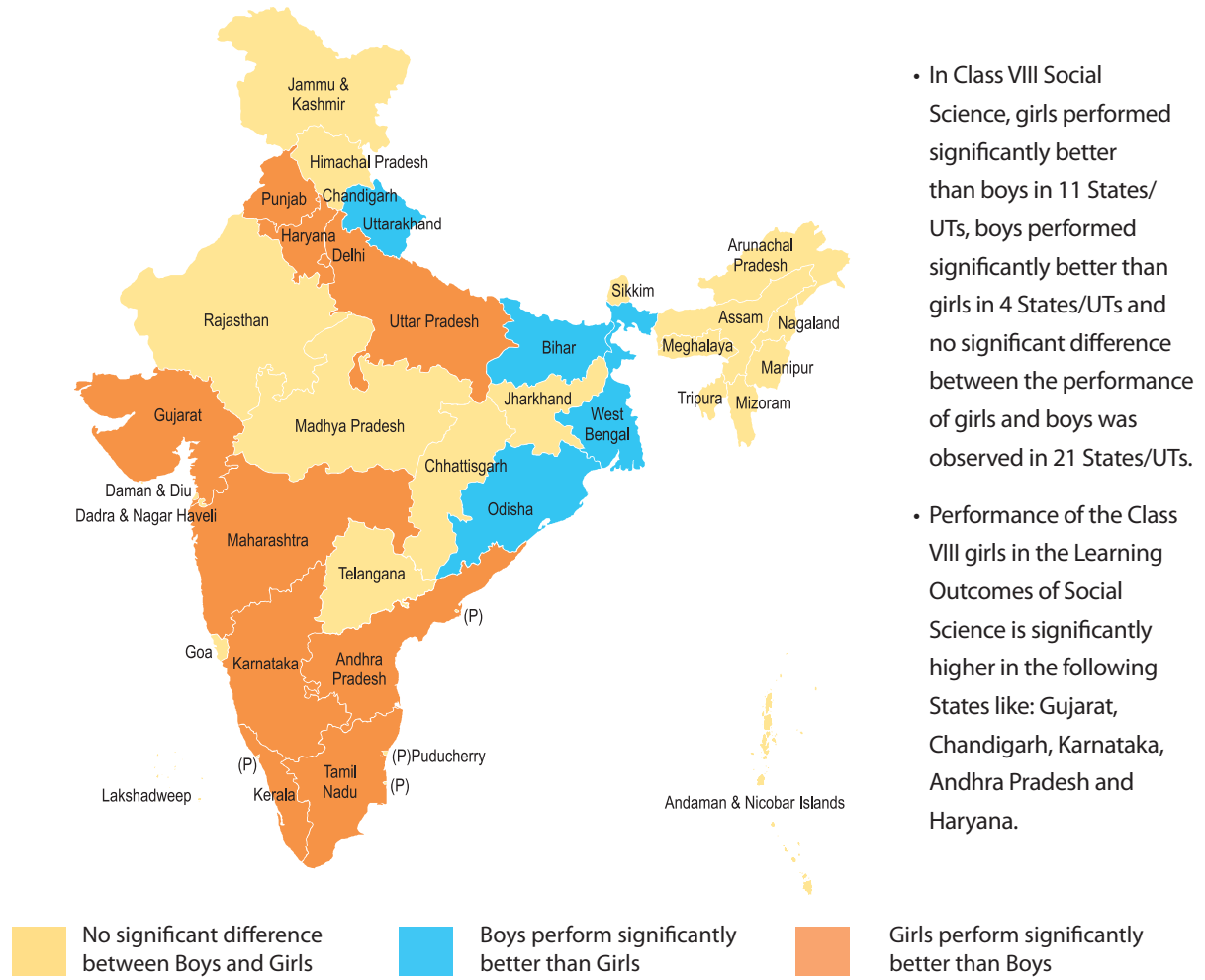
- In Class VIII Science, girls performed significantly better than boys in 4 States/UTs, boys performed significantly better than girls in 9 States/UTs and no significant difference between the performance of girls and boys was observed in 23 States/UTs.
- Performance of the Class VIII girls in the Learning Outcomes of Science is significantly higher in the following States like: Karnataka, Gujarat, Andhra Pradesh and Tamil Nadu.

State/UT	Boys	Girls	Sig.	D
Jammu & Kashmir	260	255	*	0.09
Himachal Pradesh	274	273		
Punjab	257	256		
Chandigarh	290	294		
Uttarakhand	285	277	**	0.15
Haryana	267	268		
Delhi	248	248		
Rajasthan	326	325		
Uttar Pradesh	267	265	**	0.02
Bihar	278	275	**	0.05
Sikkim	256	257		
Arunachal Pradesh	248	251		
Nagaland	247	247		
Manipur	273	271		
Mizoram	250	250		
Tripura	269	264	**	0.1
Meghalaya	251	252		
Assam	290	289		
Gujarat	294	297	**	-0.05
Daman & Diu	248	248		
Dadra & Nagar Haveli	293	300		
Maharashtra	267	266	**	0.02
Andhra Pradesh	285	288	**	-0.05
Karnataka	295	298	**	-0.06
Goa	259	257		
Lakshadweep	245	244		
Kerala	271	272		
Tamil Nadu	255	257	**	-0.06
Puducherry	241	242		
A & N Islands	251	257		
Telangana	260	258	**	0.05

State/UT	Boys	Girls	Sig.	D
West Bengal	273	266	**	0.14
Jharkhand	302	301		
Odisha	279	276	**	0.05
Chhattisgarh	275	275		
Madhya Pradesh	274	274		
Gujarat	294	297	**	-0.05
Daman & Diu	248	248		
Dadra & Nagar Haveli	293	300		
Maharashtra	267	266	**	0.02
Andhra Pradesh	285	288	**	-0.05
Karnataka	295	298	**	-0.06
Goa	259	257		
Lakshadweep	245	244		
Kerala	271	272		
Tamil Nadu	255	257	**	-0.06
Puducherry	241	242		
A & N Islands	251	257		
Telangana	260	258	**	0.05

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.20: Performance of States by Gender in Class VIII: Social Science



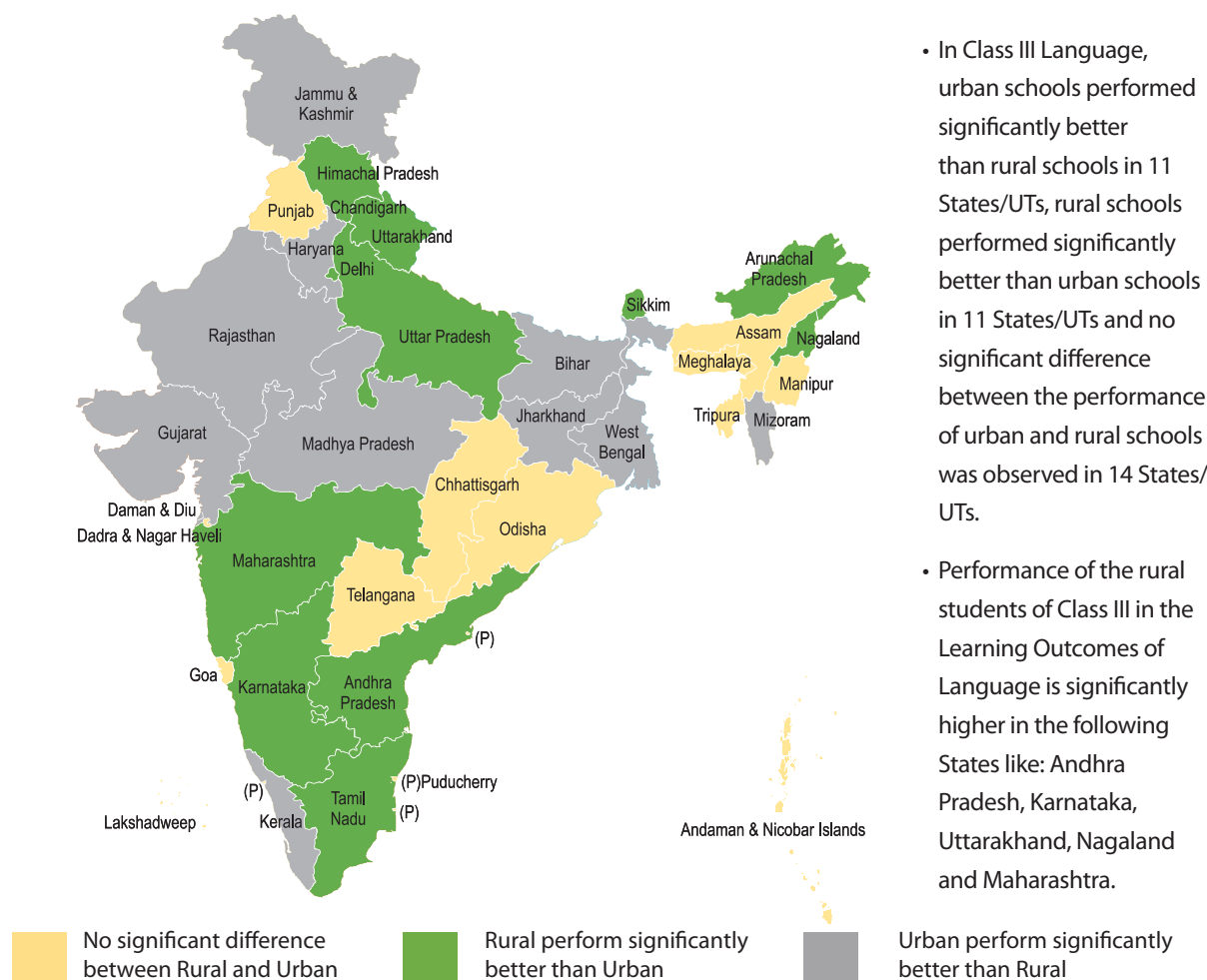
- In Class VIII Social Science, girls performed significantly better than boys in 11 States/UTs, boys performed significantly better than girls in 4 States/UTs and no significant difference between the performance of girls and boys was observed in 21 States/UTs.
- Performance of the Class VIII girls in the Learning Outcomes of Social Science is significantly higher in the following States like: Gujarat, Chandigarh, Karnataka, Andhra Pradesh and Haryana.

State/UT	Boys	Girls	Sig.	D
Jammu & Kashmir	259	257		
Himachal Pradesh	278	280		
Punjab	257	260	**	-0.07
Chandigarh	298	306	**	-0.16
Uttarakhand	288	283	**	0.09
Haryana	272	274	**	-0.06
Delhi	255	261	**	-0.16
Rajasthan	327	327		
Uttar Pradesh	270	271	*	-0.01
Bihar	288	287	*	0.02
Sikkim	263	264		
Arunachal Pradesh	259	263		
Nagaland	259	259		
Manipur	274	276		
Mizoram	255	259		
Tripura	265	264		
Meghalaya	259	261		
Assam	294	294		

State/UT	Boys	Girls	Sig.	D
West Bengal	266	263	**	0.05
Jharkhand	307	307		
Odisha	273	271	*	0.03
Chhattisgarh	281	283		
Madhya Pradesh	280	280		
Gujarat	303	309	**	-0.11
Daman & Diu	252	261		-0.27
Dadra & Nagar Haveli	302	308		
Maharashtra	274	274	*	-0.02
Andhra Pradesh	290	292	**	-0.04
Karnataka	295	298	**	-0.06
Goa	263	267		
Lakshadweep	247	248		
Kerala	263	264	*	-0.02
Tamil Nadu	254	257	**	-0.09
Puducherry	242	247		
A & N Islands	254	262		
Telangana	270	270		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.21: Performance of States by School Location in Class III: Language



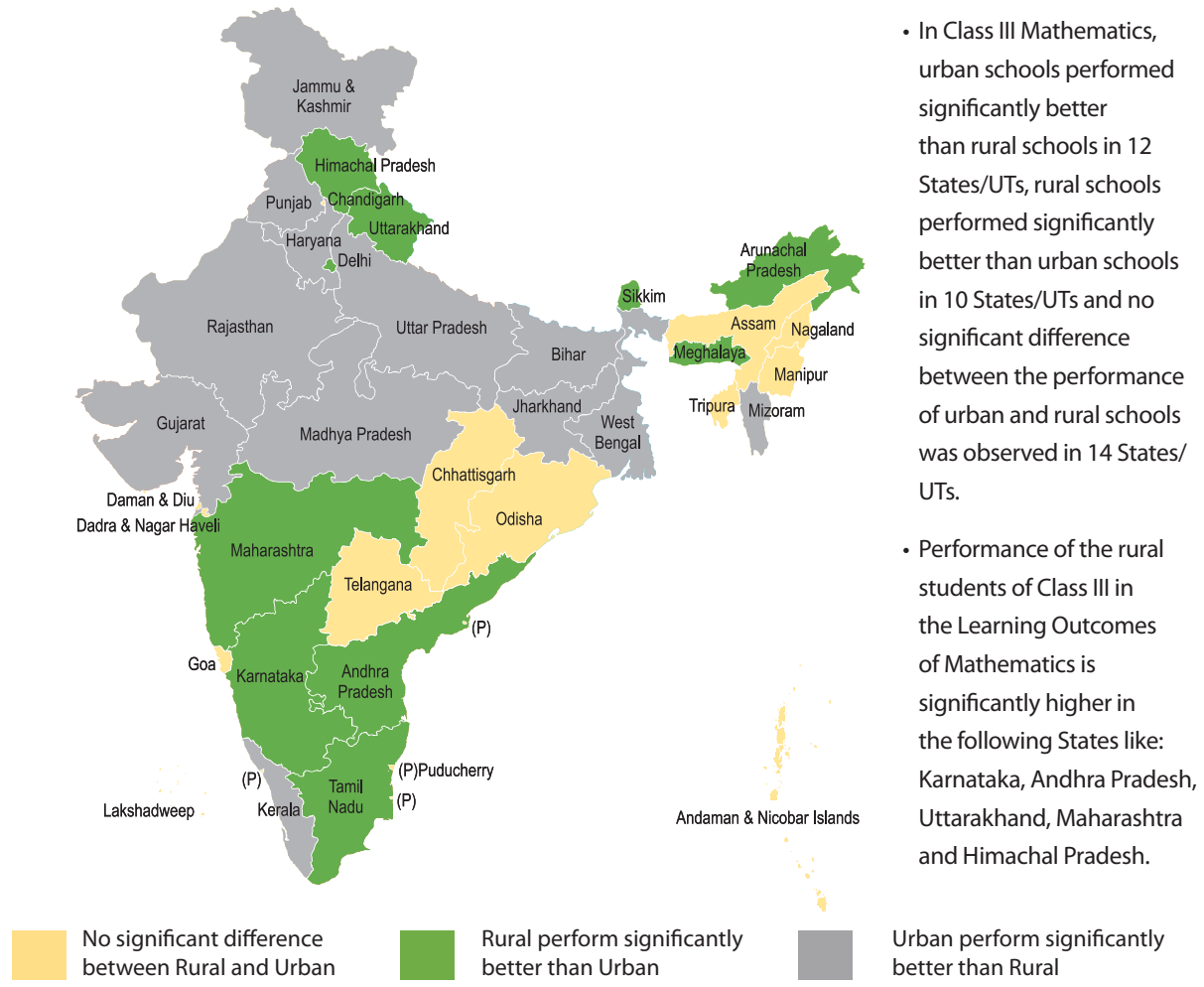
- In Class III Language, urban schools performed significantly better than rural schools in 11 States/UTs, rural schools performed significantly better than urban schools in 11 States/UTs and no significant difference between the performance of urban and rural schools was observed in 14 States/UTs.
- Performance of the rural students of Class III in the Learning Outcomes of Language is significantly higher in the following States like: Andhra Pradesh, Karnataka, Uttarakhand, Nagaland and Maharashtra.

State/UT	Rural	Urban	Sig.	D
Jammu & Kashmir	331	343	**	-0.2
Himachal Pradesh	343	327	**	0.3
Punjab	330	329		
Chandigarh	353	354		
Uttarakhand	350	337	**	0.2
Haryana	328	333	**	-0.1
Delhi	322	315	**	0.1
Rajasthan	358	364	**	-0.1
Uttar Pradesh	315	301	**	0.2
Bihar	335	344	**	-0.2
Sikkim	328	304	*	0.5
Arunachal Pradesh	308	302	*	0.1
Nagaland	349	334	**	0.3
Manipur	342	338		
Mizoram	334	348	*	-0.3
Tripura	335	339		
Meghalaya	326	328		
Assam	350	349		

State/UT	Rural	Urban	Sig.	D
West Bengal	354	361	**	-0.1
Jharkhand	343	350	**	-0.1
Odisha	327	325		
Chhattisgarh	332	334		
Madhya Pradesh	339	345	**	-0.1
Gujarat	346	348	**	-0
Daman & Diu	323	348	*	-0.5
Dadra & Nagar Haveli	344	335		
Maharashtra	348	340	**	0.2
Andhra Pradesh	366	356	**	0.2
Karnataka	362	356	**	0.1
Goa	334	333		
Lakshadweep	314	312		
Kerala	349	351	*	-0
Tamil Nadu	326	324	**	0
Puducherry	317	315		
A & N Islands	329	308		0.4
Telangana	340	341		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.22: Performance of States by School Location in Class III: Mathematics

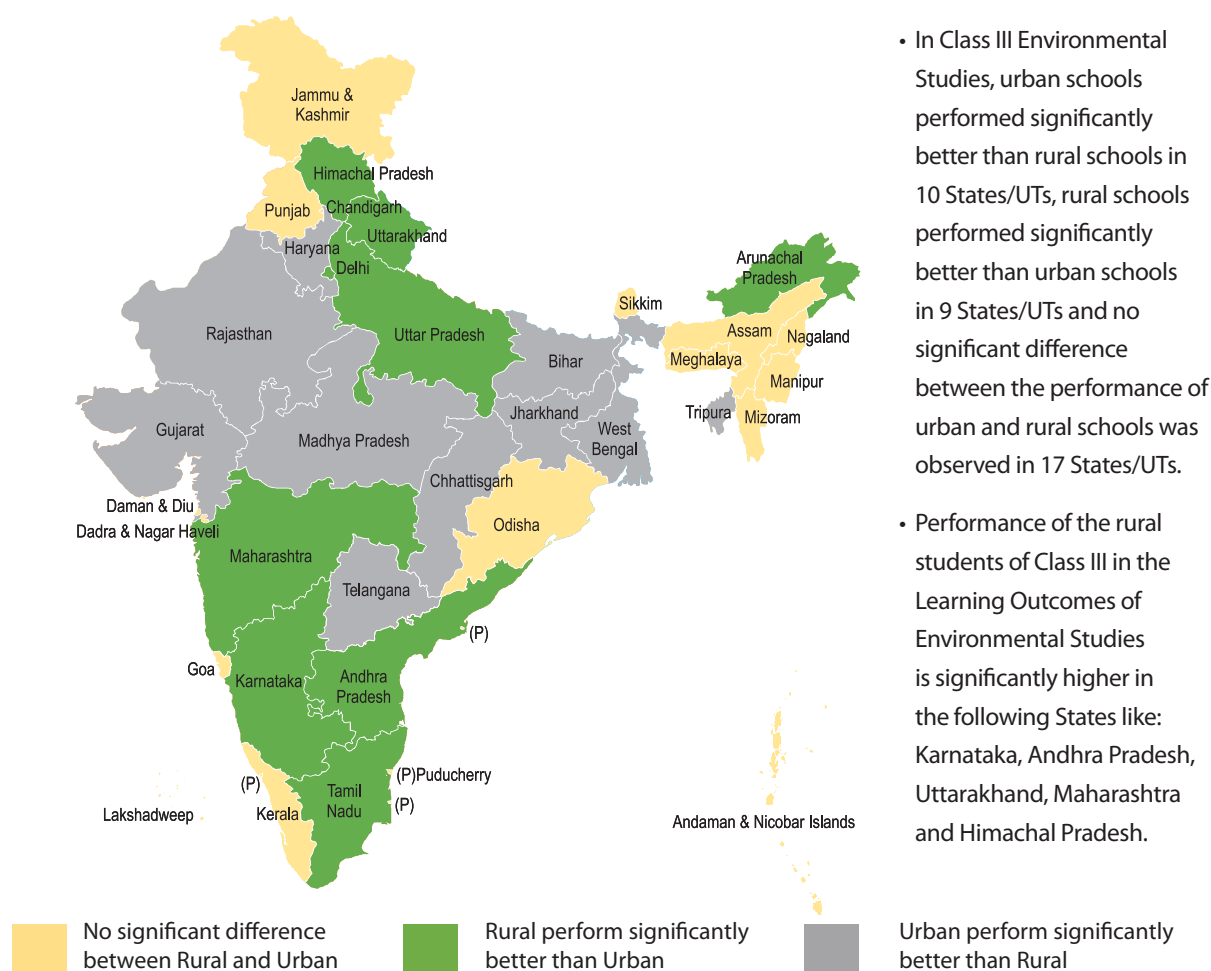


- In Class III Mathematics, urban schools performed significantly better than rural schools in 12 States/UTs, rural schools performed significantly better than urban schools in 10 States/UTs and no significant difference between the performance of urban and rural schools was observed in 14 States/UTs.
- Performance of the rural students of Class III in the Learning Outcomes of Mathematics is significantly higher in the following States like: Karnataka, Andhra Pradesh, Uttarakhand, Maharashtra and Himachal Pradesh.

State/UT	Rural	Urban	Sig.	D
Jammu & Kashmir	318	326	*	-0.2
Himachal Pradesh	323	302	**	0.4
Punjab	305	310	**	-0.1
Chandigarh	339	338		
Uttarakhand	333	321	**	0.2
Haryana	305	310	**	-0.1
Delhi	301	298	**	0.1
Rajasthan	338	349	**	-0.2
Uttar Pradesh	308	310	**	-0
Bihar	318	327	**	-0.2
Sikkim	310	287	*	0.5
Arunachal Pradesh	297	289	*	0.1
Nagaland	330	328		
Manipur	330	322		
Mizoram	312	324	*	-0.3
Tripura	318	321		
Meghalaya	308	302	**	0.1
Assam	337	336		

State/UT	Rural	Urban	Sig.	D
West Bengal	336	341	**	-0.1
Jharkhand	325	338	**	-0.2
Odisha	316	315		
Chhattisgarh	314	314		
Madhya Pradesh	315	324	**	-0.2
Gujarat	323	329	**	-0.1
Daman & Diu	310	310		
Dadra & Nagar Haveli	328	322		
Maharashtra	328	321	**	0.2
Andhra Pradesh	344	335	**	0.2
Karnataka	349	344	**	0.1
Goa	312	306		
Lakshadweep	312	303		0.2
Kerala	340	342	*	-0
Tamil Nadu	317	311	**	0.1
Puducherry	316	311		
A & N Islands	318	315		
Telangana	332	331		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.23: Performance of States by School Location in Class III: Environmental Studies

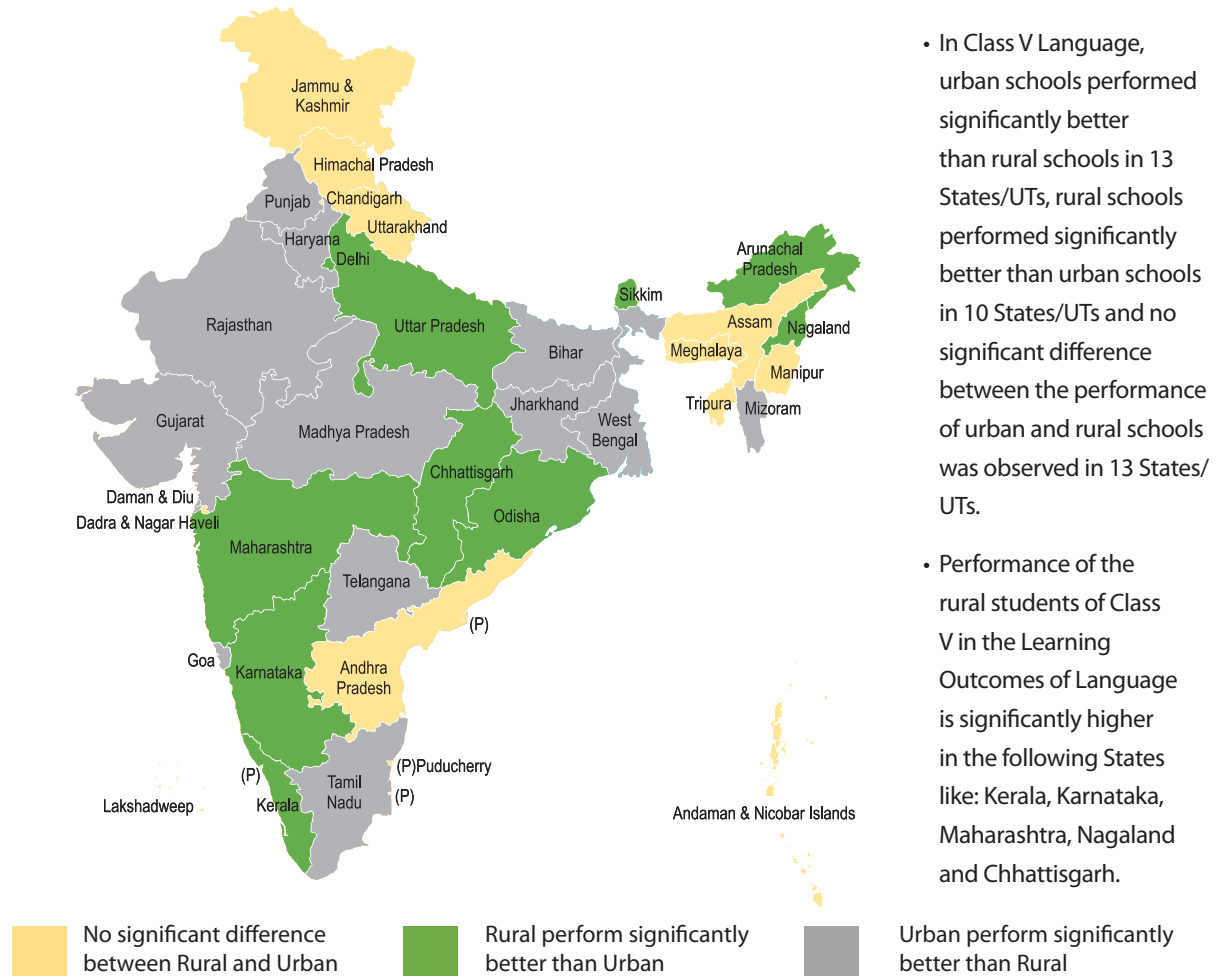
- In Class III Environmental Studies, urban schools performed significantly better than rural schools in 10 States/UTs, rural schools performed significantly better than urban schools in 9 States/UTs and no significant difference between the performance of urban and rural schools was observed in 17 States/UTs.
- Performance of the rural students of Class III in the Learning Outcomes of Environmental Studies is significantly higher in the following States like: Karnataka, Andhra Pradesh, Uttarakhand, Maharashtra and Himachal Pradesh.

State/UT	Rural	Urban	Sig.	D
Jammu & Kashmir	310	315		
Himachal Pradesh	324	309	**	0.4
Punjab	308	308		
Chandigarh	343	343		
Uttarakhand	335	329	**	0.1
Haryana	312	317	**	-0.1
Delhi	305	303	**	0.1
Rajasthan	336	347	**	-0.2
Uttar Pradesh	303	297	**	0.1
Bihar	317	326	**	-0.2
Sikkim	310	293		0.4
Arunachal Pradesh	296	290	*	0.1
Nagaland	328	325		
Manipur	332	327		
Mizoram	329	337		
Tripura	322	328	**	-0.1
Meghalaya	311	311		
Assam	331	332		

State/UT	Rural	Urban	Sig.	D
West Bengal	333	338	**	-0.1
Jharkhand	324	336	**	-0.3
Odisha	311	310		
Chhattisgarh	318	322	**	-0.1
Madhya Pradesh	318	329	**	-0.2
Gujarat	328	333	**	-0.1
Daman & Diu	313	318		
Dadra & Nagar Haveli	328	330		
Maharashtra	333	327	**	0.1
Andhra Pradesh	338	330	**	0.2
Karnataka	342	339	**	0.1
Goa	320	319		
Lakshadweep	306	295		
Kerala	346	346		
Tamil Nadu	324	322	**	0
Puducherry	312	307		
A & N Islands	319	317		
Telangana	326	328	**	-0.1

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.24: Performance of States by School Location in Class V: Language



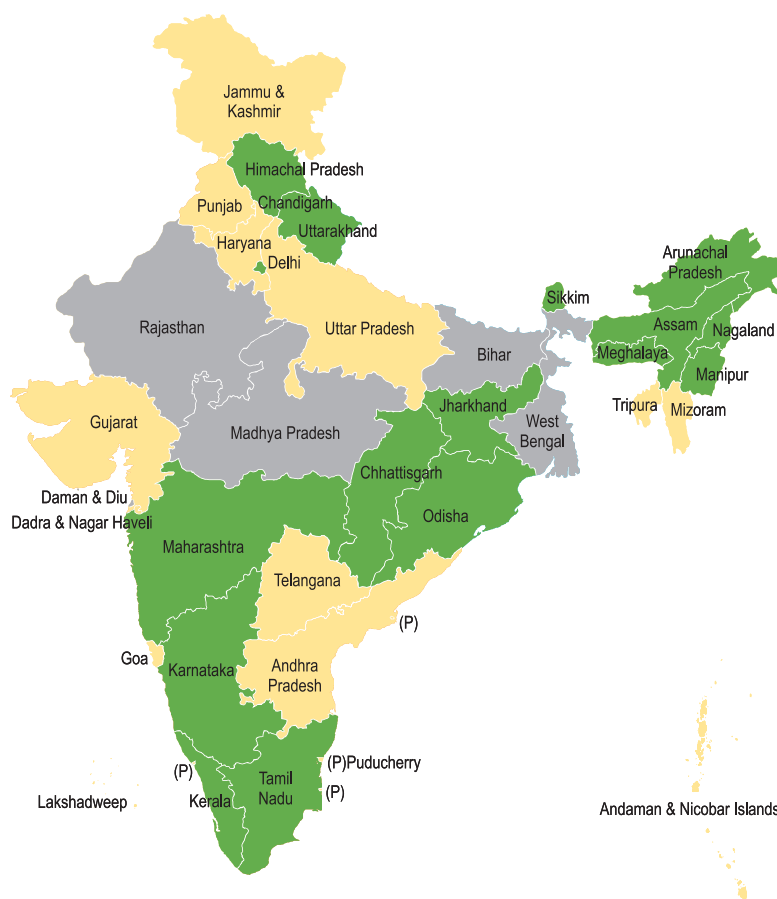
- In Class V Language, urban schools performed significantly better than rural schools in 13 States/UTs, rural schools performed significantly better than urban schools in 10 States/UTs and no significant difference between the performance of urban and rural schools was observed in 13 States/UTs.
- Performance of the rural students of Class V in the Learning Outcomes of Language is significantly higher in the following States like: Kerala, Karnataka, Maharashtra, Nagaland and Chhattisgarh.

State/UT	Rural	Urban	Sig.	D
Jammu & Kashmir	310	311		
Himachal Pradesh	328	322		
Punjab	305	309	**	-0.1
Chandigarh	349	342		
Uttarakhand	338	337		
Haryana	308	316	**	-0.1
Delhi	309	302	**	0.1
Rajasthan	344	349	**	-0.1
Uttar Pradesh	300	296	**	0.1
Bihar	316	321	**	-0.1
Sikkim	300	290	*	0.2
Arunachal Pradesh	290	282	*	0.2
Nagaland	316	305	*	0.2
Manipur	321	314		
Mizoram	296	310	**	-0.4
Tripura	315	318		
Meghalaya	296	295		
Assam	322	321		
West Bengal	314	332	**	-0.3
Jharkhand	325	330	**	-0.1
Odisha	304	299	**	0.1
Chhattisgarh	313	311	*	0.1
Madhya Pradesh	312	319	**	-0.1
Gujarat	323	327	**	-0.1
Daman & Diu	290	313	**	-0.5
Dadra & Nagar Haveli	333	344		
Maharashtra	326	321	**	0.1
Andhra Pradesh	339	338		
Karnataka	354	347	**	0.1
Goa	309	316	*	-0.1
Lakshadweep	313	292		0.5
Kerala	355	345	**	0.1
Tamil Nadu	320	322	*	-0
Puducherry	297	303		
A & N Islands	309	311		
Telangana	313	317	**	-0.1

State/UT	Rural	Urban	Sig.	D
West Bengal	314	332	**	-0.3
Jharkhand	325	330	**	-0.1
Odisha	304	299	**	0.1
Chhattisgarh	313	311	*	0.1
Madhya Pradesh	312	319	**	-0.1
Gujarat	323	327	**	-0.1
Daman & Diu	290	313	**	-0.5
Dadra & Nagar Haveli	333	344		
Maharashtra	326	321	**	0.1
Andhra Pradesh	339	338		
Karnataka	354	347	**	0.1
Goa	309	316	*	-0.1
Lakshadweep	313	292		0.5
Kerala	355	345	**	0.1
Tamil Nadu	320	322	*	-0
Puducherry	297	303		
A & N Islands	309	311		
Telangana	313	317	**	-0.1

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.25: Performance of States by School Location in Class V: Mathematics



- In Class V Mathematics, urban schools performed significantly better than rural schools in 5 States/UTs, rural schools performed significantly better than urban schools in 16 States/UTs and no significant difference between the performance of urban and rural schools was observed in 15 States/UTs.
- Performance of the rural students of Class V in the Learning Outcomes of Mathematics is significantly higher in the following States like: Karnataka, Kerala, Assam, Uttarakhand and Delhi.

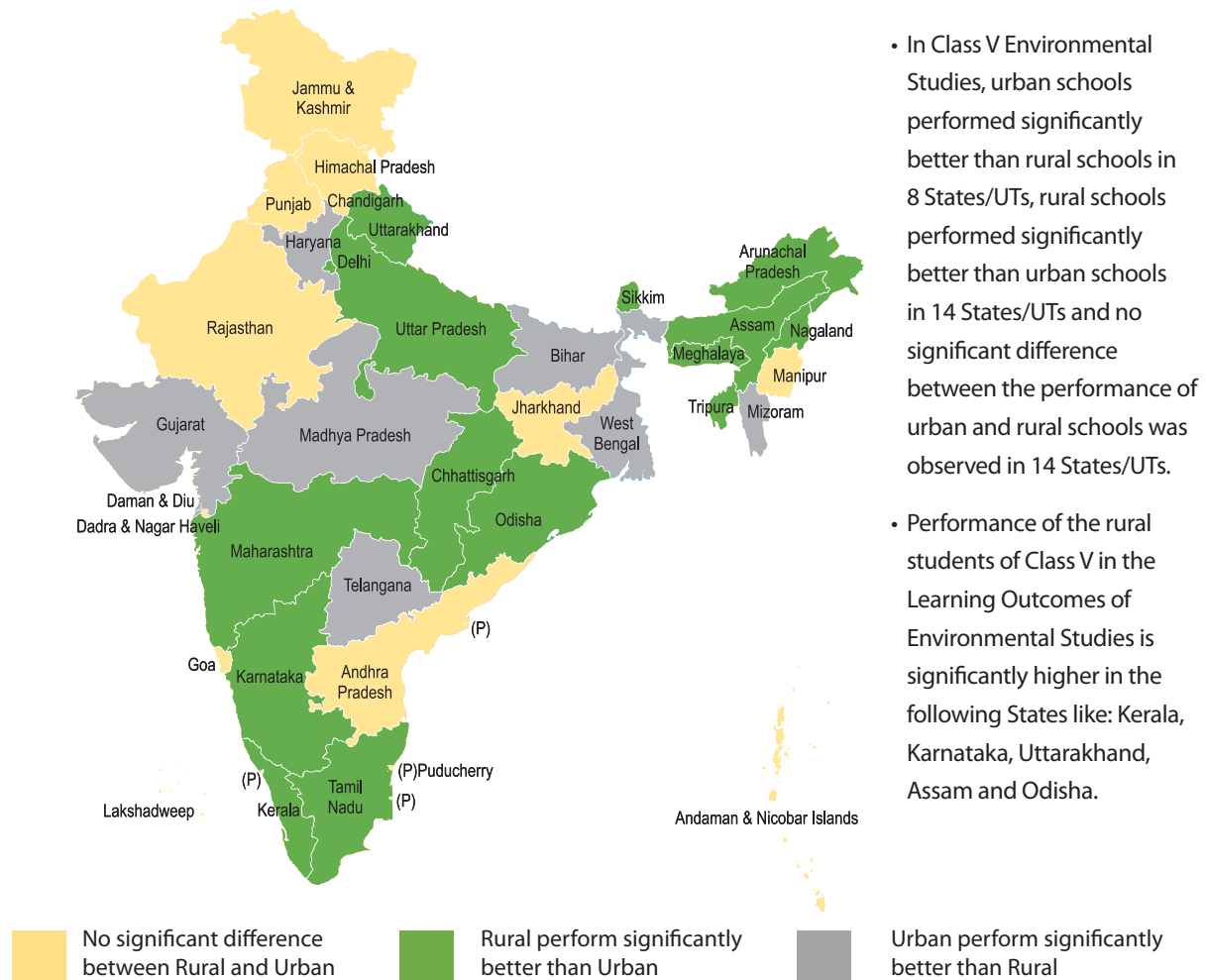
No significant difference between Rural and Urban
 Rural perform significantly better than Urban
 Urban perform significantly better than Rural

State/UT	Rural	Urban	Sig.	D
Jammu & Kashmir	315	311		
Himachal Pradesh	306	294	**	0.3
Punjab	293	292		
Chandigarh	338	335		
Uttarakhand	329	316	**	0.2
Haryana	294	295		
Delhi	295	286	**	0.2
Rajasthan	338	345	**	-0.1
Uttar Pradesh	302	300		
Bihar	309	311	**	-0
Sikkim	286	272	**	0.4
Arunachal Pradesh	280	271	**	0.2
Nagaland	304	291	**	0.3
Manipur	318	304	*	0.2
Mizoram	291	296		
Tripura	305	301		
Meghalaya	289	271	**	0.4
Assam	334	326	**	0.1

State/UT	Rural	Urban	Sig.	D
West Bengal	300	306	**	-0.1
Jharkhand	321	318	**	0.1
Odisha	322	313	**	0.2
Chhattisgarh	298	294	**	0.1
Madhya Pradesh	302	306	**	-0.1
Gujarat	320	321		
Daman & Diu	285	296		-0.2
Dadra & Nagar Haveli	324	332		
Maharashtra	310	299	**	0.2
Andhra Pradesh	334	333		
Karnataka	348	340	**	0.2
Goa	294	296		
Lakshadweep	295	286		0.2
Kerala	343	338	**	0.1
Tamil Nadu	303	297	**	0.1
Puducherry	299	305		
A & N Islands	300	305		
Telangana	316	315		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

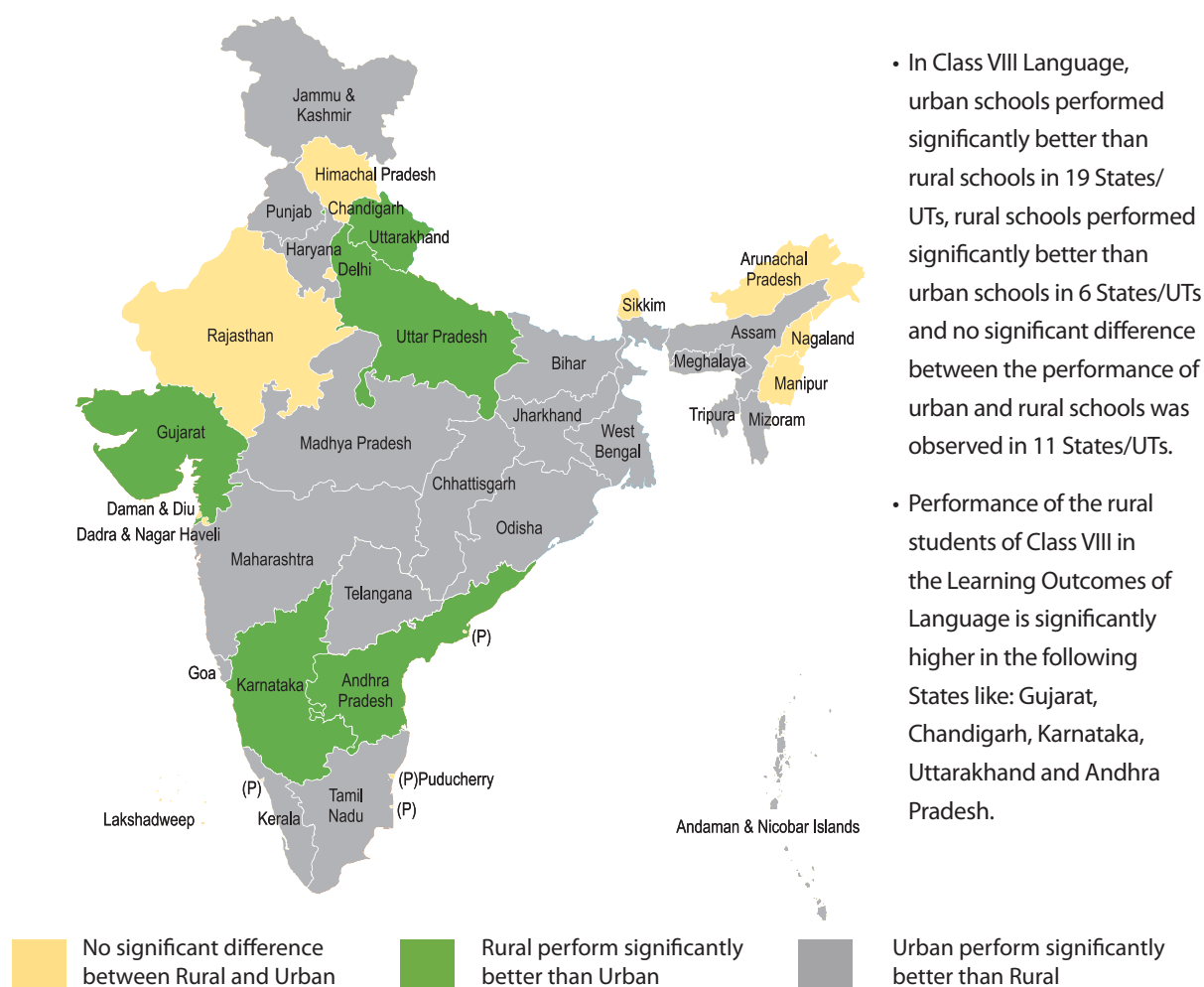
Figure 5.26: Performance of States by School Location in Class V: Environmental Studies



State/UT	Rural	Urban	Sig.	D
Jammu & Kashmir	307	304		
Himachal Pradesh	310	311		
Punjab	297	298		
Chandigarh	337	334		
Uttarakhand	329	319	**	0.2
Haryana	297	301	**	-0.1
Delhi	297	290	**	0.2
Rajasthan	339	341		
Uttar Pradesh	300	297	**	0.1
Bihar	311	315	**	-0.1
Sikkim	286	272	**	0.4
Arunachal Pradesh	285	275	**	0.2
Nagaland	305	295	*	0.2
Manipur	321	321		
Mizoram	299	309	*	-0.3
Tripura	310	304	**	0.1
Meghalaya	287	274	**	0.3
Assam	328	322	**	0.1

State/UT	Rural	Urban	Sig.	D
West Bengal	302	312	**	-0.2
Jharkhand	326	325		
Odisha	312	306	**	0.1
Chhattisgarh	303	300	*	0.1
Madhya Pradesh	305	308	**	-0.1
Gujarat	313	316	**	-0.1
Daman & Diu	280	299	*	-0.4
Dadra & Nagar Haveli	325	328		
Maharashtra	308	300	**	0.2
Andhra Pradesh	324	323		
Karnataka	337	332	**	0.1
Goa	291	293		
Lakshadweep	290	278		0.3
Kerala	338	330	**	0.1
Tamil Nadu	301	298	**	0.1
Puducherry	294	297		
A & N Islands	302	303		
Telangana	302	306	**	-0.1

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.27: Performance of States by School Location in Class VIII: Language


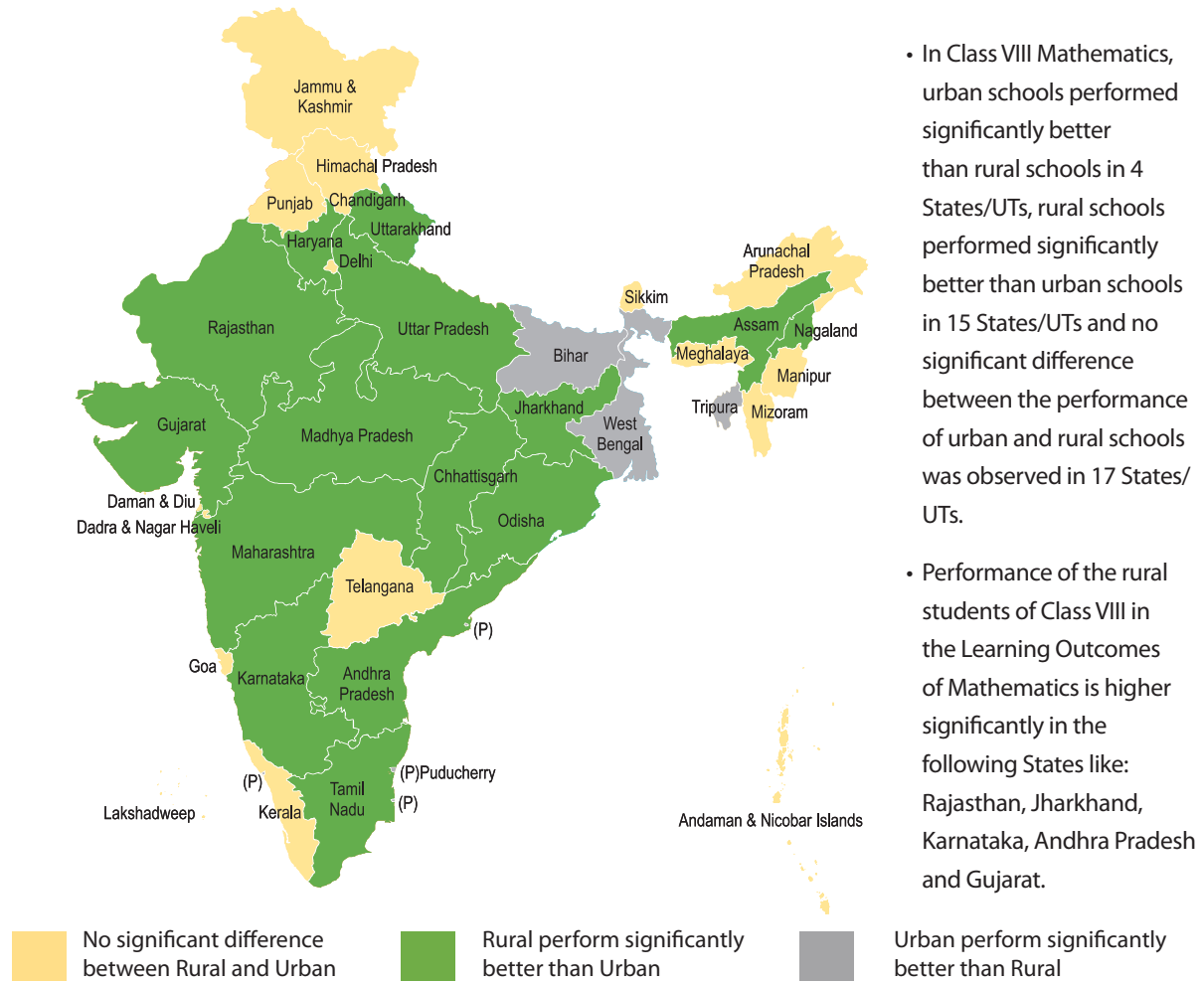
- In Class VIII Language, urban schools performed significantly better than rural schools in 19 States/UTs, rural schools performed significantly better than urban schools in 6 States/UTs and no significant difference between the performance of urban and rural schools was observed in 11 States/UTs.
- Performance of the rural students of Class VIII in the Learning Outcomes of Language is significantly higher in the following States like: Gujarat, Chandigarh, Karnataka, Uttarakhand and Andhra Pradesh.

State/UT	Rural	Urban	Sig.	D
Jammu & Kashmir	274	284	**	-0.2
Himachal Pradesh	312	312		
Punjab	298	302	**	-0.1
Chandigarh	322	312	**	0.2
Uttarakhand	310	306	*	0.1
Haryana	304	308	**	-0.1
Delhi	299	299		
Rajasthan	329	327		
Uttar Pradesh	294	288	**	0.1
Bihar	306	318	**	-0.2
Sikkim	294	295		
Arunachal Pradesh	280	282		
Nagaland	276	267		
Manipur	293	291		
Mizoram	275	296	**	-0.5
Tripura	293	318	**	-0.5
Meghalaya	282	301	**	-0.4
Assam	297	303	**	-0.1
Daman & Diu	293	296		
Dadra & Nagar Haveli	313	323		-0.2
Maharashtra	318	321	**	-0.1
Andhra Pradesh	309	306	**	0.1
Karnataka	322	314	**	0.2
Goa	305	321	**	-0.3
Lakshadweep	286	292		
Kerala	321	325	**	-0.1
Tamil Nadu	304	307	**	-0
Puducherry	274	280		
A & N Islands	289	302	*	-0.3
Telangana	295	301	**	-0.1

State/UT	Rural	Urban	Sig.	D
West Bengal	299	318	**	-0.4
Jharkhand	316	325	**	-0.2
Odisha	299	302	**	-0.1
Chhattisgarh	303	306	**	-0.1
Madhya Pradesh	300	304	**	-0.1
Gujarat	326	323	**	0.1
Daman & Diu	293	296		
Dadra & Nagar Haveli	313	323		-0.2
Maharashtra	318	321	**	-0.1
Andhra Pradesh	309	306	**	0.1
Karnataka	322	314	**	0.2
Goa	305	321	**	-0.3
Lakshadweep	286	292		
Kerala	321	325	**	-0.1
Tamil Nadu	304	307	**	-0
Puducherry	274	280		
A & N Islands	289	302	*	-0.3
Telangana	295	301	**	-0.1

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.28: Performance of States by School Location in Class VIII: Mathematics



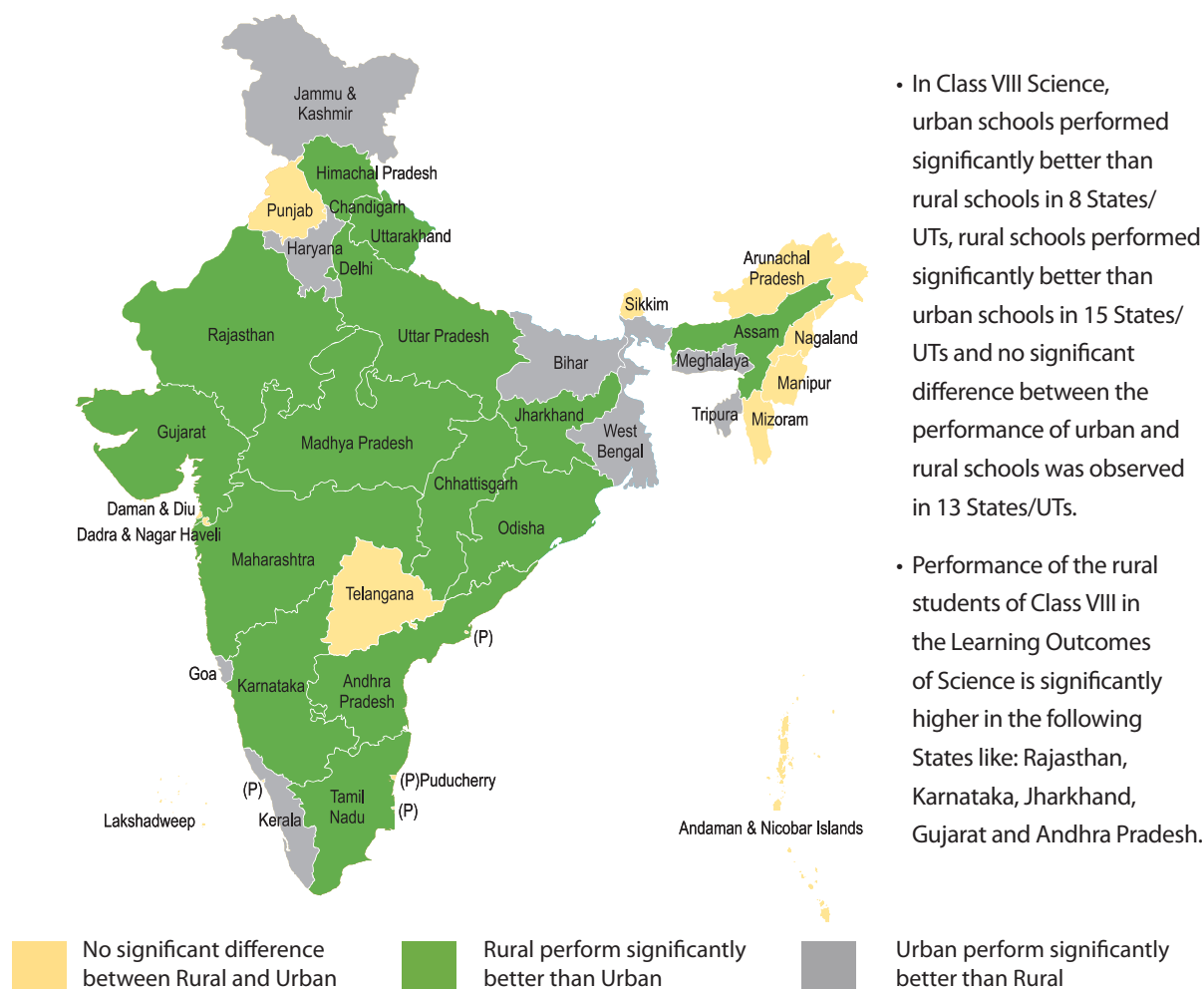
- In Class VIII Mathematics, urban schools performed significantly better than rural schools in 4 States/UTs, rural schools performed significantly better than urban schools in 15 States/UTs and no significant difference between the performance of urban and rural schools was observed in 17 States/UTs.
- Performance of the rural students of Class VIII in the Learning Outcomes of Mathematics is higher significantly in the following States like: Rajasthan, Jharkhand, Karnataka, Andhra Pradesh and Gujarat.

State/UT	Rural	Urban	Sig.	D
Jammu & Kashmir	256	255		
Himachal Pradesh	254	251		
Punjab	243	244		
Chandigarh	278	276		
Uttarakhand	267	249	**	0.4
Haryana	256	254	**	0.1
Delhi	245	244		
Rajasthan	305	294	**	0.2
Uttar Pradesh	264	246	**	0.3
Bihar	277	280	**	-0.1
Sikkim	241	240		
Arunachal Pradesh	249	248		
Nagaland	250	238	**	0.3
Manipur	267	269		
Mizoram	253	259		
Tripura	255	264	**	-0.2
Meghalaya	249	248		
Assam	285	274	**	0.2

State/UT	Rural	Urban	Sig.	D
West Bengal	260	266	**	-0.1
Jharkhand	295	281	**	0.3
Odisha	275	263	**	0.2
Chhattisgarh	256	249	**	0.2
Madhya Pradesh	264	260	**	0.1
Gujarat	284	274	**	0.2
Daman & Diu	243	241		
Dadra & Nagar Haveli	277	289		-0.2
Maharashtra	265	259	**	0.1
Andhra Pradesh	289	277	**	0.2
Karnataka	292	281	**	0.2
Goa	247	250		
Lakshadweep	249	244		
Kerala	286	286		
Tamil Nadu	252	249	**	0.1
Puducherry	237	243	*	-0.2
A & N Islands	245	253		
Telangana	257	257		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.29: Performance of States by School Location in Class VIII: Science



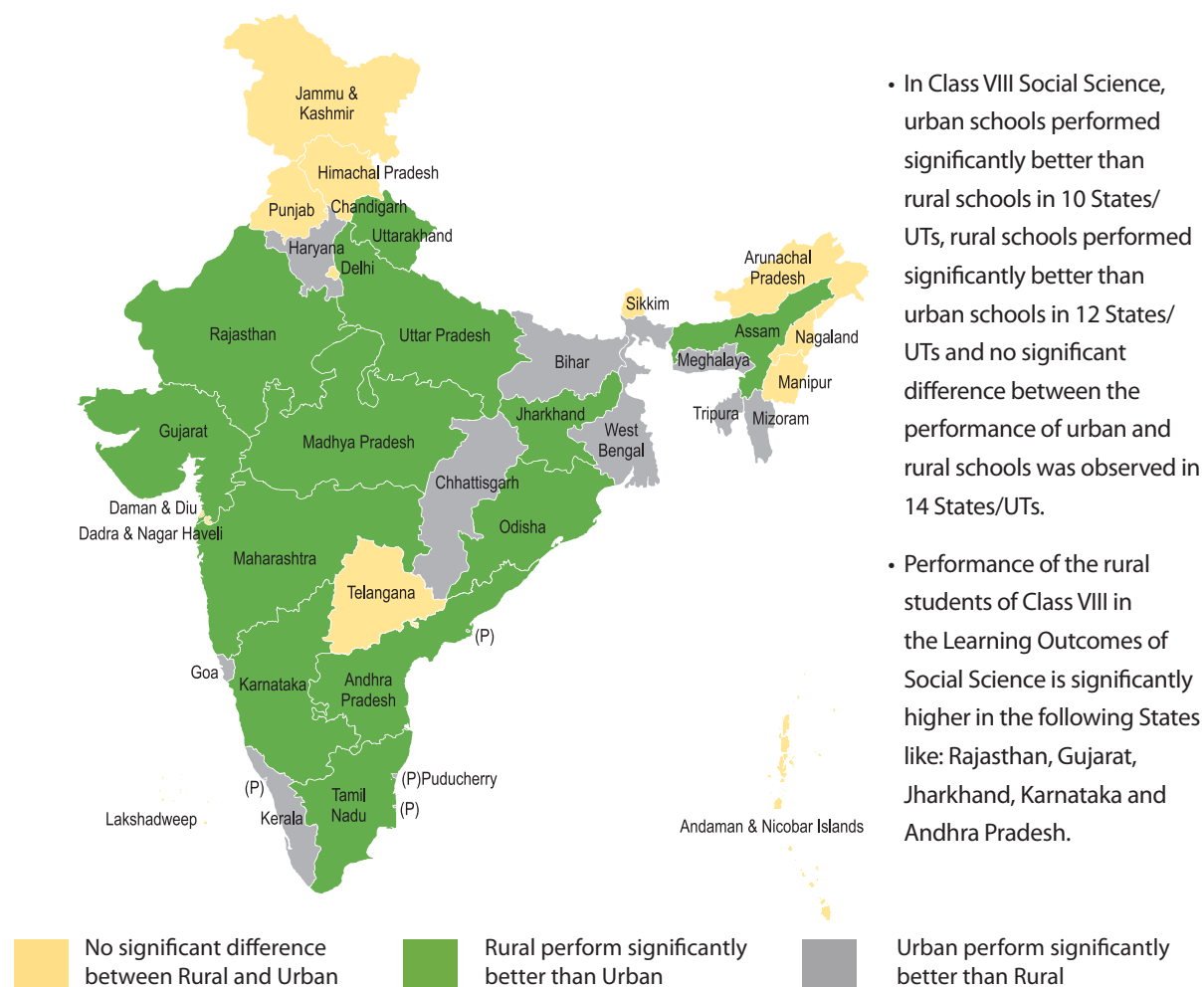
- In Class VIII Science, urban schools performed significantly better than rural schools in 8 States/UTs, rural schools performed significantly better than urban schools in 15 States/UTs and no significant difference between the performance of urban and rural schools was observed in 13 States/UTs.
- Performance of the rural students of Class VIII in the Learning Outcomes of Science is significantly higher in the following States like: Rajasthan, Karnataka, Jharkhand, Gujarat and Andhra Pradesh.

State/UT	Rural	Urban	Sig.	D
Jammu & Kashmir	257	266	*	-0.2
Himachal Pradesh	274	266	*	0.2
Punjab	257	256		
Chandigarh	293	292		
Uttarakhand	286	266	**	0.4
Haryana	267	271	**	-0.1
Delhi	251	247	**	0.1
Rajasthan	326	320	**	0.1
Uttar Pradesh	269	249	**	0.3
Bihar	276	281	**	-0.1
Sikkim	258	254		
Arunachal Pradesh	249	250		
Nagaland	249	243		
Manipur	271	276		
Mizoram	247	254		-0.2
Tripura	262	276	**	-0.3
Meghalaya	251	255	*	-0.1
Assam	290	284	**	0.1

State/UT	Rural	Urban	Sig.	D
West Bengal	267	275	**	-0.2
Jharkhand	304	290	**	0.2
Odisha	279	269	**	0.2
Chhattisgarh	275	270	**	0.1
Madhya Pradesh	274	272	**	0
Gujarat	298	287	**	0.2
Daman & Diu	249	246		
Dadra & Nagar Haveli	293	313		-0.3
Maharashtra	269	263	**	0.1
Andhra Pradesh	290	275	**	0.3
Karnataka	304	287	**	0.3
Goa	254	264	**	-0.2
Lakshadweep	246	242		
Kerala	271	274	**	-0.1
Tamil Nadu	257	254	**	0.1
Puducherry	239	244		
A & N Islands	251	259		
Telangana	259	259		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.30: Performance of States by School Location in Class VIII: Social Science

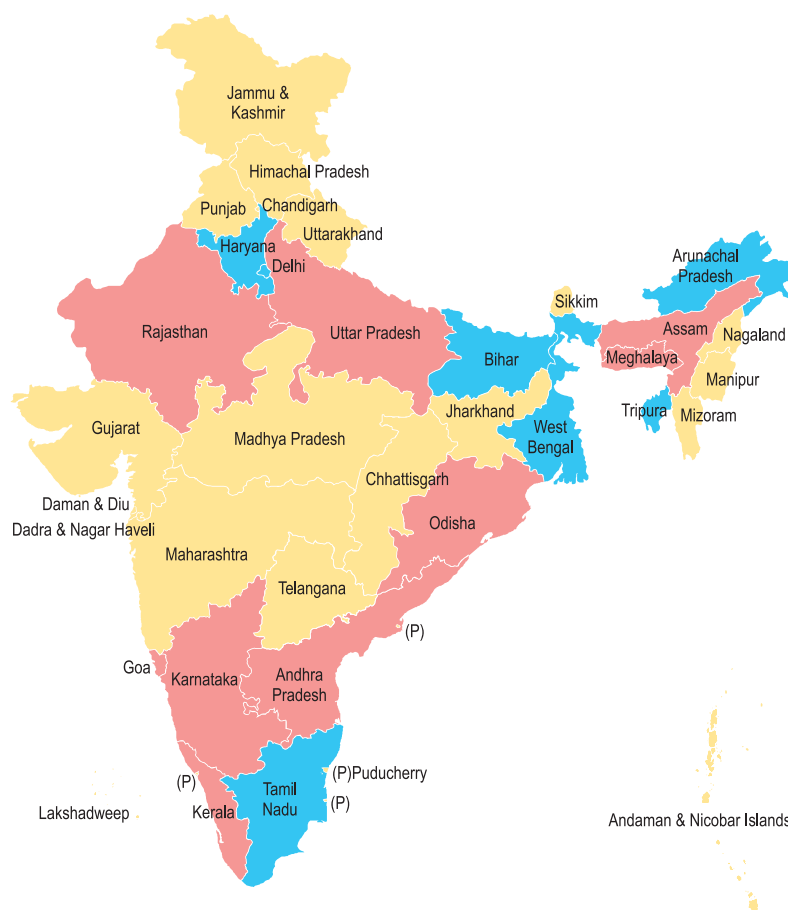


- In Class VIII Social Science, urban schools performed significantly better than rural schools in 10 States/UTs, rural schools performed significantly better than urban schools in 12 States/UTs and no significant difference between the performance of urban and rural schools was observed in 14 States/UTs.
- Performance of the rural students of Class VIII in the Learning Outcomes of Social Science is significantly higher in the following States like: Rajasthan, Gujarat, Jharkhand, Karnataka and Andhra Pradesh.

State/UT	Rural	Urban	Sig.	D
Jammu & Kashmir	258	263		
Himachal Pradesh	280	275		
Punjab	259	257		
Chandigarh	302	303		
Uttarakhand	290	274	**	0.3
Haryana	272	275	**	-0.1
Delhi	259	258		
Rajasthan	327	323	**	0.1
Uttar Pradesh	272	260	**	0.2
Bihar	287	292	**	-0.1
Sikkim	264	262		
Arunachal Pradesh	262	260		
Nagaland	261	255		
Manipur	276	272		
Mizoram	252	263	*	-0.3
Tripura	262	271	**	-0.2
Meghalaya	259	264	**	-0.1
Assam	295	287	**	0.2

State/UT	Rural	Urban	Sig.	D
West Bengal	262	273	**	-0.2
Jharkhand	307	302	**	0.1
Odisha	273	266	**	0.2
Chhattisgarh	281	286	**	-0.1
Madhya Pradesh	280	279	*	0
Gujarat	308	299	**	0.2
Daman & Diu	255	259		
Dadra & Nagar Haveli	304	313		
Maharashtra	276	272	**	0.1
Andhra Pradesh	295	278	**	0.3
Karnataka	302	290	**	0.2
Goa	260	271	**	-0.3
Lakshadweep	248	246		
Kerala	263	267	**	-0.1
Tamil Nadu	257	255	**	0.1
Puducherry	240	248	**	-0.2
A & N Islands	255	262		
Telangana	269	271		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.31: Performance of States by School Management in Class III: Language

- In Class III Language, government aided schools performed significantly better than government schools in 7 States/UTs, government schools performed significantly better than government aided schools in 9 States/UTs and no significant difference between the performance of government and government aided schools was observed in 20 States/UTs.

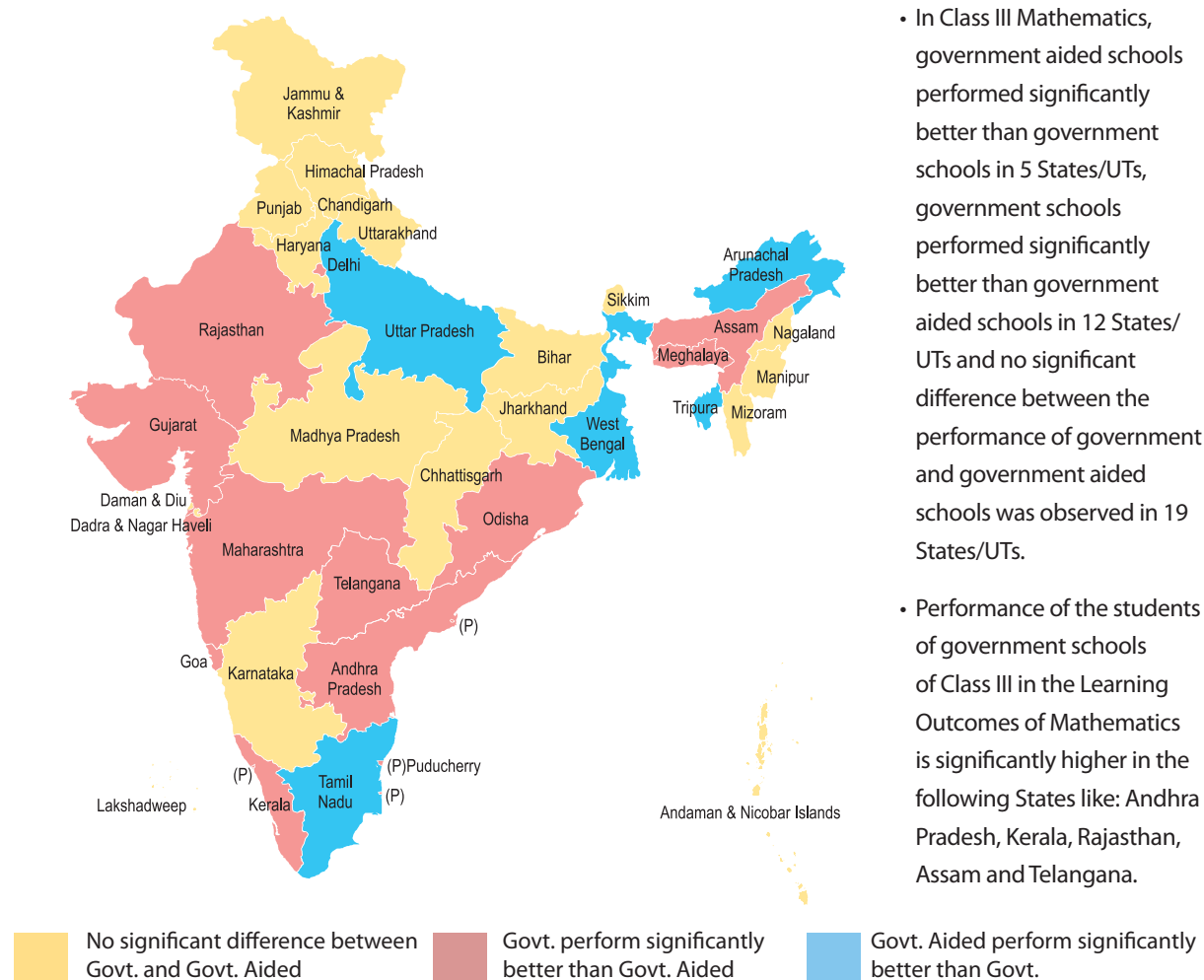
- Performance of the students of government schools of Class III in the Learning Outcomes of Language is significantly higher in the following States like: Andhra Pradesh, Karnataka, Rajasthan, Kerala and Assam.

No significant difference between Govt. and Govt. Aided
 Govt. perform significantly better than Govt. Aided
 Govt. Aided perform significantly better than Govt.

State/UT	Govt.	Govt. Aided	Sig.	D	State/UT	Govt.	Govt. Aided	Sig.	D
Jammu & Kashmir	332	367		-0.64	West Bengal	352	359	**	-0.12
Himachal Pradesh	341	322		0.38	Jharkhand	344	344		
Punjab	330	332			Odisha	327	313	**	0.3
Chandigarh	353	370		-0.32	Chhattisgarh	332	336		
Uttarakhand	347	340			Madhya Pradesh	340	340		
Haryana	329	336	**	-0.13	Gujarat	347	345		
Delhi	316	322	*	-0.11	Daman & Diu	330			
Rajasthan	358	332	**	0.52	Dadra & Nagar Haveli	342	370		-0.54
Uttar Pradesh	314	309	**	0.08	Maharashtra	344	343		
Bihar	336	356	**	-0.39	Andhra Pradesh	365	357	**	0.15
Sikkim	325	326			Karnataka	361	357	**	0.09
Arunachal Pradesh	305	324	**	-0.38	Goa	342	331	*	0.22
Nagaland	345				Lakshadweep	313			
Manipur	341	344			Kerala	355	347	**	0.15
Mizoram	337	325		0.27	Tamil Nadu	321	330	**	-0.19
Tripura	336	350	*	-0.26	Puducherry	319	307		0.27
Meghalaya	330	325	**	0.1	A & N Islands	326	320		
Assam	351	336	**	0.26	Telangana	340	338		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.32: Performance of States by School Management in Class III: Mathematics

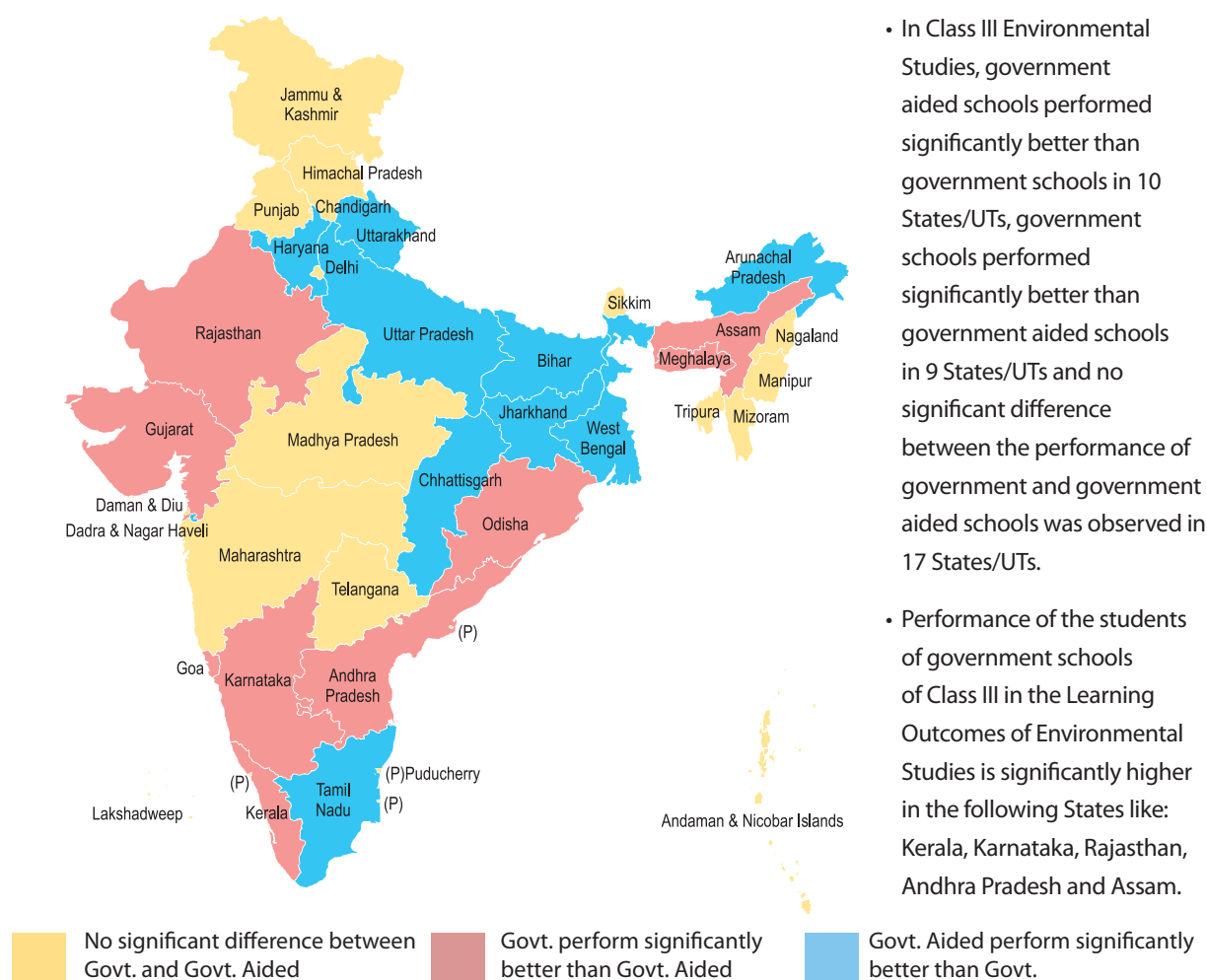


- In Class III Mathematics, government aided schools performed significantly better than government schools in 5 States/UTs, government schools performed significantly better than government aided schools in 12 States/UTs and no significant difference between the performance of government and government aided schools was observed in 19 States/UTs.
- Performance of the students of government schools of Class III in the Learning Outcomes of Mathematics is significantly higher in the following States like: Andhra Pradesh, Kerala, Rajasthan, Assam and Telangana.

State/UT	Govt.	Govt. Aided	Sig.	D
Jammu & Kashmir	318	362		-0.8
Himachal Pradesh	320	313		
Punjab	306	308		
Chandigarh	338	348		
Uttarakhand	331	325		
Haryana	307	309		
Delhi	299	292	**	0.14
Rajasthan	339	321	**	0.36
Uttar Pradesh	308	316	**	-0.15
Bihar	318	320		
Sikkim	308	281		0.55
Arunachal Pradesh	293	310	**	-0.33
Nagaland	330			
Manipur	329	328		
Mizoram	315	326		-0.23
Tripura	318	333	*	-0.28
Meghalaya	311	304	**	0.14
Assam	338	322	**	0.29

State/UT	Govt.	Govt. Aided	Sig.	D
West Bengal	335	339	**	-0.08
Jharkhand	327	327		
Odisha	317	292	**	0.48
Chhattisgarh	314	313		
Madhya Pradesh	316	315		
Gujarat	325	321	**	0.08
Daman & Diu	310			
Dadra & Nagar Haveli	327	355		-0.56
Maharashtra	325	324	**	0.03
Andhra Pradesh	343	334	**	0.18
Karnataka	348	348		
Goa	320	307	**	0.29
Lakshadweep	308			
Kerala	342	339	**	0.06
Tamil Nadu	314	315	*	-0.02
Puducherry	318	301	*	0.37
A & N Islands	318	322		
Telangana	333	324	**	0.17

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.33: Performance of States by School Management in Class III: Environmental Studies

- In Class III Environmental Studies, government aided schools performed significantly better than government schools in 10 States/UTs, government schools performed significantly better than government aided schools in 9 States/UTs and no significant difference between the performance of government and government aided schools was observed in 17 States/UTs.
- Performance of the students of government schools of Class III in the Learning Outcomes of Environmental Studies is significantly higher in the following States like: Kerala, Karnataka, Rajasthan, Andhra Pradesh and Assam.

State/UT	Govt.	Govt. Aided	Sig.	D
Jammu & Kashmir	310	337		-0.57
Himachal Pradesh	323	302		0.48
Punjab	308	308		
Chandigarh	343	354		-0.25
Uttarakhand	333	345	**	-0.28
Haryana	313	320	**	-0.14
Delhi	303	301		
Rajasthan	337	310	**	0.62
Uttar Pradesh	302	305	**	-0.05
Bihar	317	328	**	-0.23
Sikkim	308	294		0.33
Arunachal Pradesh	293	309	**	-0.33
Nagaland	327			
Manipur	331	330		
Mizoram	331	307		0.52
Tripura	323	326		
Meghalaya	317	308	**	0.18
Assam	332	321	**	0.23

State/UT	Govt.	Govt. Aided	Sig.	D
West Bengal	332	337	**	-0.11
Jharkhand	325	329	**	-0.09
Odisha	311	300	**	0.25
Chhattisgarh	318	323	*	-0.11
Madhya Pradesh	320	322		
Gujarat	330	322	**	0.17
Daman & Diu	314			
Dadra & Nagar Haveli	326	360	*	-0.78
Maharashtra	330	330		
Andhra Pradesh	337	332	**	0.12
Karnataka	342	339	**	0.07
Goa	329	317	**	0.29
Lakshadweep	301			
Kerala	352	344	**	0.17
Tamil Nadu	318	329	**	-0.25
Puducherry	311	305		
A & N Islands	318	330		-0.28
Telangana	327	325		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.34: Performance of States by School Management in Class V: Language



- In Class V Language, government aided schools performed significantly better than government schools in 9 States/UTs, government schools performed significantly better than government aided schools in 9 States/UTs and no significant difference between the performance of government and government aided schools was observed in 18 States/UTs.
- Performance of the students of government schools of Class V in the Learning Outcomes of Language is significantly higher in the following States like: Kerala, Karnataka, Chandigarh, Gujarat and Assam.

No significant difference between Govt. and Govt. Aided
 Govt. perform significantly better than Govt. Aided
 Govt. Aided perform significantly better than Govt.

State/UT	Govt.	Govt. Aided	Sig.	D
Jammu & Kashmir	310	300		
Himachal Pradesh	328	309		0.36
Punjab	306	303	*	0.08
Chandigarh	346	307	**	0.65
Uttarakhand	338	333		
Haryana	310	307		
Delhi	303	304		
Rajasthan	344			
Uttar Pradesh	299	303	**	-0.06
Bihar	316	332	**	-0.3
Sikkim	296	298		
Arunachal Pradesh	283	322	**	-0.81
Nagaland	312			
Manipur	319	323		
Mizoram	297	316	**	-0.49
Tripura	315	344	**	-0.56
Meghalaya	297	295		
Assam	323	313	**	0.2

State/UT	Govt.	Govt. Aided	Sig.	D
West Bengal	317	318		
Jharkhand	325	333	**	-0.14
Odisha	304	298	*	0.12
Chhattisgarh	313	315		
Madhya Pradesh	313	314		
Gujarat	325	307	**	0.32
Daman & Diu	299	303		
Dadra & Nagar Haveli	334	354		-0.36
Maharashtra	324	323		
Andhra Pradesh	338	347	**	-0.15
Karnataka	354	346	**	0.14
Goa	294	316	**	-0.42
Lakshadweep	304			
Kerala	361	349	**	0.16
Tamil Nadu	315	327	**	-0.23
Puducherry	304	287	*	0.33
A & N Islands	310	307		
Telangana	315	307	**	0.16

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.35: Performance of States by School Management in Class V: Mathematics

- In Class V Mathematics, government aided schools performed significantly better than government schools in 7 States/UTs, government schools performed significantly better than government aided schools in 13 States/UTs and no significant difference between the performance of government and government aided schools was observed in 16 States/UTs.
- Performance of the students of government schools of Class V in the Learning Outcomes of Mathematics is significantly higher in the following States like: Karnataka, Kerala, Chandigarh, Assam and Gujarat.

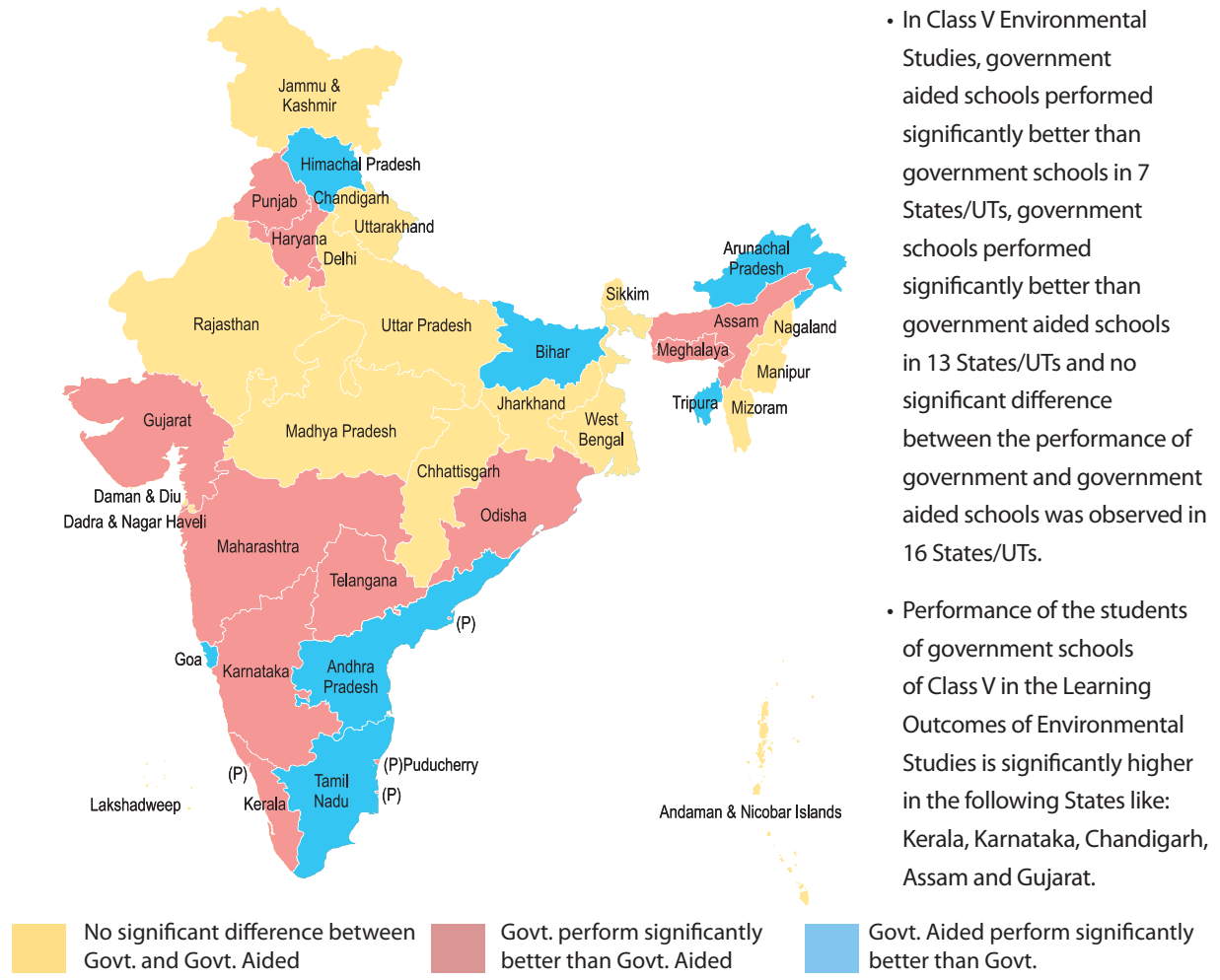
No significant difference between Govt. and Govt. Aided
 Govt. perform significantly better than Govt. Aided
 Govt. Aided perform significantly better than Govt.

State/UT	Govt.	Govt. Aided	Sig.	D
Jammu & Kashmir	315	328		-0.23
Himachal Pradesh	305	329		-0.47
Punjab	294	283	**	0.2
Chandigarh	337	311	**	0.45
Uttarakhand	326	331		
Haryana	295	280	**	0.3
Delhi	287	290		
Rajasthan	338			
Uttar Pradesh	301	307	**	-0.11
Bihar	309	313	*	-0.09
Sikkim	281	284		
Arunachal Pradesh	275	302	**	-0.64
Nagaland	300			
Manipur	315	324		
Mizoram	291	302		-0.25
Tripura	303	323	**	-0.38
Meghalaya	293	280	**	0.26
Assam	334	317	**	0.31

State/UT	Govt.	Govt. Aided	Sig.	D
West Bengal	301	302		
Jharkhand	322	312	**	0.18
Odisha	321	309	**	0.21
Chhattisgarh	297	305	**	-0.15
Madhya Pradesh	303	304		
Gujarat	322	294	**	0.5
Daman & Diu	292	283		0.2
Dadra & Nagar Haveli	325	338		-0.27
Maharashtra	308	304	**	0.08
Andhra Pradesh	333	342	**	-0.16
Karnataka	348	340	**	0.15
Goa	289	296	*	-0.18
Lakshadweep	291			
Kerala	347	339	**	0.12
Tamil Nadu	300	301		
Puducherry	307	286	**	0.44
A & N Islands	302	296		
Telangana	317	308	**	0.15

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.36: Performance of States by School Management in Class V: Environmental Studies

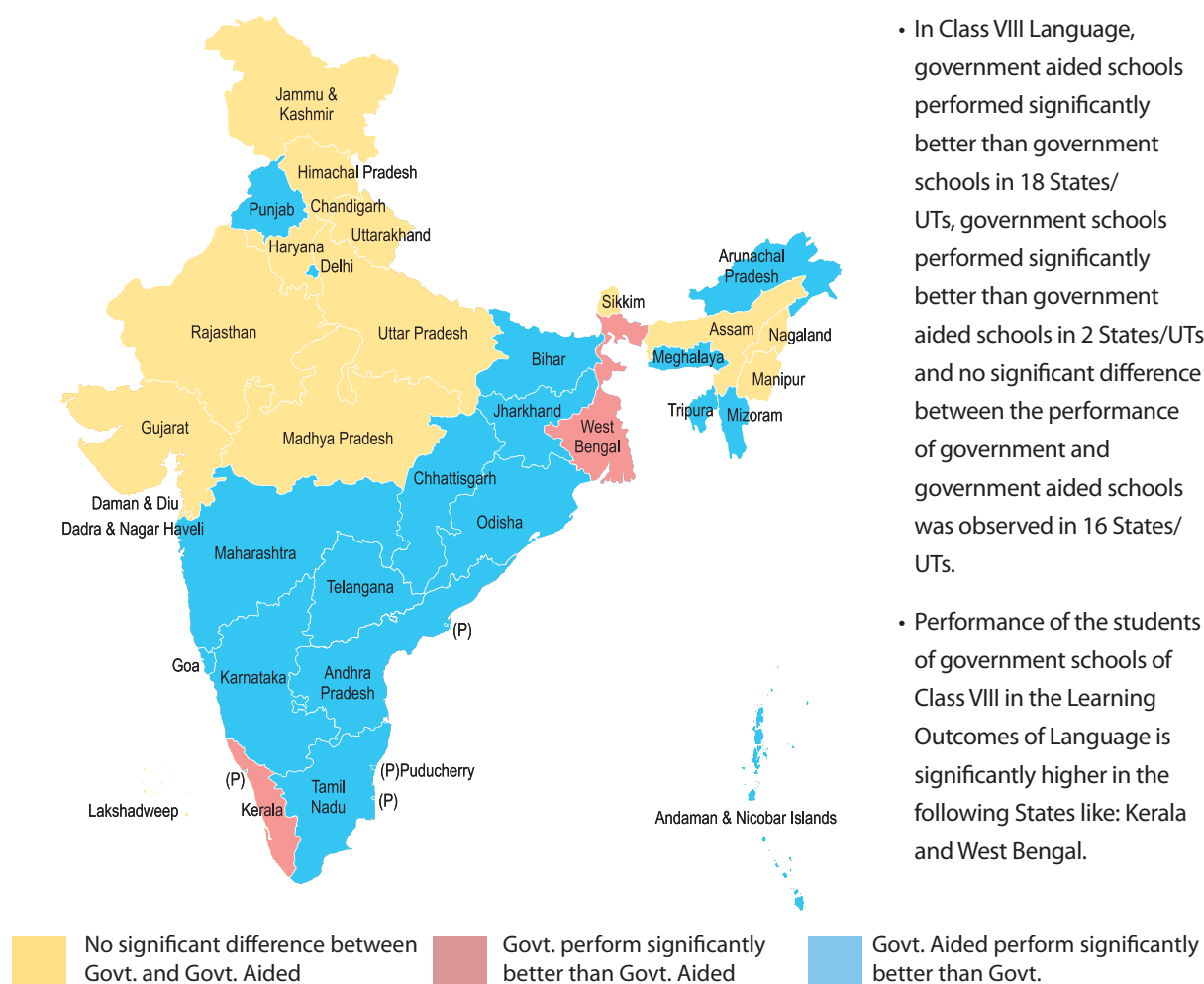


- In Class V Environmental Studies, government aided schools performed significantly better than government schools in 7 States/UTs, government schools performed significantly better than government aided schools in 13 States/UTs and no significant difference between the performance of government and government aided schools was observed in 16 States/UTs.
- Performance of the students of government schools of Class V in the Learning Outcomes of Environmental Studies is significantly higher in the following States like: Kerala, Karnataka, Chandigarh, Assam and Gujarat.

State/UT	Govt.	Govt. Aided	Sig.	D
Jammu & Kashmir	307	319		-0.22
Himachal Pradesh	310	337	*	-0.58
Punjab	298	289	**	0.19
Chandigarh	336	300	**	0.64
Uttarakhand	328	320		
Haryana	298	287	**	0.21
Delhi	292	288	*	0.08
Rajasthan	339			
Uttar Pradesh	300	300		
Bihar	311	322	**	-0.2
Sikkim	282	286		
Arunachal Pradesh	279	302	**	-0.51
Nagaland	302			
Manipur	321	323		
Mizoram	300	310		-0.23
Tripura	307	323	**	-0.31
Meghalaya	292	279	**	0.29
Assam	328	314	**	0.26

State/UT	Govt.	Govt. Aided	Sig.	D
West Bengal	304	305		
Jharkhand	326	328		
Odisha	311	302	**	0.18
Chhattisgarh	303	305		
Madhya Pradesh	305	309		
Gujarat	315	293	**	0.44
Daman & Diu	288	288		
Dadra & Nagar Haveli	324	340		-0.31
Maharashtra	306	303	**	0.06
Andhra Pradesh	323	331	**	-0.14
Karnataka	337	330	**	0.16
Goa	283	294	**	-0.25
Lakshadweep	285			
Kerala	342	333	**	0.16
Tamil Nadu	299	301	**	-0.06
Puducherry	300	283	**	0.4
A & N Islands	303	291		0.27
Telangana	305	292	**	0.24

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.37: Performance of States by School Management in Class VIII: Language

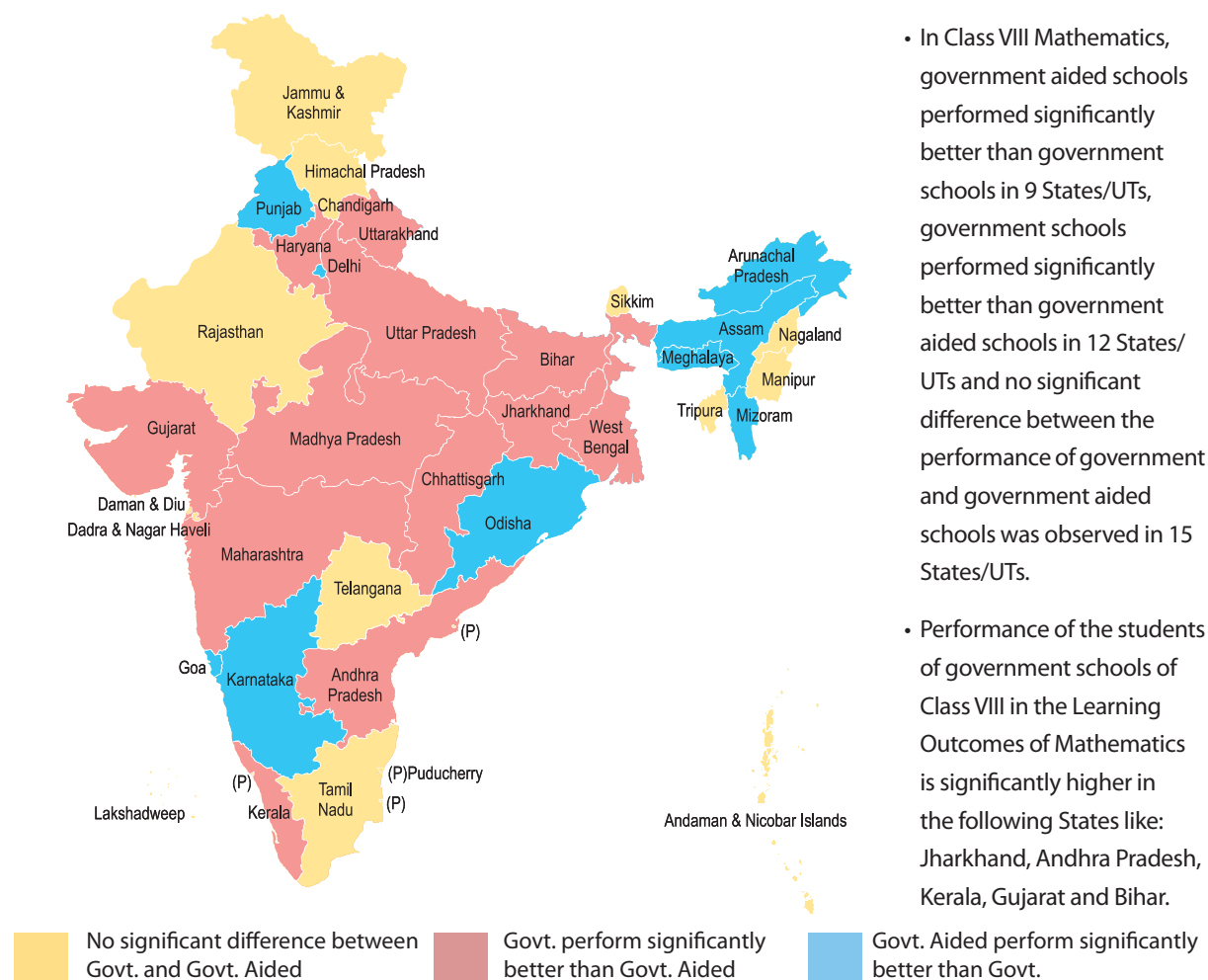
- In Class VIII Language, government aided schools performed significantly better than government schools in 18 States/UTs, government schools performed significantly better than government aided schools in 2 States/UTs and no significant difference between the performance of government and government aided schools was observed in 16 States/UTs.
- Performance of the students of government schools of Class VIII in the Learning Outcomes of Language is significantly higher in the following States like: Kerala and West Bengal.

State/UT	Govt.	Govt. Aided	Sig.	D
Jammu & Kashmir	275	267		
Himachal Pradesh	312	320		
Punjab	298	307	**	-0.18
Chandigarh	315	319		
Uttarakhand	309	309		
Haryana	305	305		
Delhi	299	306	**	-0.15
Rajasthan	329			
Uttar Pradesh	293	292		
Bihar	307	319	**	-0.22
Sikkim	294	288		
Arunachal Pradesh	274	329	**	-1.16
Nagaland	273			
Manipur	294	287		
Mizoram	277	312	**	-0.89
Tripura	300	312	**	-0.25
Meghalaya	282	289	**	-0.14
Assam	298	299		

State/UT	Govt.	Govt. Aided	Sig.	D
West Bengal	305	301	**	0.08
Jharkhand	316	326	**	-0.18
Odisha	298	303	**	-0.1
Chhattisgarh	303	308	*	-0.1
Madhya Pradesh	301	300		
Gujarat	325	326		
Daman & Diu	291	307		-0.35
Dadra & Nagar Haveli	313	341		-0.55
Maharashtra	313	321	**	-0.14
Andhra Pradesh	308	311	*	-0.07
Karnataka	318	319	**	-0.03
Goa	292	326	**	-0.71
Lakshadweep	289			
Kerala	323	322	**	0.03
Tamil Nadu	299	312	**	-0.25
Puducherry	274	286	**	-0.28
A & N Islands	292	326	*	-0.71
Telangana	295	319	**	-0.5

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.38: Performance of States by School Management in Class VIII: Mathematics

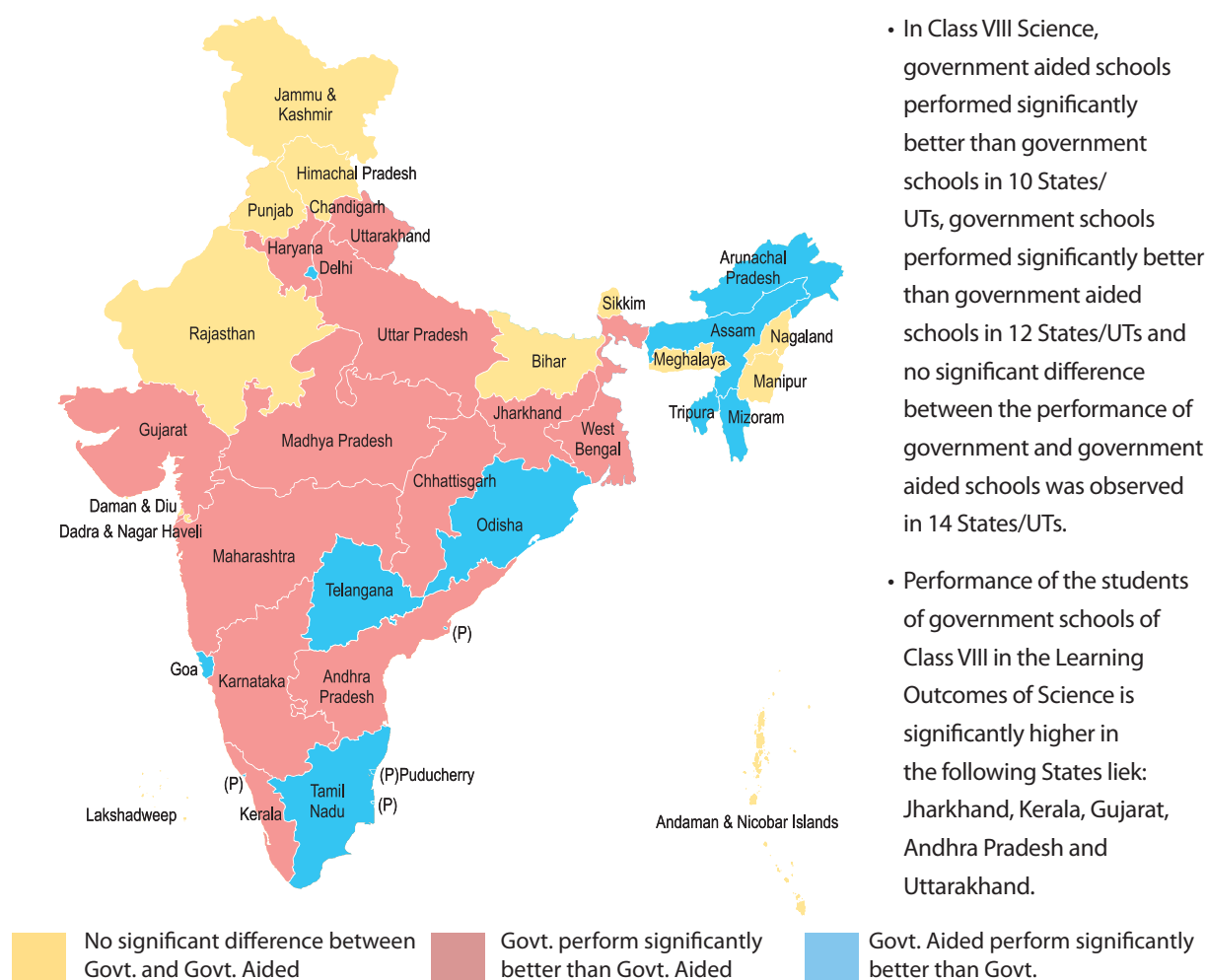


- In Class VIII Mathematics, government aided schools performed significantly better than government schools in 9 States/UTs, government schools performed significantly better than government aided schools in 12 States/UTs and no significant difference between the performance of government and government aided schools was observed in 15 States/UTs.
- Performance of the students of government schools of Class VIII in the Learning Outcomes of Mathematics is significantly higher in the following States like: Jharkhand, Andhra Pradesh, Kerala, Gujarat and Bihar.

State/UT	Govt.	Govt. Aided	Sig.	D
Jammu & Kashmir	256	267		-0.23
Himachal Pradesh	254	251		
Punjab	242	251	**	-0.22
Chandigarh	277	269		
Uttarakhand	265	257	**	0.16
Haryana	256	247	**	0.21
Delhi	244	255	**	-0.32
Rajasthan	304			
Uttar Pradesh	263	261	**	0.04
Bihar	277	267	**	0.19
Sikkim	241	238		
Arunachal Pradesh	245	273	**	-0.78
Nagaland	246			
Manipur	266	272		
Mizoram	252	268	**	-0.48
Tripura	257	264		
Meghalaya	246	250	*	-0.1
Assam	283	286	**	-0.05

State/UT	Govt.	Govt. Aided	Sig.	D
West Bengal	263	260	**	0.05
Jharkhand	296	271	**	0.47
Odisha	272	279	**	-0.12
Chhattisgarh	256	243	**	0.26
Madhya Pradesh	264	247	**	0.32
Gujarat	283	267	**	0.29
Daman & Diu	240	247		-0.21
Dadra & Nagar Haveli	277	311		-0.63
Maharashtra	266	262	**	0.07
Andhra Pradesh	287	272	**	0.25
Karnataka	287	288	*	-0.02
Goa	242	252	**	-0.3
Lakshadweep	247			
Kerala	287	285	**	0.04
Tamil Nadu	250	251		
Puducherry	240	243		
A & N Islands	247	258		-0.26
Telangana	257	257		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.39: Performance of States by School Management in Class VIII: Science

- In Class VIII Science, government aided schools performed significantly better than government schools in 10 States/UTs, government schools performed significantly better than government aided schools in 12 States/UTs and no significant difference between the performance of government and government aided schools was observed in 14 States/UTs.
- Performance of the students of government schools of Class VIII in the Learning Outcomes of Science is significantly higher in the following States like: Jharkhand, Kerala, Gujarat, Andhra Pradesh and Uttarakhand.

State/UT	Govt.	Govt. Aided	Sig.	D
Jammu & Kashmir	258	249		
Himachal Pradesh	274	249	**	0.48
Punjab	257	257		
Chandigarh	293	279		0.22
Uttarakhand	285	271	**	0.26
Haryana	269	253	**	0.29
Delhi	248	255	**	-0.19
Rajasthan	326			
Uttar Pradesh	267	264	**	0.06
Bihar	277	279		
Sikkim	257	255		
Arunachal Pradesh	244	286	**	-0.92
Nagaland	247			
Manipur	273	268		
Mizoram	247	263	**	-0.42
Tripura	266	277	**	-0.24
Meghalaya	250	252		
Assam	289	292	**	-0.06

State/UT	Govt.	Govt. Aided	Sig.	D
West Bengal	270	268	**	0.04
Jharkhand	303	292	**	0.18
Odisha	276	286	**	-0.16
Chhattisgarh	275	262	**	0.22
Madhya Pradesh	274	255	**	0.32
Gujarat	297	280	**	0.3
Daman & Diu	247	249		
Dadra & Nagar Haveli	296	311		-0.25
Maharashtra	268	266	**	0.04
Andhra Pradesh	288	266	**	0.35
Karnataka	298	296	**	0.03
Goa	244	269	**	-0.6
Lakshadweep	245			
Kerala	273	270	**	0.05
Tamil Nadu	254	258	**	-0.09
Puducherry	240	247	*	-0.2
A & N Islands	254	264		-0.24
Telangana	259	262	*	-0.08

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Figure 5.40: Performance of States by School Management in Class VIII: Social Science



- In Class VIII Social Science, government aided schools performed significantly better than government schools in 8 States/UTs, government schools performed significantly better than government aided schools in 9 States/UTs and no significant difference between the performance of government and government aided schools was observed in 19 States/UTs.
- Performance of the students of government schools of Class VIII in the Learning Outcomes of Social Science is significantly higher in the following States like: Gujarat, Jharkhand, Chandigarh, Andhra Pradesh and Uttarakhand.

No significant difference between Govt. and Govt. Aided
 Govt. perform significantly better than Govt. Aided
 Govt. Aided perform significantly better than Govt.

State/UT	Govt.	Govt. Aided	Sig.	D
Jammu & Kashmir	258	281		-0.45
Himachal Pradesh	279	281		
Punjab	258	259		
Chandigarh	303	282	**	0.38
Uttarakhand	289	277	**	0.24
Haryana	273	270		
Delhi	258	265	**	-0.2
Rajasthan	327			
Uttar Pradesh	270	272	**	-0.04
Bihar	287	289		
Sikkim	264	253		0.28
Arunachal Pradesh	257	292	**	-0.8
Nagaland	259			
Manipur	276	270		
Mizoram	254	266	*	-0.3
Tripura	265	264		
Meghalaya	260	261		
Assam	294	294		

State/UT	Govt.	Govt. Aided	Sig.	D
West Bengal	265	264	**	0.03
Jharkhand	308	297	**	0.2
Odisha	271	279	**	-0.16
Chhattisgarh	282	283		
Madhya Pradesh	280	267	**	0.23
Gujarat	308	286	**	0.41
Daman & Diu	256	259		
Dadra & Nagar Haveli	305	297		
Maharashtra	279	273	**	0.11
Andhra Pradesh	292	273	**	0.35
Karnataka	297	297		
Goa	253	274	**	-0.53
Lakshadweep	247			
Kerala	265	263	**	0.03
Tamil Nadu	255	257	**	-0.04
Puducherry	242	252	**	-0.31
A & N Islands	257	276		-0.46
Telangana	270	270		

* Statistically significant at $p < 0.05$; ** Statistically significant at $p < 0.01$. The sizes of statistically significant differences are expressed by Cohen's D (Cohen, 1988). The size of difference that is lesser than $D=0.20$ is considered small and practically irrelevant.

Table 5.1: Performance of States by Social Groups in Class III: Language

State/UT	SC	ST	OBC	General	Sig.
Jammu & Kashmir	328	323	338	336	ST, SC < Gen, OBC
Himachal Pradesh	341	341	346	340	*
Punjab	329	318	331	333	*
Chandigarh	350	318	346	354	*
Uttarakhand	341	328	348	357	ST < SC < OBC, Gen
Haryana	327	330	326	339	*
Delhi	314	319	320	316	*
Rajasthan	360	349	360	366	ST < SC, OBC < Gen
Uttar Pradesh	314	310	313	317	ST < OBC, SC < Gen
Bihar	334	334	336	337	SC, ST < OBC, Gen
Sikkim	316	331	325	318	*
Arunachal Pradesh	291	311	306	292	*
Nagaland	328	348	326	324	Gen, OBC < ST
Manipur	337	352	336	325	Gen < SC < ST
Mizoram	342	337	397	381	*
Tripura	338	330	338	337	ST < Gen, SC, OBC
Meghalaya	343	322	346	377	ST < OBC < Gen
Assam	351	339	341	355	ST, OBC < SC < Gen
West Bengal	356	342	353	358	ST < OBC < SC, Gen
Jharkhand	344	342	345	350	ST, SC, OBC < Gen
Odisha	329	318	333	336	ST < SC < OBC < Gen
Chhattisgarh	328	332	333	333	SC < OBC
Madhya Pradesh	342	334	343	344	ST < SC < OBC, Gen
Gujarat	348	344	346	352	ST < OBC, SC < Gen
Daman & Diu	327	344	303	341	*
Dadra & Nagar Haveli	331	346	365	330	*
Maharashtra	341	338	345	345	ST < SC < Gen, OBC
Andhra Pradesh	364	356	365	366	ST < SC, OBC, Gen
Karnataka	357	360	362	354	Gen < SC < ST, OBC
Goa	326	337	332	333	*
Lakshadweep		313	310		*
Kerala	352	322	349	355	ST < OBC < SC, Gen
Tamil Nadu	324	329	326	320	Gen < SC < OBC, ST
Puducherry	319	289	314	323	*
A & N Islands		323	333	324	*
Telangana	343	330	340	347	ST < OBC, SC < Gen

* Inadequate sample, significant difference cannot be computed

Table 5.2: Performance of States by Social Groups in Class III: Mathematics

State/UT	SC	ST	OBC	General	Sig.
Jammu & Kashmir	316	312	320	322	ST < OBC, Gen
Himachal Pradesh	320	313	327	320	ST < OBC
Punjab	304	298	307	310	*
Chandigarh	337	306	347	339	*
Uttarakhand	324	314	336	332	ST < SC < Gen, OBC
Haryana	304	319	303	317	*
Delhi	296	306	299	299	SC, OBC < ST
Rajasthan	343	329	341	345	ST < OBC, SC < Gen
Uttar Pradesh	308	304	309	308	ST < Gen, SC, OBC
Bihar	317	317	319	319	SC < OBC, Gen
Sikkim	305	309	305	306	*
Arunachal Pradesh	276	300	293	277	SC, Gen < ST
Nagaland	318	331	329	311	Gen < ST
Manipur	332	340	322	313	Gen < SC < ST
Mizoram	301	315	346	368	*
Tripura	318	311	321	323	ST < SC, OBC, Gen
Meghalaya	326	303	320	352	ST < SC < Gen
Assam	339	328	326	342	OBC, ST < SC, Gen
West Bengal	337	325	335	339	ST < OBC, SC < Gen
Jharkhand	326	323	328	334	ST < SC, OBC < Gen
Odisha	320	306	323	330	ST < SC < OBC < Gen
Chhattisgarh	311	314	314	318	SC < Gen
Madhya Pradesh	318	310	319	322	ST < SC, OBC < Gen
Gujarat	327	321	324	333	ST < OBC < SC < Gen
Daman & Diu	314	318	280	324	*
Dadra & Nagar Haveli	317	326	342	337	*
Maharashtra	322	318	326	326	ST < SC < OBC, Gen
Andhra Pradesh	342	336	342	345	ST < OBC, SC < Gen
Karnataka	344	348	349	344	SC, Gen < ST, OBC
Goa	302	317	310	309	*
Lakshadweep		308	299		*
Kerala	340	308	340	344	ST < SC, OBC, Gen
Tamil Nadu	314	314	315	306	Gen < ST, SC, OBC
Puducherry	317	279	313	304	*
A & N Islands		315	324	316	*
Telangana	335	322	333	333	ST < OBC, Gen, SC

* Inadequate sample, significant difference cannot be computed

Table 5.3: Performance of States by Social Groups in Class III: Environmental Studies

State/UT	SC	ST	OBC	General	Sig.
Jammu & Kashmir	305	304	315	314	ST, SC < Gen, OBC
Himachal Pradesh	323	316	329	321	ST < OBC
Punjab	307	310	307	310	*
Chandigarh	342	299	341	343	*
Uttarakhand	326	312	337	340	ST < SC < OBC, Gen
Haryana	311	326	309	323	*
Delhi	302	326	306	303	SC, Gen, OBC < ST
Rajasthan	341	328	339	343	ST < OBC, SC < Gen
Uttar Pradesh	302	300	302	305	ST < OBC, SC < Gen
Bihar	316	317	318	319	SC, ST < Gen
Sikkim	305	312	306	302	*
Arunachal Pradesh	279	299	290	279	Gen, SC < ST
Nagaland	311	329	330	312	*
Manipur	328	338	329	319	Gen < ST
Mizoram	327	331	379	364	*
Tripura	324	313	327	328	ST < SC, OBC, Gen
Meghalaya	327	308	327	350	ST < SC, OBC < Gen
Assam	334	327	324	335	OBC, ST < SC Gen
West Bengal	334	323	333	336	ST < OBC, SC < Gen
Jharkhand	325	325	325	328	*
Odisha	314	302	317	322	ST < SC < OBC < Gen
Chhattisgarh	315	318	320	322	SC < OBC, Gen
Madhya Pradesh	323	315	322	322	ST < OBC, Gen, SC
Gujarat	330	326	329	335	ST < OBC, SC < Gen
Daman & Diu	323	327	291	324	*
Dadra & Nagar Haveli	325	328	353	325	*
Maharashtra	328	322	332	331	ST < SC < Gen OBC
Andhra Pradesh	337	327	337	337	ST < OBC, Gen, SC
Karnataka	338	340	342	338	Gen, SC, ST < OBC
Goa	313	326	320	319	*
Lakshadweep		301	304		*
Kerala	350	323	346	351	ST < OBC < SC, Gen
Tamil Nadu	323	323	324	317	Gen < SC, ST, OBC
Puducherry	313	267	308	312	*
A & N Islands		311	322	319	*
Telangana	329	317	327	333	ST < OBC, SC < Gen

* Inadequate sample, significant difference cannot be computed

Table 5.4: Performance of States by Social Groups in Class V: Language

State/UT	SC	ST	OBC	General	Sig.
Jammu & Kashmir	297	306	310	314	SC < ST, OBC, Gen
Himachal Pradesh	328	317	330	328	ST < OBC
Punjab	305	302	306	310	*
Chandigarh	342	325	358	345	*
Uttarakhand	333	320	339	343	ST < SC, OBC, Gen
Haryana	308	301	307	320	ST < Gen
Delhi	297	289	299	305	ST < SC, OBC, Gen
Rajasthan	347	332	347	354	ST < OBC, SC < Gen
Uttar Pradesh	300	291	300	301	ST < OBC, SC, Gen
Bihar	311	319	317	319	SC < OBC < ST, Gen
Sikkim	289	301	296	294	*
Arunachal Pradesh	289	292	280	270	Gen < ST
Nagaland	287	314	299	295	*
Manipur	324	328	310	314	OBC < ST
Mizoram	303	300	338	372	*
Tripura	317	307	319	321	ST < SC, OBC, Gen
Meghalaya	294	295	317	307	SC, ST < OBC
Assam	323	306	314	328	ST < OBC < SC < Gen
West Bengal	310	300	315	328	ST < SC < OBC < Gen
Jharkhand	322	324	328	334	SC, ST < OBC < Gen
Odisha	304	294	312	311	ST < SC < Gen, OBC
Chhattisgarh	312	314	312	316	*
Madhya Pradesh	314	307	316	322	ST < SC, OBC < Gen
Gujarat	322	326	323	328	SC, OBC < ST, Gen
Daman & Diu	306	306	293	303	*
Dadra & Nagar Haveli	350	334	345	338	*
Maharashtra	320	321	323	326	SC, ST < OBC < Gen
Andhra Pradesh	330	323	345	346	ST < SC < OBC, Gen
Karnataka	349	350	353	346	Gen < ST < ST, OBC
Goa	316	307	311	314	*
Lakshadweep		304	285		*
Kerala	349	327	356	348	ST < Gen, SC < OBC
Tamil Nadu	318	308	323	315	ST < Gen, SC < OBC
Puducherry	302	287	299	297	*
A & N Islands	248	297	311	311	*
Telangana	309	300	320	322	ST < SC < OBC, Gen

* Inadequate sample, significant difference cannot be computed

Table 5.5: Performance of States by Social Groups in Class V: Mathematics

State/UT	SC	ST	OBC	General	Sig.
Jammu And Kashmir	300	313	317	319	SC < ST, OBC, Gen
Himachal Pradesh	304	296	312	305	ST < OBC
Punjab	293	266	292	295	ST < OBC, SC, Gen
Chandigarh	334	320	352	336	*
Uttarakhand	324	299	329	328	ST < SC, Gen, OBC
Haryana	292	288	292	302	*
Delhi	283	268	286	288	ST < SC, OBC, Gen
Rajasthan	343	326	342	343	ST < OBC, SC, Gen
Uttar Pradesh	300	289	303	303	ST < SC < OBC, Gen
Bihar	305	308	310	307	SC < Gen < ST, OBC
Sikkim	276	286	280	279	*
Arunachal Pradesh	276	281	278	266	*
Nagaland	274	302	297	283	*
Manipur	333	316	312	319	OBC, ST < SC
Mizoram	289	293	334	314	*
Tripura	304	297	305	308	ST < SC, OBC, Gen
Meghalaya	286	281	288	328	ST, SC, OBC < Gen
Assam	336	312	320	341	ST < OBC < SC < Gen
West Bengal	296	287	303	308	ST < SC < OBC < Gen
Jharkhand	319	314	324	323	ST < SC < Gen OBC
Odisha	322	309	333	326	ST < SC < Gen < OBC
Chhattisgarh	294	300	297	295	SC, Gen < ST
Madhya Pradesh	304	296	306	312	ST < SC, OBC < Gen
Gujarat	323	320	320	324	OBC, ST < SC, Gen
Daman & Diu	301	288	277	300	*
Dadra & Nagar Haveli	343	323	333	336	*
Maharashtra	303	308	304	305	SC < Gen < ST
Andhra Pradesh	324	315	340	346	ST < SC < OBC < Gen
Karnataka	342	343	347	336	Gen < SC, ST < OBC
Goa	296	297	297	295	*
Lakshadweep		291	299		*
Kerala	336	331	344	337	ST < SC, Gen < OBC
Tamil Nadu	299	300	301	295	Gen < SC, ST, OBC
Puducherry	304	294	300	304	*
A & N Islands	257	295	302	304	*
Telangana	312	304	322	314	ST < SC, Gen < OBC

* Inadequate sample, significant difference cannot be computed

Table 5.6: Performance of States by Social Groups in Class V: Environmental Studies

State/UT	SC	ST	OBC	General	Sig.
Jammu And Kashmir	295	304	307	311	SC < ST, OBC, Gen
Himachal Pradesh	310	298	317	309	ST < Gen, SC, OBC
Punjab	296	279	296	301	ST < OBC, SC, Gen
Chandigarh	332	356	349	335	*
Uttarakhand	326	307	330	326	ST < SC, Gen, OBC
Haryana	295	288	296	305	ST < Gen
Delhi	288	280	287	293	ST < Gen
Rajasthan	341	331	343	342	ST < SC, Gen, OBC
Uttar Pradesh	299	290	300	301	ST < SC, OBC, Gen
Bihar	307	314	313	310	SC < Gen < OBC, ST
Sikkim	282	286	281	276	*
Arunachal Pradesh	285	287	278	263	Gen < SC, ST
Nagaland	276	304	296	283	*
Manipur	332	324	316	319	*
Mizoram	291	302	338	335	*
Tripura	309	299	312	312	ST < SC, OBC, Gen
Meghalaya	296	281	286	315	ST, OBC < Gen
Assam	325	310	316	334	ST < OBC < SC < Gen
West Bengal	300	289	305	311	ST < SC < OBC < Gen
Jharkhand	323	323	328	330	ST, SC < OBC, Gen
Odisha	312	302	320	316	ST < SC < Gen < OBC
Chhattisgarh	298	306	302	305	SC < OBC < Gen, ST
Madhya Pradesh	306	299	309	312	ST < SC < OBC < Gen
Gujarat	314	317	313	316	OBC, SC < Gen, ST
Daman & Diu	295	293	279	294	*
Dadra & Nagar Haveli	336	324	318	327	*
Maharashtra	303	307	304	303	SC < OBC < ST
Andhra Pradesh	316	307	330	331	ST < SC < OBC, Gen
Karnataka	331	334	337	331	Gen, SC < ST, OBC
Goa	289	292	291	293	*
Lakshadweep		285	284		*
Kerala	334	324	338	331	ST < Gen < SC, OBC
Tamil Nadu	299	295	301	297	ST < Gen < SC, OBC
Puducherry	296	285	296	295	*
A & N Islands	230	302	303	303	*
Telangana	298	291	309	314	ST < SC < OBC < Gen

* Inadequate sample, significant difference cannot be computed

Table 5.7: Performance of States by Social Groups in Class VIII: Language

State/UT	SC	ST	OBC	General	Sig.
Jammu And Kashmir	273	276	275	275	*
Himachal Pradesh	308	309	309	317	SC, OBC, ST < Gen
Punjab	296	290	303	305	ST < OBC, Gen
Chandigarh	310	284	320	316	*
Uttarakhand	301	303	308	320	SC, ST, OBC < Gen
Haryana	302	300	303	315	ST, SC, OBC < Gen
Delhi	297	296	302	299	*
Rajasthan	329	317	333	335	ST < SC < OBC, Gen
Uttar Pradesh	292	286	294	292	ST < SC, Gen < OBC
Bihar	301	302	308	313	SC, ST < OBC < Gen
Sikkim	287	292	298	292	*
Arunachal Pradesh	274	285	269	262	*
Nagaland	297	272	283	280	*
Manipur	283	304	287	288	SC, OBC, Gen < ST
Mizoram	278	284	351	296	*
Tripura	305	276	311	310	ST < SC < Gen, OBC
Meghalaya	285	286	295	306	SC, ST < Gen
Assam	303	291	295	301	ST < OBC < Gen < SC
West Bengal	295	286	301	313	ST < SC < OBC < Gen
Jharkhand	308	312	320	327	SC < ST < OBC < Gen
Odisha	297	285	306	310	ST < SC < OBC < Gen
Chhattisgarh	300	300	306	310	ST, SC < OBC < Gen
Madhya Pradesh	300	292	305	307	ST < SC < OBC < Gen
Gujarat	325	324	325	328	ST, OBC, SC < Gen
Daman & Diu	302	299	294	294	*
Dadra & Nagar Haveli	309	312	318	327	*
Maharashtra	315	306	322	323	ST < SC < OBC, Gen
Andhra Pradesh	303	297	311	312	ST < SC < OBC, Gen
Karnataka	313	316	320	324	SC < ST < OBC < Gen
Goa	313	307	312	312	*
Lakshadweep		289	330		*
Kerala	317	295	322	330	ST < SC < OBC < Gen
Tamil Nadu	303	292	307	301	ST < Gen, SC < OBC
Puducherry	271	266	278	297	*
A & N Islands	352	270	297	294	*
Telangana	295	288	299	306	ST < SC < OBC < Gen

* Inadequate sample, significant difference cannot be computed

Table 5.8: Performance of States by Social Groups in Class VIII: Mathematics

State/UT	SC	ST	OBC	General	Sig.
Jammu And Kashmir	253	255	258	257	*
Himachal Pradesh	253	250	252	257	*
Punjab	241	231	246	245	ST < SC, Gen, OBC
Chandigarh	272	265	283	277	*
Uttarakhand	262	248	261	265	ST < OBC, SC, Gen
Haryana	254	251	255	259	ST < Gen
Delhi	243	242	250	243	ST, SC, Gen < OBC
Rajasthan	304	296	307	306	ST < SC < Gen, OBC
Uttar Pradesh	262	256	263	259	ST < Gen < SC, OBC
Bihar	272	265	278	279	ST < SC < OBC, Gen
Sikkim	240	241	240	244	*
Arunachal Pradesh	245	251	242	239	*
Nagaland	239	246	250	240	*
Manipur	267	263	269	271	*
Mizoram	248	256	262	253	*
Tripura	255	253	262	261	ST, SC < Gen, OBC
Meghalaya	251	247	260	275	ST, SC, OBC < Gen
Assam	282	273	272	293	OBC, ST < SC < Gen
West Bengal	258	250	261	266	ST < SC < OBC < Gen
Jharkhand	290	280	299	297	ST < SC < Gen, OBC
Odisha	272	263	279	278	ST < SC < Gen, OBC
Chhattisgarh	251	255	256	258	SC < ST < OBC, Gen
Madhya Pradesh	263	257	266	268	ST < SC < OBC, Gen
Gujarat	278	280	283	276	Gen < SC < ST < OBC
Daman & Diu	244	241	244	239	*
Dadra & Nagar Haveli	261	275	274	303	*
Maharashtra	258	265	265	262	SC < Gen < OBC, ST
Andhra Pradesh	282	275	289	288	ST < SC < Gen, OBC
Karnataka	282	285	290	287	SC < ST, Gen < OBC
Goa	246	246	248	248	*
Lakshadweep		247	258		*
Kerala	285	280	286	286	ST < SC, OBC, Gen
Tamil Nadu	251	246	251	247	ST, Gen < OBC, SC
Puducherry	240	249	240	250	*
A & N Islands	286	250	249	247	*
Telangana	254	252	259	261	ST, SC < OBC, Gen

* Inadequate sample, significant difference cannot be computed

Table 5.9: Performance of States by Social Groups in Class VIII: Science

State/UT	SC	ST	OBC	General	Sig.
Jammu And Kashmir	248	259	261	258	SC < Gen, ST, OBC
Himachal Pradesh	271	266	269	277	ST < Gen
Punjab	255	246	261	259	ST < SC, Gen, OBC
Chandigarh	286	252	303	293	*
Uttarakhand	280	271	277	287	ST < SC, Gen
Haryana	266	259	267	273	ST < Gen
Delhi	244	243	252	248	ST, SC < OBC
Rajasthan	326	314	330	330	ST < SC, Gen, OBC
Uttar Pradesh	267	259	267	263	ST < Gen < SC, OBC
Bihar	270	266	278	280	ST < SC < OBC, Gen
Sikkim	248	256	260	255	*
Arunachal Pradesh	245	253	242	236	*
Nagaland	254	247	254	239	*
Manipur	275	271	271	273	*
Mizoram	239	250	274	254	*
Tripura	268	254	273	271	ST < SC, Gen, OBC
Meghalaya	252	250	262	276	ST, SC < Gen
Assam	289	280	282	296	ST < OBC < SC < Gen
West Bengal	264	256	268	276	ST < SC < OBC < Gen
Jharkhand	297	292	307	304	ST < SC < Gen, OBC
Odisha	275	266	285	283	ST < SC < Gen OBC
Chhattisgarh	270	275	276	278	SC < ST, OBC, Gen
Madhya Pradesh	273	268	277	278	ST < SC < OBC, Gen
Gujarat	293	297	297	288	Gen < SC < OBC, ST
Daman & Diu	256	251	250	243	*
Dadra & Nagar Haveli	269	293	277	323	*
Maharashtra	261	269	268	266	SC < Gen < OBC < ST
Andhra Pradesh	282	273	289	293	ST < SC < OBC < Gen
Karnataka	291	297	299	297	SC < ST, Gen, OBC
Goa	258	254	257	259	*
Lakshadweep		244	260		*
Kerala	271	258	270	278	ST < OBC, SC < Gen
Tamil Nadu	255	250	257	252	ST, Gen < SC, OBC
Puducherry	238	243	242	255	*
A & N Islands	341	236	259	253	*
Telangana	256	253	262	261	ST < SC < Gen, OBC

* Inadequate sample, significant difference cannot be computed

Table 5.10: Performance of States by Social Groups in Class VIII: Social Science

State/UT	SC	ST	OBC	General	Sig.
Jammu And Kashmir	253	258	261	258	*
Himachal Pradesh	277	278	277	282	*
Punjab	257	243	261	261	ST < SC, OBC, Gen
Chandigarh	293	257	303	304	*
Uttarakhand	282	275	283	292	ST < SC, OBC < Gen
Haryana	270	275	272	280	SC < Gen
Delhi	256	251	259	258	ST < Gen, OBC
Rajasthan	324	317	331	334	ST < SC < OBC, Gen
Uttar Pradesh	271	265	271	269	ST < Gen < SC, OBC
Bihar	282	275	289	288	ST < SC < Gen, OBC
Sikkim	255	263	266	261	*
Arunachal Pradesh	254	265	252	247	*
Nagaland	268	259	258	256	*
Manipur	264	280	273	276	*
Mizoram	245	257	323	269	*
Tripura	266	254	271	269	ST < SC < Gen, OBC
Meghalaya	258	260	258	264	*
Assam	294	288	285	301	OBC, ST < SC < Gen
West Bengal	261	253	264	270	ST < SC < OBC < Gen
Jharkhand	306	295	311	315	ST < SC < OBC < Gen
Odisha	271	263	278	276	ST < SC < Gen, OBC
Chhattisgarh	279	282	283	289	SC < OBC < Gen
Madhya Pradesh	280	273	283	285	ST < SC < OBC < Gen
Gujarat	307	305	307	302	Gen < ST < OBC, SC
Daman & Diu	253	260	260	251	*
Dadra & Nagar Haveli	296	301	310	329	*
Maharashtra	269	274	275	275	SC < ST, Gen, OBC
Andhra Pradesh	287	280	292	296	ST < SC < OBC < Gen
Karnataka	291	296	299	295	SC < Gen, ST < OBC
Goa	265	261	264	265	*
Lakshadweep		247	273		*
Kerala	262	249	263	270	ST < SC, OBC < Gen
Tamil Nadu	256	252	256	253	ST, Gen < SC, OBC
Puducherry	240	254	245	260	*
A & N Islands	334	253	261	256	*
Telangana	267	265	273	271	ST, SC < Gen, OBC

* Inadequate sample, significant difference cannot be computed

5.6 Assessment of Student Performance at National Level

Participation by Gender, Location, School Management, and Social Groups in Classes III, V and VIII

The diagrams below show the participation sample percentage in terms of Gender, Location, School Management and Social Groups at national level. The participation was nearly equal for both boys and girls. The participation was skewed in favor of rural areas. The participation of government school was nearly four times than that of government aided school. The participation was a cumulative representation of four major social groups namely SC, ST, OBC and General.

Figure 5.41: Participation by Gender

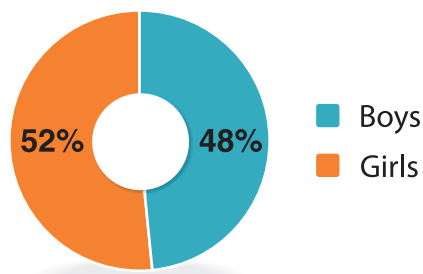


Figure 5.42: Participation by Location

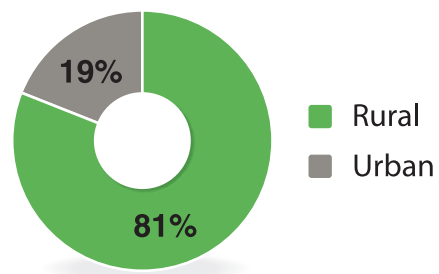


Figure 5.43: Participation by School Management

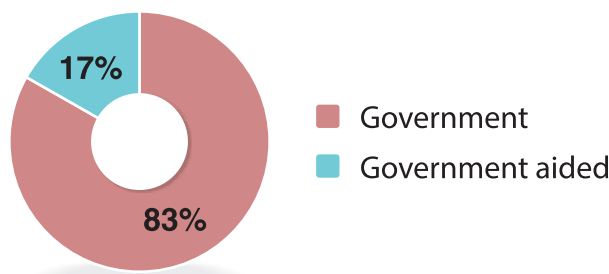
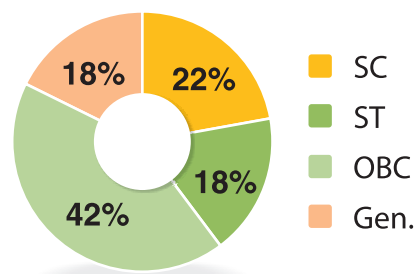
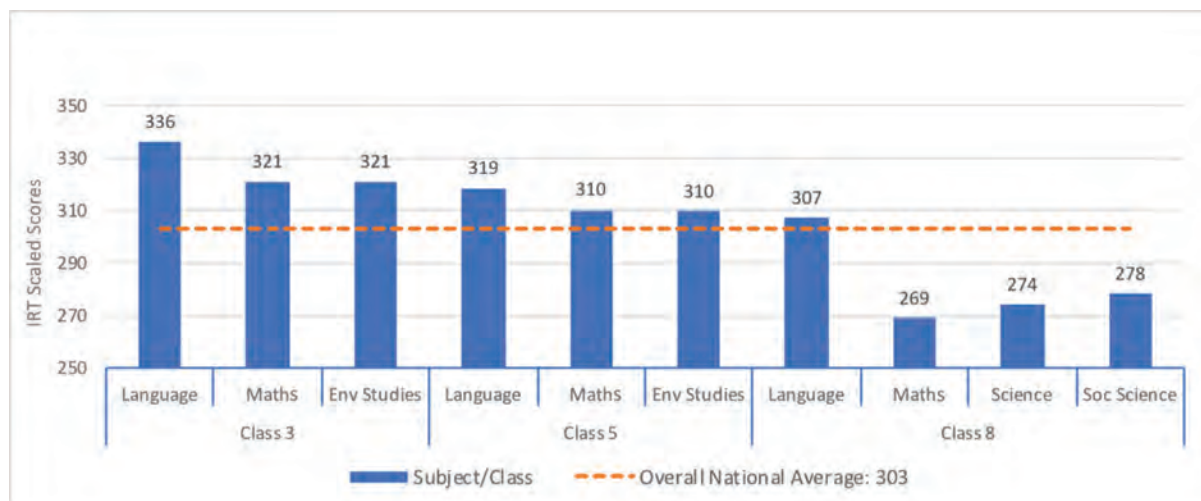


Figure 5.44: Participation by Social Groups



The graph below depicts the performance of the students in the different Classes and in different Subjects. It can be observed that Class III students performed better than the Overall national average whereas Class V performed at par with the Overall national average however Class VIII performed significantly lower than the Overall national average. Thus it can be inferred that with increasing grades the national performance is going down.

Figure 5.45: National Performance: Class wise and Subject wise



The tables below show the national level class wise and subject wise low performing learning outcomes for class III, V and VIII respectively.

Table 5.11: Subject wise Low Performing Learning Outcomes in Class III

Subject	Learning Outcomes
Language	<ul style="list-style-type: none"> • Reads small text with comprehension i.e. identifies main ideas, details, sequence and draws conclusion
Mathematics	<ul style="list-style-type: none"> • Estimates and measures length and distance using standard units like centimeters or meters and identifies relationship • Fills a given region leaving no gaps using a tile of a given shape • Extends patterns in simple shapes and numbers
Environmental Studies	<ul style="list-style-type: none"> • Observes rules in games (local, indoor, outdoor) • Records observations, experiences, information on objects/activities/places visited in different ways and predicts patterns etc. • Identifies simple features (eg. movement at places found/ kept, eating habits, and sounds) of animals and birds in the immediate surroundings.

Table 5.12: Subject wise Low Performing Learning Outcomes in Class V

Subject	Learning Outcomes
Language	<ul style="list-style-type: none"> • Reads and comprehends independently story books, news items/headlines, advertisements etc.
Mathematics	<ul style="list-style-type: none"> • Estimates the volume of a solid body in known units • Identifies and forms equivalent fraction of a given fraction • Applies operations of numbers in daily life situations
Environmental Studies	<ul style="list-style-type: none"> • Establishes linkages among terrain, climate resources (food, water, shelter, livelihood) and cultural life (eg. life in distant/difficult areas like hot/cold deserts) • Groups objects, materials, activities for features/ properties such as shape, taste, colour, texture, sounds, traits etc. • Guesses (properties, conditions of phenomena), estimates spatial quantities (distance, area, volume, weight) and time in simple standard units and verifies using simple tools/setup

Table 5.13: Subject wise Low Performing Learning Outcomes in Class VIII

Subject	Learning Outcomes
Language	<ul style="list-style-type: none"> • Reads textual/non textual material with comprehension and identifies the details, characters, main idea, and sequence of ideas and events while reading
Mathematics	<ul style="list-style-type: none"> • Finds surface area and volume of cuboidal and cylindrical objects • Generalises properties of addition and subtraction, multiplication and division of rational numbers through patterns • Finds out approximate area of closed shapes by using units square grid/graph sheets • Solves problems related to conversion of percentage to fraction and decimals and vice versa • Arranges given/collected information in the form of table, pictograph and bar graph and interprets them • Uses exponential form of numbers to simplify problems involving multiplication and division of large numbers
Science	<ul style="list-style-type: none"> • Conducts simply investigation to seek answers to queries • Explains processes and phenomenon • Plots and interprets graphs • Constructs models using materials from surroundings and explains their working
Social Science	<ul style="list-style-type: none"> • Describes the functioning of rural and urban local government bodies in sectors like health and education • Analyse the decline of pre existing urban centers and handicraft industries and the development of new urban centers and industries in india during the colonial period • Locates important historical sites, places on outline map of india. • Locates distribution of important minerals, e.g. coal and mineral oil on the world map • Draws interrelationship between types of farming and development in different regions of the world • Applies the knowledge of the fundamental rights to find out about their violation, protection and promotion in a given situation • Identifies the role of government in providing public facilities such as water, sanitation, road, electricity etc. and recognizes their availability

Figure 5.46: Performance of Students by Gender

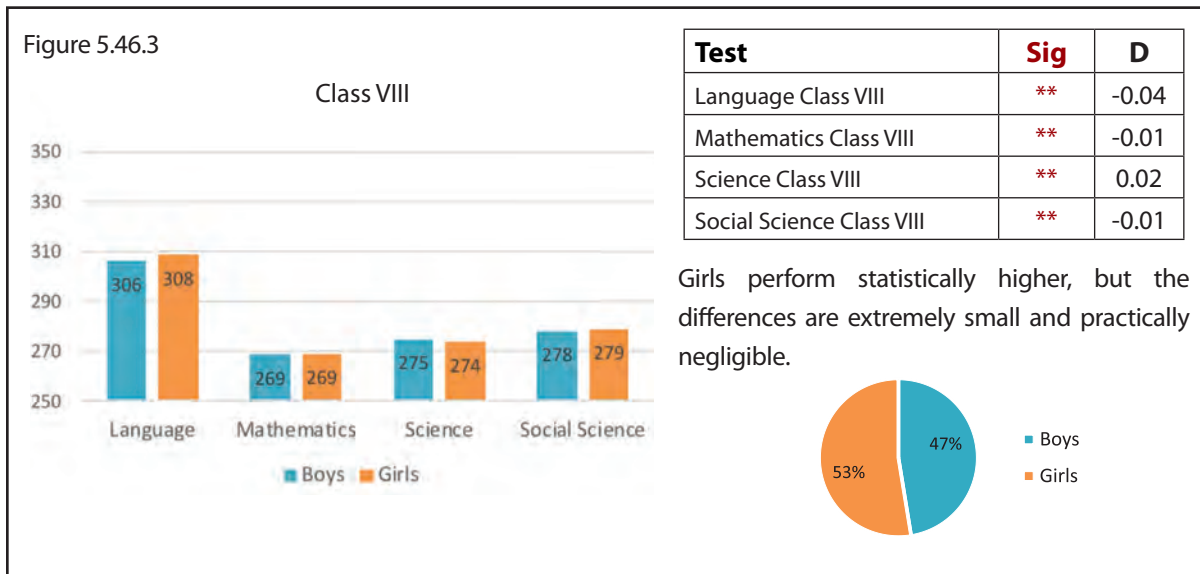
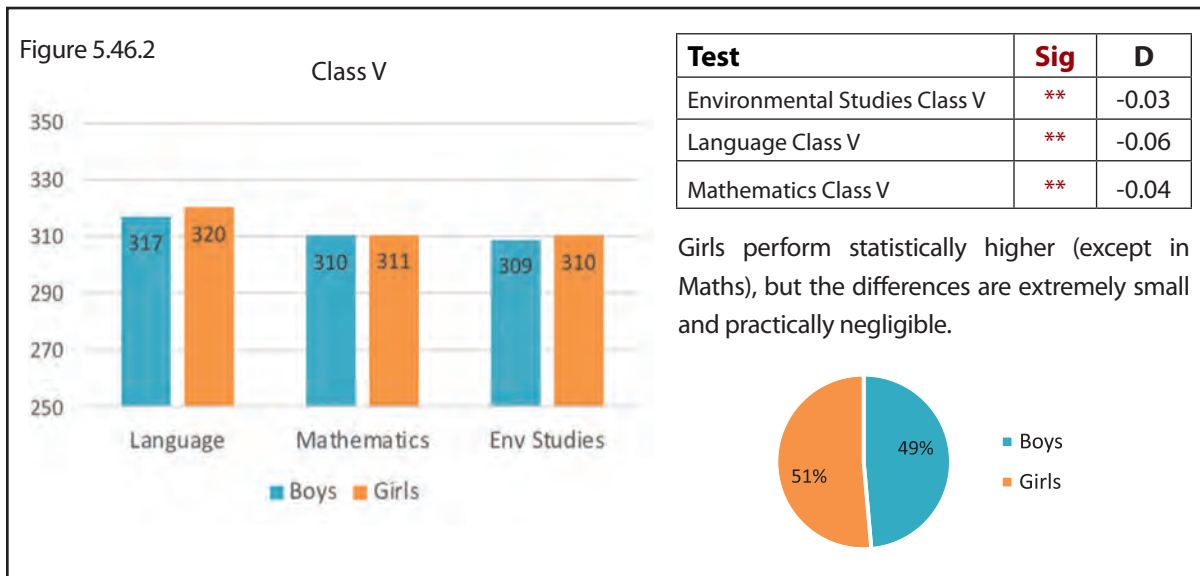
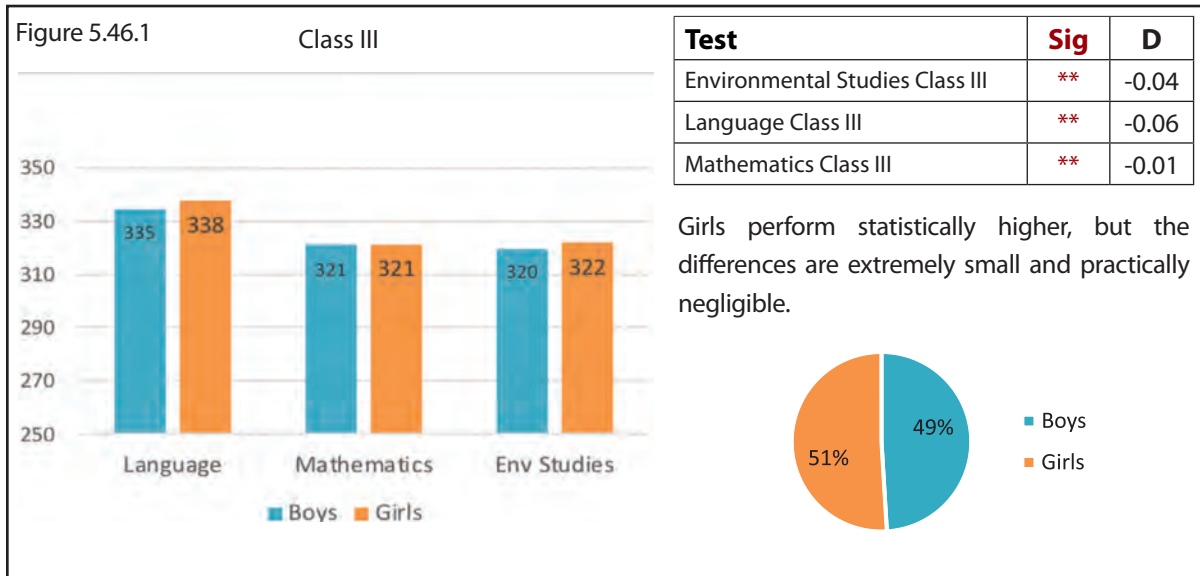


Figure 5.47: Performance of Students by Location

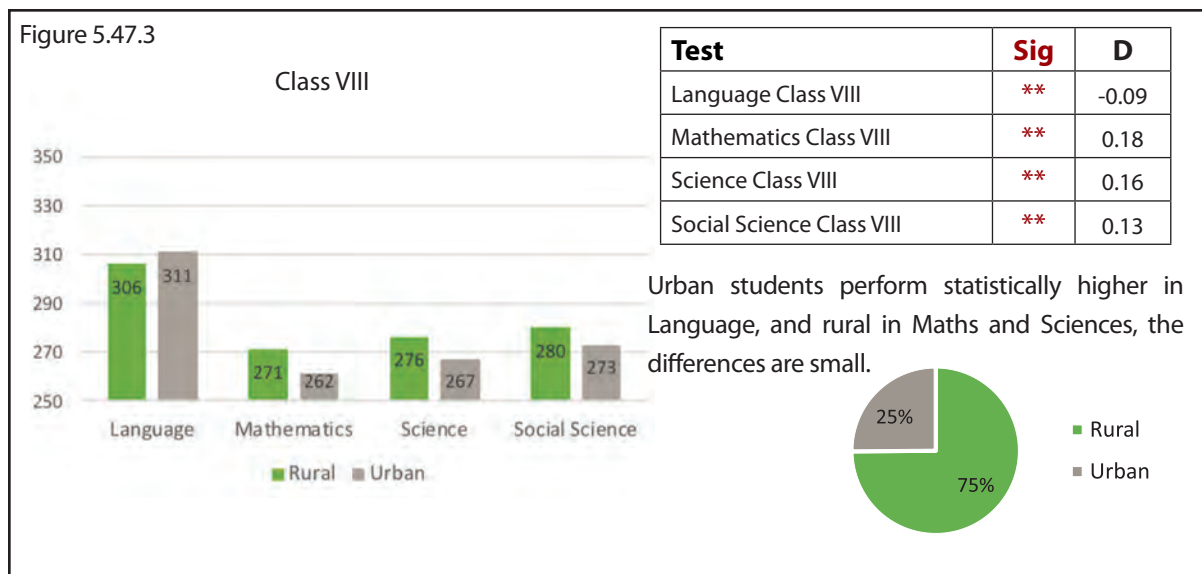
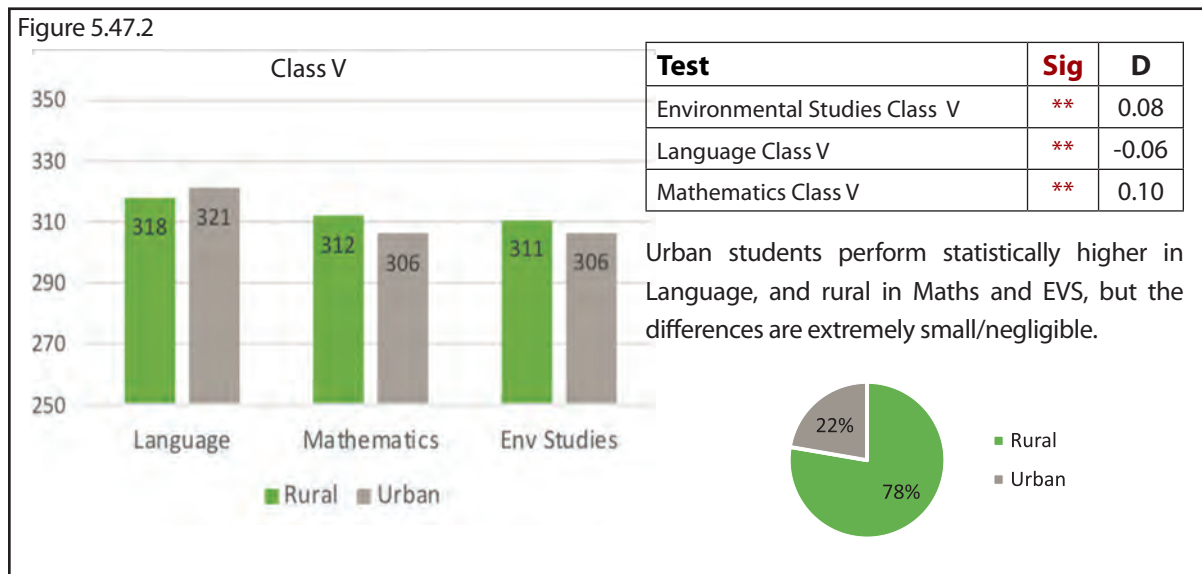
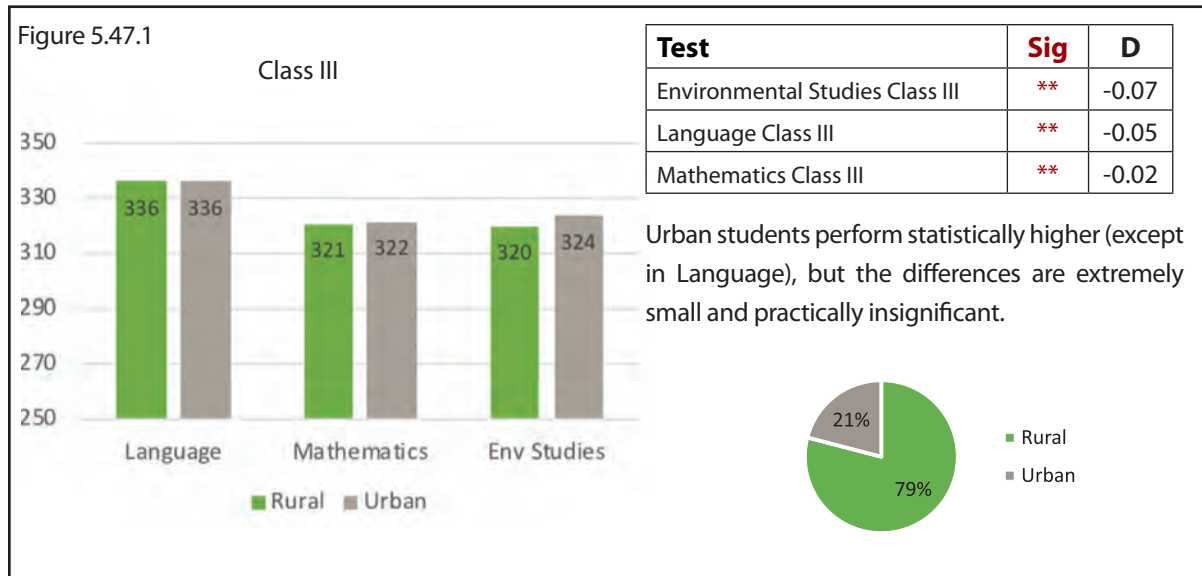


Figure 5.48: Performance of Students by School Management

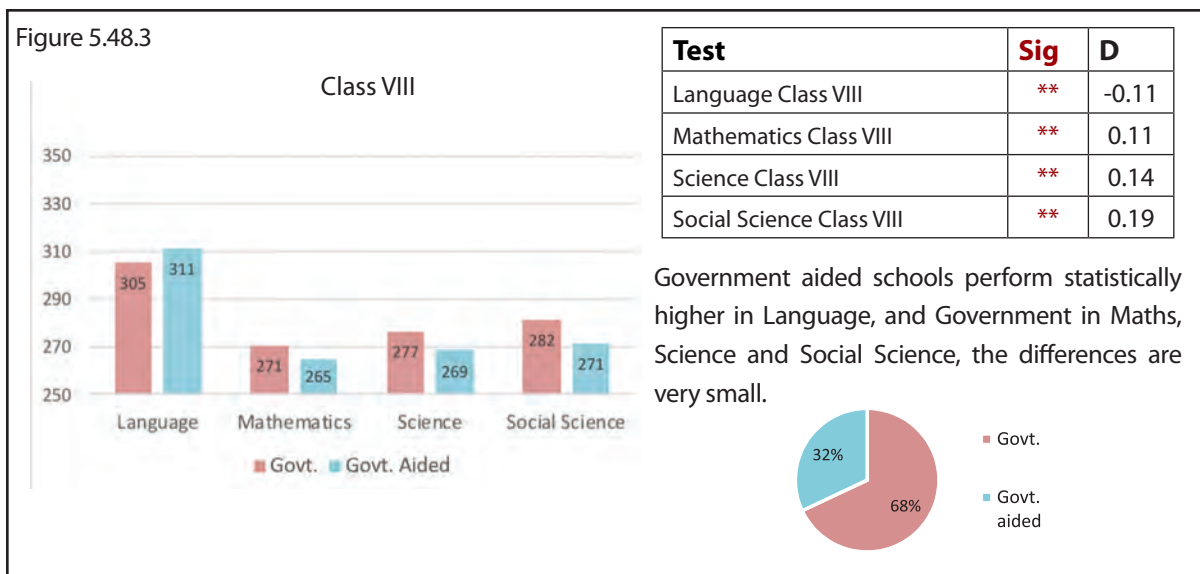
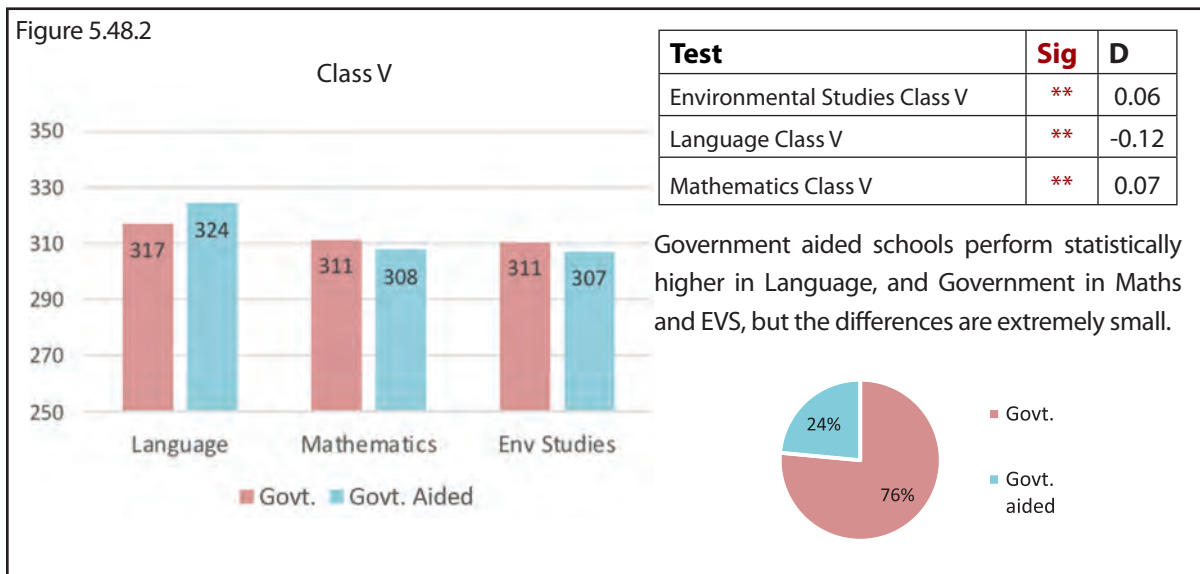
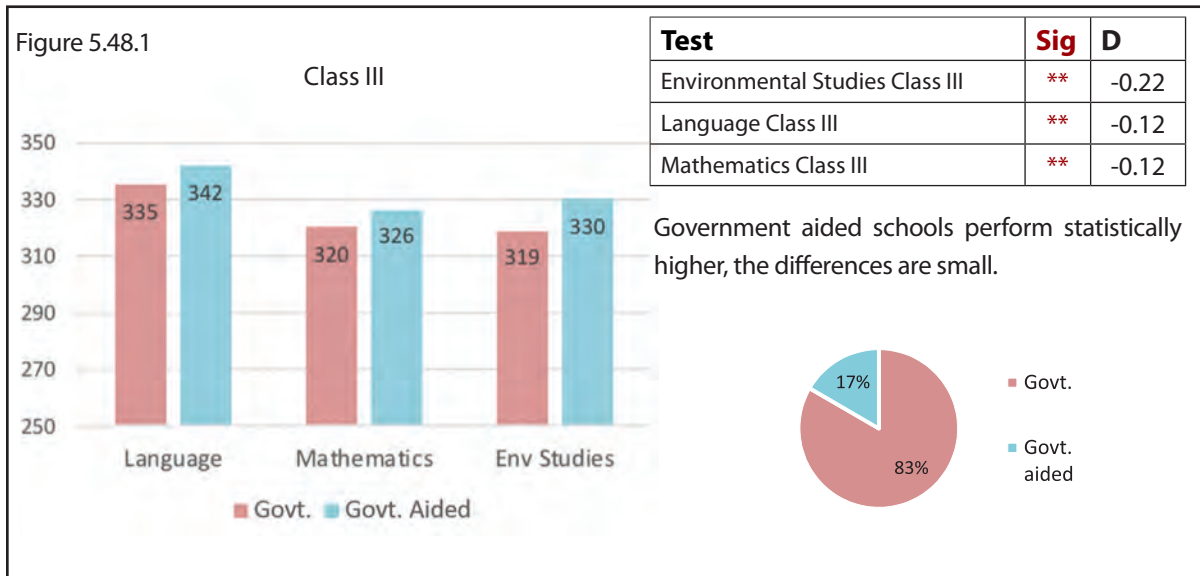
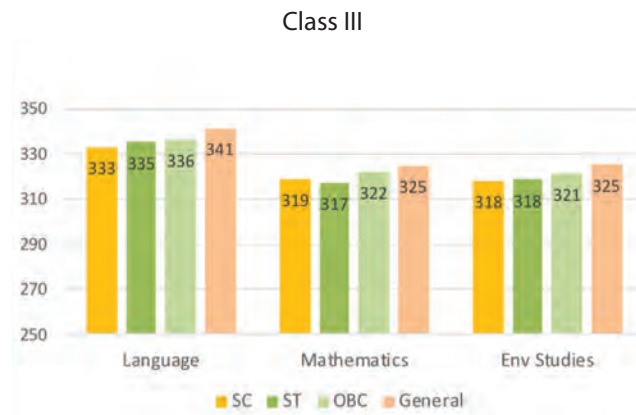


Figure 5.49: Performance of Students by Social Groups

Figure 5.49.1



In Class III general group performs the best in all subjects, followed by OBC, whereas SC and ST are the lowest in all subjects.

Although the differences between groups are statistically significant, they are extremely small and practically negligible.

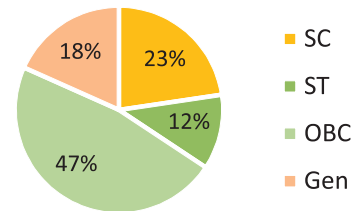
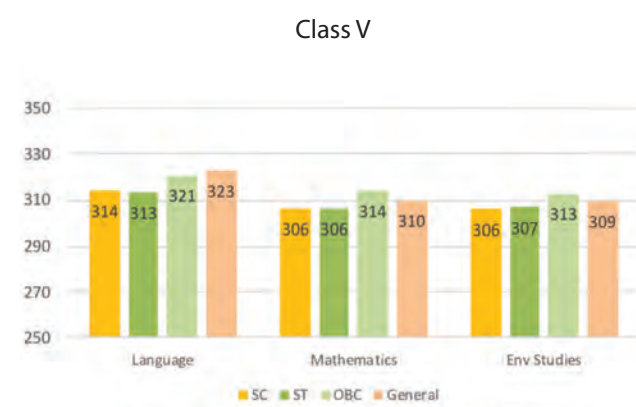


Figure 5.49.2



In Class V general group performs the best in Language and OBC in Mathematics and EVS, whereas SC and ST are the lowest in all subjects.

Although the differences between groups are statistically significant, they are very small with low practical relevance.

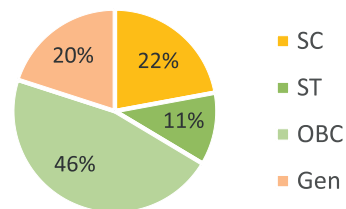
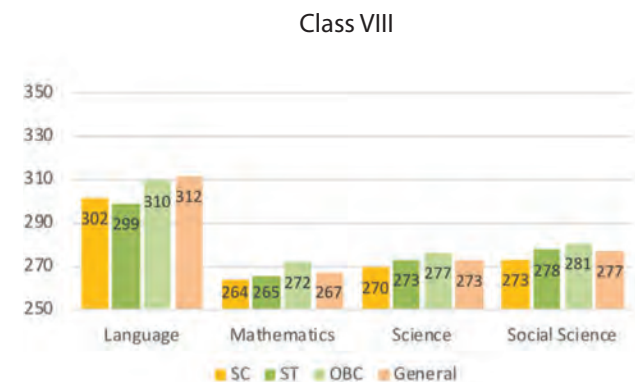
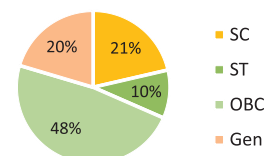


Figure 5.49.3



In Class VIII general group performs the best in Language and OBC in Mathematics, Science, and Social Science, whereas SC and ST are the lowest in most subjects.

Although the differences between groups are statistically significant, they are very small with low practical relevance.



5.7 Item Parameters

Item Parameter is a fundamental concept that is used to judge the quality of an item within both Classical Test Theory (CTT) as well as in Item Response Theory (IRT).

The tables below show the results of the analysis explained in this Chapter. The tables explain the difficulty values, the discrimination index, differential item functioning, the distractor analysis, the reliability and validity of the items and tests used in NAS 2017.

Description of the variables depicted in the tables (5.14 to 5.23) is as follows:

Variables	Description
key	Correct Response to the corresponding item
LO	Learning Outcomes
F	Form number
P	Item positioning
N	Total number of respondents
pval	Probability value
itcor	Item correlation
A	Percentage of responses to option A
B	Percentage of responses to option B
C	Percentage of responses to option C
D	Percentage of responses to option D
A_pbc	Percent correct on option A (positive value means correct answer)
B_pbc	Percent correct on option B (positive value means correct answer)
C_pbc	Percent correct on option C (positive value means correct answer)
D_pbc	Percent correct on option D (positive value means correct answer)
DIF	Differential item functioning (A: we can include, B: decide whether or not to include, C: reject)
a-par	Discrimination
b-par	Difficulty

Table 5.14: Item Parameters Language Class III

Item ID	LO	Competency	Text Type	F	P	N	pval	itcor	A	B	C	D	A_pbc	B_pbc	C_pbc	D_pbc	DIF	a-par	b-par
LA03ML304101	L304	Locate	Narrative	1	1	96988	.81	.37	6	81	5	3	-.17	.37	-.15	-.09	A	.71	-1.55
LA03ML304102	L304	Locate	Narrative	1	2	96988	.79	.38	7	79	6	3	-.16	.38	-.15	-.13	A	.70	-1.36
LA03ML304103	L304	Infer	Narrative	1	3	96988	.64	.36	8	64	17	6	-.17	.36	-.13	-.10	A	.58	-.71
LA03ML304104	L304	Locate	Narrative	1	4	96988	.71	.45	71	11	7	5	.45	-.21	-.21	-.16	A	.83	-.87
LA03ML304105	L304	Vocab	Narrative	1	5	96988	.56	.36	7	21	12	56	-.18	-.13	-.11	.36	A	.56	-.29
LA03ML312106	L312	Locate	Comics	1	6	48992	.63	.49	11	10	11	63	-.16	-.21	-.22	.49	A	.91	-.51
LA03ML312107	L312	Locate	Comics	1	7	48992	.72	.47	6	8	72	10	-.17	-.21	.47	-.23	A	.92	-.86
LA03ML312108	L312	Vocab	Comics	1	8	48992	.66	.40	9	11	66	9	-.11	-.25	.40	-.12	A	.68	-.74
LA03ML312109	L312	Infer	Comics	1	9	48992	.55	.43	55	17	15	9	.43	-.15	-.22	-.12	A	.73	-.20
LA03ML312110	L312	Vocab	Comics	1	10	48992	.67	.46	67	10	10	9	.46	-.19	-.21	-.18	A	.84	-.67
LA03ML304111	L304	Interpret	Story	1	11	48992	.74	.44	74	9	8	5	.44	-.23	-.16	-.13	A	.83	-1.00
LA03ML304112	L304	Locate	Story	1	12	48992	.69	.43	6	69	13	7	-.16	.43	-.19	-.18	A	.78	-.82
LA03ML304113	L304	Locate	Story	1	13	48992	.72	.45	9	10	72	5	-.14	-.25	.45	-.17	A	.86	-.91
LA03ML304114	L304	Locate	Story	1	14	48992	.75	.47	5	75	9	7	-.16	.47	-.22	-.20	A	.95	-1.00
LA03ML304115	L304	Vocab	Story	1	15	48992	.54	.41	8	12	22	54	-.20	-.20	-.09	.41	A	.67	-.16
LA03ML304206	L304	Locate	Story	2	6	47996	.74	.47	8	8	74	6	-.20	-.22	.47	-.20	A	.98	-.94
LA03ML304207	L304	Locate	Story	2	7	47996	.58	.33	8	13	16	58	-.09	-.08	-.16	.33	A	.53	-.40
LA03ML304208	L304	Locate	Story	2	8	47996	.78	.48	7	78	8	4	-.22	.48	-.23	-.18	A	1.04	-1.04
LA03ML304209	L304	Interpret	Story	2	9	47996	.56	.32	12	56	17	10	-.19	.32	-.08	-.05	A	.50	-.34
LA03ML304210	L304	Locate	Story	2	10	47996	.63	.44	63	14	12	6	.44	-.21	-.15	-.17	A	.77	-.54
LA03ML312211	L312	Locate	Calendar	2	11	47996	.79	.44	79	9	5	3	.44	-.22	-.17	-.14	A	.93	-1.18
LA03ML312212	L312	Locate	Calendar	2	12	47996	.66	.42	5	18	66	6	-.20	-.16	.42	-.18	A	.76	-.68
LA03ML312213	L312	Locate	Calendar	2	13	47996	.67	.46	9	67	11	8	-.15	.46	-.22	-.17	A	.85	-.66
LA03ML312214	L312	Locate	Calendar	2	14	47996	.71	.50	5	10	9	71	-.20	-.26	-.18	.50	A	1.05	-.79
LA03ML312215	L312	Locate	Calendar	2	15	47996	.56	.37	12	17	56	10	-.11	-.12	.37	-.16	A	.62	-.26

Table 5.14.1: Reliability Statistics Set A

Cronbach's Alpha	N of Items	
.813	15	
Spearman-Brown Coefficient	Equal Length	.830
	Unequal Length	.830

Table 5.14.2: Reliability Statistics Set B

Cronbach's Alpha	N of Items	
.725	15	
Spearman-Brown Coefficient	Equal Length	.745
	Unequal Length	.746

Tables show the values of reliability using Cronbach's Alpha and Spearman-Brown Coefficient. It shows that the statistical consistency between the items is higher and all the items have high covariances.

Table 5.15: Item Parameters Mathematics Class III

ItemID	LO	Domain	F	P	N	pval	itcor	A	B	C	D	A_pbc	B_pbc	C_pbc	D_pbc	DIF	a-par	b-par
MA03MM317131	M317	Number	1	1	96408	.75	.36	75	6	14	2	.36	-.20	-.18	-.13	A	.66	-1.22
MA03MM309132	M309	Number	1	2	96408	.82	.36	6	82	6	3	-.19	.36	-.16	-.14	A	.74	-1.55
MA03MM304133	M304	Number	1	3	96408	.61	.38	13	61	15	7	-.15	.38	-.21	-.10	A	.63	-.55
MA03MM302134	M302	Number	1	4	96408	.76	.42	76	6	11	4	.42	-.21	-.25	-.13	A	.85	-1.11
MA03MM319135	M319	Number	1	5	96408	.77	.36	9	8	77	3	-.17	-.19	.36	-.14	A	.68	-1.29
MA03MM306136	M306	Number	1	6	48802	.63	.44	11	63	9	13	-.17	.44	-.19	-.21	A	.76	-.55
MA03MM318137	M318	Number	1	7	48802	.53	.42	21	12	53	8	-.17	-.20	.42	-.12	A	.73	-.14
MA03MM303138	M303	Number	1	8	48802	.55	.43	8	15	55	17	-.18	-.15	.43	-.20	A	.76	-.22
MA03MM301139	M301	Number	1	9	48802	.54	.37	11	9	20	54	-.16	-.19	-.09	.37	A	.60	-.21
MA03MM303140	M303	Number	1	10	48802	.61	.42	61	10	16	8	.42	-.19	-.23	-.09	A	.73	-.46
MA03MM303141	M303	Number	1	11	48802	.65	.48	11	12	65	8	-.23	-.24	.48	-.16	A	.94	-.56
MA03MM311142	M311	Number	1	12	48802	.45	.36	10	15	24	45	-.17	-.21	-.03	.36	A	.58	.23
MA03MM305143	M305	Number	1	13	48802	.68	.45	68	8	13	6	.45	-.24	-.18	-.18	A	.86	-.69
MA03MM301144	M301	Number	1	14	48802	.66	.45	11	10	7	66	-.20	-.19	-.18	.45	A	.82	-.65
MA03MM304145	M304	Number	1	15	48802	.62	.39	6	62	6	21	-.15	.39	-.17	-.18	A	.65	-.56
MA03MM305236	M305	Shapes	2	6	47606	.54	.46	7	12	23	54	-.19	-.21	-.17	.46	A	.84	-.15
MA03MM318237	M318	Shapes	2	7	47606	.57	.40	57	22	8	8	.40	-.16	-.20	-.13	A	.68	-.31
MA03MM303238	M303	Shapes	2	8	47606	.62	.48	9	12	13	62	-.20	-.22	-.18	.48	A	.93	-.45
MA03MM306239	M306	Measurement	2	9	47606	.62	.44	7	9	62	14	-.14	-.18	.44	-.21	A	.81	-.50
MA03MM309240	M309	Measurement	2	10	47606	.76	.42	76	8	6	5	.42	-.20	-.18	-.17	A	.83	-1.11
MA03MM303241	M303	Patterns	2	11	47606	.51	.37	15	51	18	9	-.18	.37	-.09	-.12	A	.60	-.06
MA03MM318242	M318	Patterns	2	12	47606	.64	.36	9	64	11	11	-.16	.36	-.17	-.09	A	.60	-.70
MA03MM312243	M312	Patterns	2	13	47606	.37	.17	16	16	37	25	-.17	-.08	.17	.13	A	.25	1.30
MA03MM318244	M318	Patterns	2	14	47606	.54	.42	12	17	11	54	-.09	-.18	-.19	.42	A	.74	-.21
MA03MM304245	M304	Data	2	15	47606	.77	.40	5	77	6	7	-.16	.40	-.20	-.16	A	.79	-1.21

Table 5.15.1: Reliability Statistics Set A

Cronbach's Alpha		N of Items
.751		15
Spearman-Brown Coefficient	Equal Length	.768
	Unequal Length	.769

Table 5.15.2: Reliability Statistics Set B

Cronbach's Alpha		N of Items
.725		15
Spearman-Brown Coefficient	Equal Length	.745
	Unequal Length	.746

Tables show the values of reliability using Cronbach's Alpha and Spearman-Brown Coefficient. It can be said that the reliability of the items of Mathematics Class III is moderately high.

Table 5.16: Item Parameters Environmental Studies Class III

ItemID	LO	F	P	N	pval	itcor	A	B	C	D	A_pbc	B_pbc	C_pbc	D_pbc	DIF	a-par	b-par
EV03ME307116	E307	1	1	97178	.69	.38	10	69	10	7	-.13	.38	-.20	-.13	A	.65	-.91
EV03ME314117	E314	1	2	97178	.74	.47	5	8	8	74	-.17	-.24	-.21	.47	A	.93	-.97
EV03ME305118	E305	1	3	97178	.76	.44	6	7	76	7	-.17	-.21	.44	-.19	A	.87	-1.09
EV03ME304119	E304	1	4	97178	.66	.36	66	11	9	10	.36	-.18	-.19	-.08	A	.60	-.79
EV03ME304120	E304	1	5	97178	.77	.40	9	77	5	5	-.19	.40	-.20	-.14	A	.76	-1.20
EV03ME311121	E311	1	6	49391	.55	.43	13	13	14	55	-.21	-.20	-.10	.43	A	.74	-.23
EV03ME307122	E307	1	7	49391	.68	.49	7	13	7	68	-.23	-.21	-.20	.49	A	.94	-.73
EV03ME302123	E302	1	8	49391	.59	.37	18	11	59	9	-.05	-.21	.37	-.20	A	.58	-.44
EV03ME304124	E304	1	9	49391	.51	.28	25	51	13	6	.04	.28	-.23	-.14	A	.41	-.06
EV03ME310125	E310	1	10	49391	.69	.49	69	12	9	6	.49	-.26	-.20	-.15	A	.93	-.73
EV03ME309126	E309	1	11	49391	.58	.40	16	58	11	10	-.15	.40	-.17	-.13	A	.65	-.40
EV03ME307127	E307	1	12	49391	.70	.47	8	10	70	7	-.23	-.21	.47	-.16	A	.90	-.81
EV03ME304128	E304	1	13	49391	.57	.41	12	12	57	13	-.12	-.16	.41	-.15	A	.68	-.34
EV03ME305129	E305	1	14	49391	.52	.39	52	13	23	7	.39	-.21	-.09	-.14	A	.62	-.11
EV03ME307130	E307	1	15	49391	.74	.49	74	8	8	5	.49	-.24	-.19	-.22	A	1.00	-.93
EV03ME303221	E303	2	6	47787	.62	.42	62	12	7	15	.42	-.19	-.19	-.12	A	.72	-.51
EV03ME310222	E310	2	7	47787	.67	.50	67	12	8	8	.50	-.23	-.20	-.21	A	.99	-.63
EV03ME304223	E304	2	8	47787	.49	.34	19	11	17	49	.01	-.16	-.21	.34	A	.53	.07
EV03ME302224	E302	2	9	47787	.56	.41	13	13	56	12	-.13	-.23	.41	-.08	A	.68	-.26
EV03ME311225	E311	2	10	47787	.56	.34	20	56	11	7	-.11	.34	-.18	-.08	A	.52	-.29
EV03ME313226	E313	2	11	47787	.38	.32	19	17	20	38	.00	-.19	-.08	.32	A	.53	.67
EV03ME304227	E304	2	12	47787	.76	.52	76	7	7	5	.52	-.23	-.27	-.18	A	1.22	-.93
EV03ME307228	E307	2	13	47787	.62	.45	13	12	9	62	-.13	-.17	-.25	.45	A	.81	-.46
EV03ME304229	E304	2	14	47787	.71	.45	8	71	7	8	-.20	.45	-.23	-.12	A	.86	-.86
EV03ME305230	E305	2	15	47787	.72	.50	8	8	6	72	-.23	-.21	-.19	.50	A	1.06	-.80

Table 5.16.1: Reliability Statistics Set A

Cronbach's Alpha		N of Items
.807		15
Spearman-Brown Coefficient	Equal Length	.818
	Unequal Length	.819

Table 5.16.2: Reliability Statistics Set B

Cronbach's Alpha		N of Items
.806		15
Spearman-Brown Coefficient	Equal Length	.819
	Unequal Length	.819

In terms of reliability, all the items of Environmental Studies in Class III are significantly consistent, i.e. the outcome is more reliable.

Table 5.17: Item Parameters Language Class V

ItemID	LO	Competency	Text Type	F	P	N	pval	itcor	A	B	C	D	A_pbc	B_pbc	C_pbc	D_pbc	DIF	a-par	b-par
LA05ML508101	L508	Infer	Descriptive	1	1	103177	.57	.26	14	57	6	19	-.09	.26	-.14	-.07	A	.39	-.48
LA05ML508102	L508	Interpret	Descriptive	1	2	103177	.69	.34	7	69	11	9	-.18	.34	-.12	-.11	A	.55	-1.02
LA05ML508103	L508	Locate	Descriptive	1	3	103177	.52	.31	52	17	21	6	.31	-.12	-.07	-.19	A	.48	-.11
LA05ML508104	L508	Locate	Descriptive	1	4	103177	.55	.36	15	15	11	55	-.10	-.13	-.18	.36	A	.58	-.24
LA05ML508105	L508	Vocab	Descriptive	1	5	103177	.73	.37	10	6	73	6	-.13	-.18	.37	-.18	A	.68	-1.10
LA05ML508106	L508	Locate	Story	1	6	52198	.71	.45	6	13	71	6	-.21	-.22	.45	-.16	A	.98	-.78
LA05ML508107	L508	Interpret	Story	1	7	52198	.66	.47	10	66	9	11	-.20	.47	-.19	-.20	A	1.01	-.58
LA05ML508108	L508	Vocab	Story	1	8	52198	.50	.41	22	9	15	50	-.14	-.13	-.19	.41	A	.71	.01
LA05ML508109	L508	Infer	Story	1	9	52198	.61	.42	15	12	61	7	-.15	-.18	.42	-.19	A	.78	-.45
LA05ML508110	L508	Interpret	Story	1	10	52198	.61	.42	61	15	11	8	.42	-.14	-.20	-.15	A	.79	-.46
LA05ML504111	L504	Locate	Advertisement	1	11	52198	.51	.33	26	14	51	6	-.11	-.11	.33	-.18	A	.49	-.05
LA05ML504112	L504	Locate	Advertisement	1	12	52198	.60	.38	12	60	9	15	-.15	.38	-.21	-.12	A	.64	-.46
LA05ML504113	L504	Interpret	Advertisement	1	13	52198	.42	.35	20	18	16	42	-.02	-.16	-.17	.35	A	.56	.38
LA05ML504114	L504	Interpret	Advertisement	1	14	52198	.47	.30	16	47	17	16	-.12	.30	-.09	-.10	A	.44	.17
LA05ML504115	L504	Vocab	Advertisement	1	15	52198	.57	.36	57	13	15	10	.36	-.18	-.14	-.11	A	.58	-.37
LA05ML508206	L508	Locate	Story	2	6	50979	.59	.42	11	9	16	59	-.17	-.20	-.13	.42	A	.77	-.39
LA05ML508207	L508	Locate	Story	2	7	50979	.60	.47	7	13	15	60	-.22	-.21	-.16	.47	A	.93	-.39
LA05ML508208	L508	Vocab	Story	2	8	50979	.52	.40	18	15	52	10	-.12	-.15	.40	-.18	A	.70	-.11
LA05ML508209	L508	Vocab	Story	2	9	50979	.50	.41	50	12	20	14	.41	-.20	-.11	-.15	A	.70	.00
LA05ML508210	L508	Interpret	Story	2	10	50979	.53	.34	22	53	8	12	-.03	.34	-.21	-.15	A	.53	-.15
LA05ML504211	L504	Locate	Poster	2	11	50979	.56	.32	12	9	56	19	-.20	-.18	.32	-.02	A	.50	-.33
LA05ML504212	L504	Interpret	Poster	2	12	50979	.65	.37	8	65	13	11	-.16	.37	-.20	-.12	A	.65	-.73
LA05ML504213	L504	Locate	Poster	2	13	50979	.66	.43	8	11	66	11	-.16	-.15	.43	-.25	A	.82	-.67
LA05ML504214	L504	Interpret	Poster	2	14	50979	.61	.40	11	12	11	61	-.16	-.19	-.15	.40	A	.74	-.47
LA05ML504215	L504	Vocab	Poster	2	15	50979	.51	.23	51	23	12	11	.23	.01	-.15	-.12	A	.34	-.09

Table 5.17.1: Reliability Statistics Set A

Cronbach's Alpha		N of Items
.765		15
Spearman-Brown Coefficient	Equal Length	.787
	Unequal Length	.788

Table 5.17.2: Reliability Statistics Set B

Cronbach's Alpha		N of Items
.760		15
Spearman-Brown Coefficient	Equal Length	.783
	Unequal Length	.783

Results show that all the items of Language in Class V are significantly consistent and have high covariances.

The values of reliability using Cronbach's Alpha and Spearman-Brown Coefficient shows that the reliability of the items of Language Class V is moderately high.

Table 5.18: Item Parameters Mathematics Class V

ItemID	LO	Domain	F	P	N	pval	itcor	A	B	C	D	A_pbc	B_pbc	C_pbc	D_pbc	DIF	a-par	b-par
MA05MM501131	M501	Number	1	1	102197	.63	.35	63	14	14	6	.35	-.17	-.14	-.14	A	.60	-.62
MA05MM418132	M418	Measurement	1	2	102197	.74	.36	10	74	7	6	-.18	.36	-.18	-.14	A	.72	-1.10
MA05MM401133	M401	Number	1	3	102197	.48	.37	34	6	10	48	-.18	-.14	-.15	.37	A	.61	.08
MA05MM514134	M514	Number	1	4	102197	.46	.39	20	17	14	46	-.19	-.11	-.14	.39	A	.68	.19
MA05MM505135	M505	Number	1	5	102197	.50	.28	23	10	50	13	.05	-.15	.28	-.25	A	.41	-.01
MA05MM509136	M509	Shapes	1	6	51858	.56	.41	56	18	15	8	.41	-.20	-.18	-.11	A	.72	-.25
MA05MM505137	M505	Number	1	7	51858	.66	.24	6	66	6	19	-.15	.24	-.17	-.02	A	.36	-1.15
MA05MM514138	M514	Number	1	8	51858	.54	.46	54	17	14	11	.46	-.16	-.23	-.18	A	.87	-.15
MA05MM512139	M512	Measurement	1	9	51858	.57	.42	28	57	7	5	-.23	.42	-.17	-.12	A	.76	-.27
MA05MM421140	M421	Data	1	10	51858	.57	.32	57	16	13	9	.32	-.17	-.10	-.11	A	.51	-.39
MA05MM506141	M506	Number	1	11	51858	.42	.31	11	27	15	42	-.18	-.03	-.13	.31	A	.48	.47
MA05MM509142	M509	Shapes	1	12	51858	.56	.40	14	19	56	8	-.15	-.21	.40	-.12	A	.70	-.28
MA05MM504143	M504	Measurement	1	13	51858	.52	.37	9	14	19	52	-.19	-.15	-.11	.37	A	.62	-.12
MA05MM515144	M515	Patterns	1	14	51858	.50	.39	17	12	15	50	-.18	-.14	-.12	.39	A	.66	-.03
MA05MM516145	M516	Data	1	15	51858	.63	.28	16	8	63	8	-.08	-.15	.28	-.12	A	.44	-.82
MA05MM513236	M513	Measurement	2	6	50339	.40	.35	17	40	26	12	-.18	.35	-.08	-.11	A	.57	.48
MA05MM506237	M506	Number	2	7	50339	.47	.38	8	18	47	22	-.13	-.11	.38	-.19	A	.61	.15
MA05MM418238	M418	Measurement	2	8	50339	.58	.43	10	58	13	15	-.19	.43	-.21	-.15	A	.79	-.35
MA05MM412239	M412	Measurement	2	9	50339	.54	.35	17	54	13	11	-.11	.35	-.16	-.14	A	.55	-.21
MA05MM515240	M515	Patterns	2	10	50339	.45	.40	20	18	45	13	-.14	-.13	.40	-.17	A	.69	.21
MA05MM421241	M421	Data	2	11	50339	.63	.48	9	17	63	8	-.21	-.25	.48	-.18	A	.98	-.49
MA05MM508242	M508	Number	2	12	50339	.56	.36	56	15	17	8	.36	-.10	-.17	-.16	A	.58	-.30
MA05MM509243	M509	Shapes	2	13	50339	.51	.33	51	17	18	10	.33	-.11	-.09	-.18	A	.50	-.05
MA05MM514244	M514	Number	2	14	50339	.52	.44	11	11	52	21	-.15	-.10	.44	-.26	A	.79	-.08
MA05MM514245	M514	Number	2	15	50339	.44	.38	26	12	14	44	-.13	-.15	-.14	.38	A	.64	.24

Table 5.18.1: Reliability Statistics Set A

Cronbach's Alpha	N of Items	
.756	15	
Spearman-Brown Coefficient	Equal Length	.763
	Unequal Length	.764

Table 5.18.2: Reliability Statistics Set B

Cronbach's Alpha	N of Items	
.774	15	
Spearman-Brown Coefficient	Equal Length	.789
	Unequal Length	.789

Mathematics items for Class V are significantly correlated and share high covariances.

Results show that the reliability of the items of Mathematics in Class V is moderately high.

Table 5.19: Item Parameters Environmental Studies Class V

ItemID	LO	F	P	N	pval	itcor	A	B	C	D	A_pbc	B_pbc	C_pbc	D_pbc	DIF	a-par	b-par
EV05ME501116	E501	1	1	103108	.54	.38	54	14	17	12	.38	-.18	-.11	-.17	A	.62	-.18
EV05ME504117	E504	1	2	103108	.67	.44	10	10	9	67	-.22	-.17	-.18	.44	A	.83	-.69
EV05ME508118	E508	1	3	103108	.54	.27	54	11	20	11	.27	-.19	-.08	-.03	A	.40	-.28
EV05ME508119	E508	1	4	103108	.53	.39	16	12	53	14	-.13	-.16	.39	-.16	A	.63	-.15
EV05ME509120	E509	1	5	103108	.66	.37	7	10	13	66	-.13	-.08	-.23	.37	A	.63	-.75
EV05ME510121	E510	1	6	52108	.59	.38	13	59	14	11	-.21	.38	-.15	-.12	A	.62	-.42
EV05ME513122	E513	1	7	52108	.66	.42	10	11	66	9	-.20	-.16	.42	-.18	A	.79	-.66
EV05ME513123	E513	1	8	52108	.64	.42	12	13	64	7	-.13	-.23	.42	-.16	A	.77	-.59
EV05ME509124	E509	1	9	52108	.42	.27	28	42	16	11	-.02	.27	-.11	-.16	A	.42	.50
EV05ME503125	E503	1	10	52108	.55	.40	55	18	10	14	.40	-.18	-.16	-.14	A	.69	-.21
EV05ME509126	E509	1	11	52108	.68	.47	68	9	11	8	.47	-.18	-.25	-.18	A	.98	-.65
EV05ME504127	E504	1	12	52108	.79	.42	4	6	79	7	-.16	-.18	.42	-.22	A	.97	-1.16
EV05ME509128	E509	1	13	52108	.38	.19	18	38	14	26	-.11	.19	-.14	.07	A	.27	1.14
EV05ME507129	E507	1	14	52108	.58	.37	11	58	14	14	-.12	.37	-.12	-.19	A	.61	-.35
EV05ME403130	E403	1	15	52108	.58	.42	9	16	12	58	-.16	-.16	-.19	.42	A	.76	-.35
EV05ME513221	E513	2	6	51000	.69	.38	8	69	8	12	-.17	.38	-.18	-.17	A	.71	-.87
EV05ME508222	E508	2	7	51000	.48	.35	9	48	20	19	-.14	.35	-.16	-.10	A	.54	.10
EV05ME506223	E506	2	8	51000	.41	.27	11	23	41	22	-.14	.03	.27	-.15	A	.40	.62
EV05ME509224	E509	2	9	51000	.41	.34	41	18	25	12	.34	-.08	-.15	-.13	A	.54	.45
EV05ME503225	E503	2	10	51000	.61	.42	7	10	61	17	-.17	-.22	.42	-.15	A	.77	-.48
EV05ME509226	E509	2	11	51000	.66	.39	7	8	66	14	-.14	-.13	.39	-.21	A	.72	-.73
EV05ME504227	E504	2	12	51000	.60	.46	9	13	14	60	-.18	-.20	-.20	.46	A	.91	-.39
EV05ME512228	E512	2	13	51000	.54	.44	9	54	21	11	-.16	.44	-.20	-.18	A	.79	-.18
EV05ME505229	E505	2	14	51000	.33	.25	23	33	23	16	.02	.25	-.07	-.16	A	.38	1.18
EV05ME410230	E410	2	15	51000	.60	.42	60	13	10	11	.42	-.16	-.19	-.16	A	.77	-.43

Table 5.19.1: Reliability Statistics Set A

Cronbach's Alpha	N of Items	
.768	15	
Spearman-Brown Coefficient	Equal Length	.782
	Unequal Length	.783

Table 5.19.2: Reliability Statistics Set B

Cronbach's Alpha	N of Items	
.769	15	
Spearman-Brown Coefficient	Equal Length	.770
	Unequal Length	.771

In terms of reliability, all the items of Environmental Studies in Class V are significantly consistent, i.e. the outcome is more reliable using both Cronbach's Alpha and Spearman-Brown Coefficient.

Table 5.20: Item Parameters Language Class VIII

ItemID	L0	Competency	Text Type	F	P	N	pval	itcor	A	B	C	D	A_pbc	B_pbc	C_pbc	D_pbc	DIF	a-par	b-par
LA08ML813101	L813	Locate	Descriptive	1	1	113656	.76	.38	8	76	4	8	-.21	.38	-.13	-.14	A	.74	-1.21
LA08ML813102	L813	Locate	Descriptive	1	2	113656	.45	.32	24	19	45	7	-.04	-.14	.32	-.18	A	.51	.25
LA08ML813103	L813	Interpret	Descriptive	1	3	113656	.65	.40	15	65	8	8	-.11	.40	-.19	-.20	A	.70	-.68
LA08ML813104	L813	Locate	Descriptive	1	4	113656	.70	.41	70	8	6	12	.41	-.13	-.22	-.18	A	.79	-.86
LA08ML813105	L813	Infer	Descriptive	1	5	113656	.40	.23	16	7	33	40	-.24	-.19	.14	.23	A	.34	.77
LA08ML813106	L813	Interpret	Story	1	6	56993	.54	.38	16	54	12	14	-.17	.38	-.14	-.11	A	.59	-.19
LA08ML813107	L813	Interpret	Story	1	7	56993	.49	.45	18	14	15	49	-.10	-.20	-.21	.45	A	.79	.01
LA08ML813108	L813	Locate	Story	1	8	56993	.52	.43	52	11	15	17	.43	-.19	-.18	-.12	A	.75	-.10
LA08ML813109	L813	Locate	Story	1	9	56993	.62	.51	10	6	18	62	-.17	-.17	-.29	.51	A	1.04	-.42
LA08ML813110	L813	Infer	Story	1	10	56993	.65	.51	13	12	65	7	-.22	-.24	.51	-.20	A	1.06	-.52
LA08ML813111	L813	Interpret	Poster	1	11	56993	.66	.46	14	66	12	4	-.19	.46	-.25	-.14	A	.87	-.63
LA08ML813112	L813	Interpret	Poster	1	12	56993	.42	.35	20	42	10	24	-.10	.35	-.15	-.10	A	.56	.37
LA08ML813113	L813	Locate	Poster	1	13	56993	.68	.48	13	7	68	8	-.24	-.19	.48	-.21	A	.95	-.70
LA08ML813114	L813	Infer	Poster	1	14	56993	.75	.49	75	7	8	7	.49	-.16	-.26	-.24	A	1.11	-.91
LA08ML813115	L813	Interpret	Poster	1	15	56993	.69	.42	7	8	12	69	-.14	-.18	-.22	.42	A	.81	-.82
LA08ML813206	L813	Locate	Descriptive	2	6	56663	.70	.46	16	70	5	5	-.24	.46	-.18	-.17	A	.96	-.75
LA08ML813207	L813	Interpret	Descriptive	2	7	56663	.31	.15	31	27	15	22	.15	.11	-.10	-.09	A	.23	2.10
LA08ML813208	L813	Interpret	Descriptive	2	8	56663	.60	.44	14	10	60	12	-.16	-.15	.44	-.22	A	.85	-.41
LA08ML813209	L813	Infer	Descriptive	2	9	56663	.52	.33	13	9	52	21	-.09	-.17	.33	-.11	A	.51	-.10
LA08ML813210	L813	Infer	Descriptive	2	10	56663	.31	.18	29	31	20	16	.06	.18	-.07	-.09	A	.26	1.96
LA08ML813211	L813	Infer	Table	2	11	56663	.40	.21	26	40	21	8	-.09	.21	.04	-.15	A	.32	.78
LA08ML813212	L813	Locate	Table	2	12	56663	.70	.49	6	9	11	70	-.20	-.20	-.24	.49	A	1.18	-.71
LA08ML813213	L813	Locate	Table	2	13	56663	.76	.48	7	8	76	6	-.23	-.21	.48	-.21	A	1.28	-.91
LA08ML813214	L813	Interpret	Table	2	14	56663	.29	.20	13	29	24	28	-.13	.20	-.04	.02	A	.33	1.65
LA08ML813215	L813	Infer	Table	2	15	56663	.52	.31	18	10	52	15	-.05	-.12	.31	-.17	A	.51	-.12

Table 5.20.1: Reliability Statistics Set A

Cronbach's Alpha		N of Items
.708		15
Spearman-Brown Coefficient	Equal Length	.826
	Unequal Length	.827

Table 5.20.2: Reliability Statistics Set B

Cronbach's Alpha		N of Items
.726		15
Spearman-Brown Coefficient	Equal Length	.747
	Unequal Length	.748

Tables show the values of reliability using Cronbach's Alpha and Spearman-Brown Coefficient. It shows that the statistical consistency between the items is higher and all the items have high covariances.

Table 5.21: Item Parameters Mathematics Class VIII

ItemID	LO	Domain	F	P	N	pval	itcor	A	B	C	D	A_pbc	B_pbc	C_pbc	D_pbc	DIF	a-par	b-par
MA08MM705116	M705	Number	1	1	113941	.40	.34	38	40	10	8	-.22	.34	-.09	-.03	A	.56	.49
MA08MM707117	M707	Algebra	1	2	113941	.52	.43	15	10	19	52	-.12	-.18	-.22	.43	A	.83	-.07
MA08MM812118	M812	Geometry	1	3	113941	.42	.38	42	10	21	22	.38	-.10	-.10	-.21	A	.64	.38
MA08MM719119	M719	Data	1	4	113941	.59	.33	12	15	59	10	-.14	-.13	.33	-.15	A	.56	-.47
MA08MM819120	M819	Data	1	5	113941	.43	.27	14	25	13	43	-.10	-.10	-.10	.27	A	.41	.46
MA08MM802121	M802	Number	1	6	57037	.42	.35	12	25	17	42	-.08	-.12	-.16	.35	A	.56	.43
MA08MM702122	M702	Number	1	7	57037	.41	.40	17	18	18	41	-.16	-.14	-.13	.40	A	.67	.42
MA08MM620123	M620	Mensuration	1	8	57037	.39	.46	13	39	27	16	-.15	.46	-.22	-.12	A	.87	.40
MA08MM710124	M710	Ratio	1	9	57037	.35	.41	38	35	13	10	-.14	.41	-.15	-.16	A	.72	.67
MA08MM804125	M804	Number	1	10	57037	.47	.46	18	47	16	15	-.22	.46	-.12	-.19	A	.85	.12
MA08MM818126	M818	Mensuration	1	11	57037	.28	.17	28	22	31	12	.17	-.02	-.07	-.04	A	.26	2.28
MA08MM808127	M808	Algebra	1	12	57037	.45	.21	45	16	23	11	.21	-.03	-.15	.01	A	.29	.41
MA08MM721128	M721	Data	1	13	57037	.53	.40	17	53	15	10	-.16	.40	-.18	-.14	A	.71	-.14
MA08MM801129	M801	Number	1	14	57037	.32	.25	29	32	22	11	-.09	.25	-.02	-.12	A	.38	1.27
MA08MM706130	M706	Number	1	15	57037	.38	.38	22	24	38	11	-.13	-.14	.38	-.12	A	.63	.54
MA08MM606221	M606	Number	2	6	56904	.44	.46	9	32	44	10	-.15	-.25	.46	-.11	A	.88	.20
MA08MM717222	M717	Mensuration	2	7	56904	.34	.21	27	34	20	13	.01	.21	-.11	-.09	A	.31	1.29
MA08MM719223	M719	Data	2	8	56904	.38	.19	14	22	38	20	-.07	-.01	.19	-.08	A	.28	1.06
MA08MM812224	M812	Geometry	2	9	56904	.24	.11	45	16	24	11	.09	-.06	.11	-.12	A	.17	4.12
MA08MM620225	M620	Mensuration	2	10	56904	.40	.44	22	22	40	12	-.18	-.18	.44	-.10	A	.81	.38
MA08MM803226	M803	Number	2	11	56904	.50	.38	21	50	11	13	-.16	.38	-.14	-.14	A	.67	-.01
MA08MM702227	M702	Number	2	12	56904	.40	.20	8	25	40	22	-.08	.07	.20	-.17	A	.28	.91
MA08MM621228	M621	Data	2	13	56904	.39	.38	22	20	14	39	-.08	-.16	-.17	.38	A	.66	.47
MA08MM601229	M601	Number	2	14	56904	.40	.34	24	40	18	11	-.12	.34	-.12	-.10	A	.54	.50
MA08MM620230	M620	Mensuration	2	15	56904	.50	.44	19	21	50	5	-.22	-.19	.44	-.11	A	.87	-.03

Table 5.21.1: Reliability Statistics Set A

Cronbach's Alpha		N of Items
.751		15
Spearman-Brown Coefficient	Equal Length	.768
	Unequal Length	.769

Table 5.21.2: Reliability Statistics Set B

Cronbach's Alpha		N of Items
.725		15
Spearman-Brown Coefficient	Equal Length	.745
	Unequal Length	.746

Tables show the values of reliability using Cronbach's Alpha and Spearman-Brown Coefficient. It can be said that the reliability of the items of Mathematics Class VIII is moderately high.

Table 5.22: Item Parameters Science Class VIII

ItemID	LO	F	P	N	pval	itcor	A	B	C	D	A_pbc	B_pbc	C_pbc	D_pbc	DIF	a-par	b-par
SC08MC708131	SCI708	1	1	113863	.50	.42	29	13	50	4	-.23	-.16	.42	-.10	A	.79	-.01
SC08MC704132	SCI704	1	2	113863	.26	.13	26	21	20	28	.13	-.02	-.04	-.01	A	.21	3.03
SC08MC801133	SCI801	1	3	113863	.48	.36	17	14	16	48	-.16	-.10	-.14	.36	A	.62	.07
SC08MC813134	SCI813	1	4	113863	.61	.38	17	9	61	8	-.19	-.16	.38	-.14	A	.74	-.50
SC08MC807135	SCI807	1	5	113863	.44	.37	34	44	11	7	-.16	.37	-.14	-.12	A	.64	.27
SC08MC811136	SCI811	1	6	57040	.40	.35	23	13	19	40	-.11	-.12	-.13	.35	A	.58	.46
SC08MC811137	SCI811	1	7	57040	.55	.38	13	55	20	9	-.17	.38	-.16	-.14	A	.68	-.23
SC08MC705138	SCI705	1	8	57040	.25	.03	18	25	18	34	-.15	.03	-.18	.31	A	.10	3.05
SC08MC811139	SCI811	1	9	57040	.30	.28	23	18	24	30	-.08	-.11	-.04	.28	A	.44	1.28
SC08MC705140	SCI705	1	10	57040	.57	.42	57	16	14	8	.42	-.16	-.20	-.15	A	.81	-.30
SC08MC805141	SCI805	1	11	57040	.36	.36	16	31	36	13	-.18	-.05	.36	-.13	A	.59	.69
SC08MC811142	SCI811	1	12	57040	.40	.40	17	19	19	40	-.08	-.14	-.19	.40	A	.70	.41
SC08MC704143	SCI704	1	13	57040	.44	.42	15	44	19	17	-.17	.42	-.14	-.15	A	.73	.25
SC08MC805144	SCI805	1	14	57040	.40	.19	22	16	40	17	.02	-.05	.19	-.14	A	.28	.88
SC08MC703145	SCI703	1	15	57040	.43	.37	43	17	15	20	.37	-.13	-.16	-.10	A	.62	.30
SC08MC703236	SCI703	2	6	56823	.50	.38	15	18	50	12	-.15	-.14	.38	-.13	A	.64	-.01
SC08MC705237	SCI705	2	7	56823	.45	.36	11	33	45	6	-.14	-.17	.36	-.08	A	.60	.20
SC08MC710238	SCI710	2	8	56823	.38	.37	38	17	19	20	.37	-.12	-.11	-.13	A	.62	.53
SC08MC711239	SCI711	2	9	56823	.37	.37	11	15	37	31	-.15	-.10	.37	-.11	A	.63	.60
SC08MC801240	SCI801	2	10	56823	.68	.40	68	8	11	8	.40	-.17	-.18	-.17	A	.82	-.77
SC08MC805241	SCI805	2	11	56823	.38	.31	25	20	13	38	-.11	-.07	-.11	.31	A	.48	.63
SC08MC703242	SCI703	2	12	56823	.38	.29	21	38	18	18	-.02	.29	-.14	-.09	A	.46	.70
SC08MC811243	SCI811	2	13	56823	.54	.44	14	13	14	54	-.18	-.20	-.13	.44	A	.81	-.22
SC08MC801244	SCI801	2	14	56823	.43	.18	25	43	16	11	.13	.18	-.17	-.14	A	.27	.64
SC08MC804245	SCI804	2	15	56823	.49	.35	11	13	49	21	-.15	-.18	.35	-.05	A	.55	.03

Table 5.22.1: Reliability Statistics Set A

Cronbach's Alpha	N of Items	
.728	15	
Spearman-Brown Coefficient	Equal Length	.725
	Unequal Length	.725

Table 5.22.2: Reliability Statistics Set B

Cronbach's Alpha	N of Items	
.740	15	
Spearman-Brown Coefficient	Equal Length	.739
	Unequal Length	.740

From the results, it can be said that the reliability of the items of Science Class VIII is moderately high.

Table 5.23: Item Parameters Social Science Class VIII

ItemID	LO	F	P	N	pval	itcor	A	B	C	D	A_pbc	B_pbc	C_pbc	D_pbc	DIF	a-par	b-par
SS08MS802146	SST802	1	1	112448	.50	.28	12	24	50	10	-.12	-.08	.28	-.12	A	.44	.01
SS08MS703147	SST703	1	2	112448	.50	.31	18	10	18	50	-.12	-.13	-.10	.31	A	.49	-.02
SS08MS816148	SST816	1	3	112448	.31	.30	31	20	28	15	.30	-.07	-.06	-.12	A	.50	1.06
SS08MS605149	SST605	1	4	112448	.50	.33	15	50	18	13	-.16	.33	-.08	-.14	A	.52	-.03
SS08MS818150	SST818	1	5	112448	.44	.43	24	12	16	44	-.18	-.18	-.13	.43	A	.78	.22
SS08MS807151	SST807	1	6	56195	.46	.21	24	15	46	9	.02	-.11	.21	-.13	A	.30	.30
SS08MS704152	SST704	1	7	56195	.43	.26	18	18	17	43	.00	-.06	-.19	.26	A	.39	.50
SS08MS815153	SST815	1	8	56195	.49	.47	49	16	16	14	.47	-.17	-.18	-.18	A	.98	.02
SS08MS823154	SST823	1	9	56195	.29	.25	10	43	13	29	-.17	.10	-.20	.25	A	.42	1.39
SS08MS827155	SST827	1	10	56195	.44	.39	14	11	44	26	-.12	-.19	.39	-.12	A	.72	.24
SS08MS831156	SST831	1	11	56195	.50	.30	50	11	15	18	.30	-.18	-.15	.00	A	.48	-.03
SS08MS831157	SST831	1	12	56195	.35	.37	35	33	11	16	.37	-.08	-.17	-.11	A	.66	.65
SS08MS625158	SST625	1	13	56195	.30	.03	13	11	40	30	-.18	-.16	.29	.03	A	.10	1.50
SS08MS610159	SST610	1	14	56195	.35	.37	26	18	15	35	-.12	-.06	-.15	.37	A	.67	.69
SS08MS733160	SST733	1	15	56195	.58	.42	58	14	10	13	.42	-.16	-.16	-.18	A	.85	-.35
SS08MS809251	SST809	2	6	56253	.36	.22	19	36	23	15	-.01	.22	-.13	-.04	A	.32	1.10
SS08MS805252	SST805	2	7	56253	.36	.23	17	29	36	12	-.02	-.10	.23	-.07	A	.35	1.07
SS08MS810253	SST810	2	8	56253	.47	.38	47	16	15	15	.38	-.13	-.16	-.12	A	.65	.13
SS08MS831254	SST831	2	9	56253	.32	.34	35	19	9	32	-.06	-.14	-.13	.34	A	.58	.87
SS08MS722255	SST722	2	10	56253	.41	.28	41	11	18	25	.28	-.19	-.20	.09	A	.44	.53
SS08MS823256	SST823	2	11	56253	.47	.47	18	14	15	47	-.22	-.13	-.16	.47	A	.94	.08
SS08MS833257	SST833	2	12	56253	.58	.39	11	13	58	10	-.13	-.17	.39	-.15	A	.70	-.36
SS08MS726258	SST726	2	13	56253	.53	.34	15	12	53	15	-.08	-.18	.34	-.11	A	.57	-.16
SS08MS731259	SST731	2	14	56253	.52	.43	17	11	52	16	-.19	-.17	.43	-.13	A	.82	-.08
SS08MS734260	SST734	2	15	56253	.55	.40	55	13	12	14	.40	-.18	-.15	-.14	A	.75	-.23

Table 5.23.1: Reliability Statistics Set A

Cronbach's Alpha		N of Items	
.712		15	
Spearman-Brown Coefficient	Equal Length	.719	
	Unequal Length	.720	

Table 5.23.2: Reliability Statistics Set B

Cronbach's Alpha		N of Items	
.743		15	
Spearman-Brown Coefficient	Equal Length	.745	
	Unequal Length	.746	

From the results, it can be said that the reliability of the items of Social Science Class VIII is moderately high.



6. Standard Setting and Key Findings of Students' Performance Result

The main purpose of setting performance standards for NAS is to define the evaluation framework for educational assessment programs. The system of performance standards substantially improves the interpretability of assessment results and provides a framework for defining national learning targets and for monitoring and promoting educational progress towards these targets at institutional, regional and national levels.

NCERT's vision for providing maximally useful assessment-based support to the States and District level, required the setting of performance standards, i.e., the development of conceptual and operational definitions of student performance levels. The conceptual definitions of performance standards address all measurable aspects of curriculum and are not limited to the class-specific content scope of NAS, whereas the operational definitions (cut scores) are derived from the actual assessment instruments.

6.1 Setting Performance Standards

The performance levels were constructed in a 2-stage process: (1) Setting performance levels which entails the development of conceptual definitions of the levels informed by the subject/class specific content standards, i.e., learning outcomes and competencies covered by curriculum; and (2) Setting cut scores using the 2017 NAS instruments and data.

Setting Performance Levels

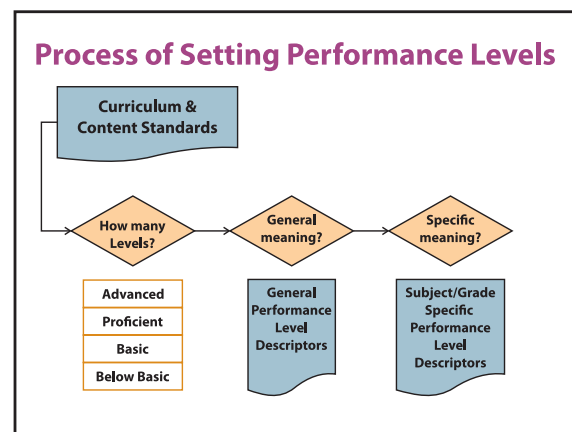
The procedure for conceptualizing performance levels entailed: deciding on the number and purpose of performance levels, choosing their labels and developing general and specific descriptions of each level (known as Performance Level Descriptors or PLDs (refer Appendix G), e.g. what should students know and be able to do in Mathematics Class V to be considered as "proficient"). This procedure is based on information drawn from official documentation on national learning standards and

Table 6.1: General performance level descriptors

Below basic	Basic	Proficient	Advanced
<ul style="list-style-type: none"> Learners at this level are at the early stages of development regarding the curriculum standards. They have not achieved sufficient knowledge and skills to be considered minimally successful regarding curriculum demands. They need guidance at every stage of learning. They can make little judgement and need a lot of encouragement and guidance. 	<ul style="list-style-type: none"> Learners at this level demonstrate a minimum level of skills related to the curriculum learning outcomes. They can follow simple instructions and apply simple rules to achieve expected performance. They have some good ideas which often lack coherence. They need guidance at many stages of learning. They can solve problems using simple logic, and can also express themselves using simple language. 	<ul style="list-style-type: none"> Learners at this level have acquired most of the learning outcomes and skills required by the curriculum. They can work independently with minimum supervision. They have a systematic methodology to solve problems. They can communicate their ideas clearly. They can also connect different ideas and create meaning with minimum guidance and supervision. They can analyze situations and interpret information for application to new situations. 	<ul style="list-style-type: none"> Learners at this level display exceptional mastery of the learning content as prescribed by the curriculum and beyond. They are independent with high analytical, reflective and critical thinking. They can connect and integrate concepts and ideas to create new knowledge/ meaning and solve complex problems. They communicate information with the highest level of creativity and coherence as well as make sound judgements.

curricula (http://www.ncert.nic.in/departments/nie/dee/publication/print_material.html). The procedure for setting performance levels employed a focused group method to solicit the opinions and judgements of field experts (teachers, supervisors, curriculum experts). Figure 6.1 summarizes the process of setting conceptual definitions of performance levels.

Figure 6.1: The process of setting performance levels



During the Setting Performance Levels stage, conceptual definitions of performance levels and performance level descriptors was carried out for Class III, V and VIII in Language, Mathematics, Environmental Studies, Science and Social Science. It was decided that four performance levels were appropriate, each with its general and specific definitions created for each class level and subject. Table 6.1 shows the general performance level descriptors developed and agreed upon at the workshop applicable to any class or subject.

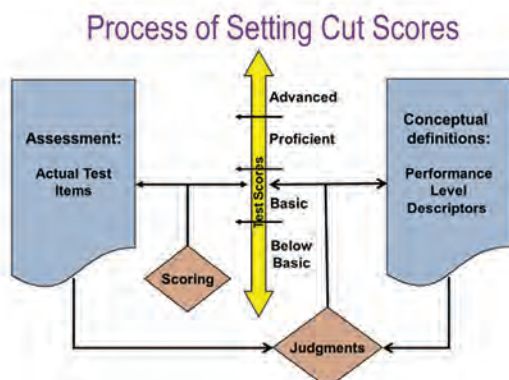
An important step taken during the process was to ensure the vertical alignment (i.e., across the targeted Classes) of the performance level descriptors. For this activity, the panel lists compared the Performance Level Descriptors for each level across Classes to ensure that there is a logical progression as students move from one Class to the next. Once this activity was completed and the panelists were satisfied with the progression across Classes, the general and specific performance level descriptors were officially approved by the NCERT and the representatives of the Education Offices of the States/UTs present at the workshop.

Setting Cut Scores

After completing the setting performance standards procedure, the setting cut scores procedure was carried out. This is a procedure for establishing cut scores on operational tests to be used for the classification of student outcomes into predefined levels. The procedure was based on subject expert judgements taking into consideration the experts' understanding of the performance level definitions, experience solving the tests and experience in evaluating student performance.

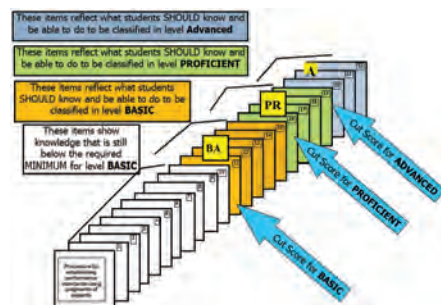
The process of setting cut scores is an iterative method that takes typically three rounds of judgements. After each round, feedback is presented to the experts to help them refine each judgement task. Feedback consists of agreement data which is the degree to which judgements of different experts are homogeneous and impact data which is the percentage of students that can be classified in each performance level based on cut scores proposed in a round. After presenting feedback, the experts have discussions about the reasonableness of the agreement and impact data and proceed to another round of judgements based on their discussion and feedback. Figure 6.2 summarizes the process of Setting Cut Scores.

Figure 6.2: The Process of Setting Cut Scores



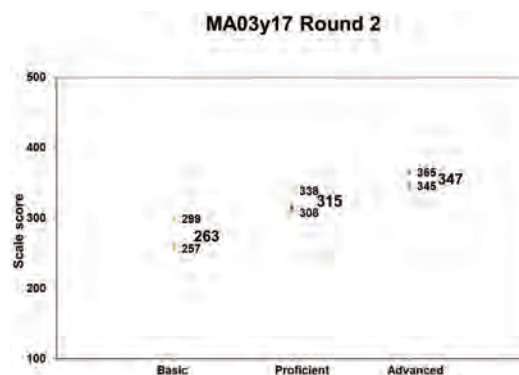
For NAS 2017 the Bookmark method (Lewis, Mitzel, & Green, 1996) was utilized. In the Bookmark approach, items in a test are ordered by difficulty (using the IRT b-parameter) from easiest to hardest. Panelists placed a “bookmark” in the “ordered item booklet” in such a way that a student at the threshold of a performance level would be expected to respond successfully to the items prior to the bookmark and unsuccessfully to the items that follow taking into consideration the specific performance level descriptors. The ranges of items represented operational definitions of performance levels and their meaning was maintained across different test forms through test equating procedures. Figure 6.3 exemplifies the way the ordered item booklet looked after identifying the cut scores.

Figure 6.3: Ordered item booklet with cut scores.



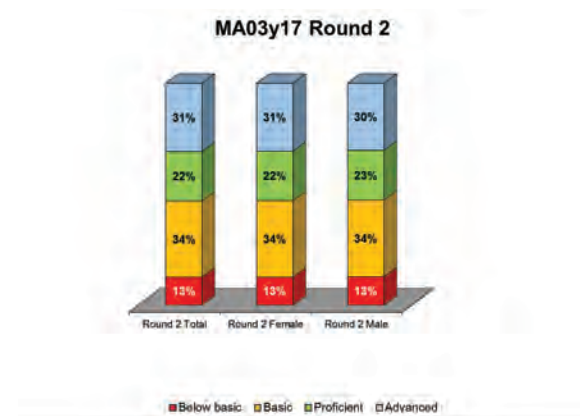
After the panelists had submitted their individual cut scores, agreement data and impact data was presented after each round. Agreement data showed the spread of the individual cut scores presented by each judge, this information was helpful during discussion as it helped panelists make better judgements in future rounds. Figure 6.4 shows an example of agreement data for Mathematics Class III after the second round of judgements. Note the proposed cut scores were 263 for Basic, 315 for Proficient and 347 for Advanced.

Figure 6.4: Example of Feedback: Agreement Data After Round 2 for Mathematics Class III



After showing the proposed cut scores for the round, impact data was shown to help panel lists understand how students will be distributed among the four performance levels if the cut scores they proposed were to be final. Impact data is represented as the percentage of students classified within each performance level. Figure 6.5 shows the impact data for round 2 for Mathematics Class III. The data shows that, if the cut-scores shown in Figure 6.4 were to be used, 13% of students would be classified as Below Basic, 34% as Basic, 22% as Proficient and 31% as Advanced.

Figure 6.5: Example of Feedback: Impact Data After Round 2 Mathematics Class III



After rounds 2 and 3, additional feedback data was presented: cut score trends across rounds and impact data across rounds. This type of feedback provided information about how the cut scores varied after each round. Figure 6.6 shows the trends of the proposed cut scores for each of the 3 rounds. It can be observed that all of the cut scores decreased from round 1 to round 2 and increased slightly for Advanced from round 2 to round 3.

Figure 6.6: Example of Feedback: Cut Score Trend by Rounds for Mathematics Class III

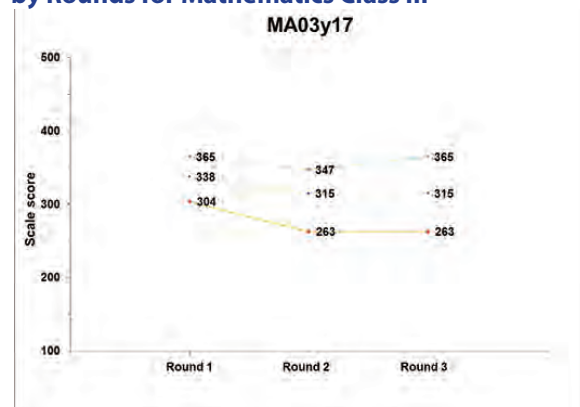
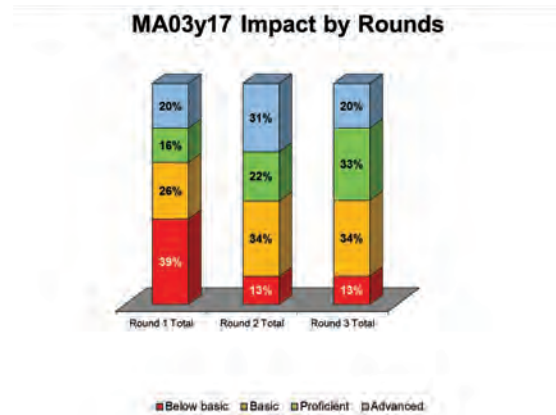


Figure 6.7 shows the impact data by rounds for Mathematics Class III. This feedback allowed the panelists to consider if the distribution of students in each performance level was logical, taking into consideration their classroom experience and the specific Performance Level Descriptors.

Figure 6.7: Example of Feedback: Impact Data by Rounds for Mathematics Class III



After completing all rounds, a final moderation round was conducted to fine-tune the cut scores. During this stage, vertical and horizontal alignment was conducted by showing the percentage of students in each performance level for each test, side by side, across subject and across Classes, and then adjusting the cut scores. Figure 6.8 and Figure 6.9 shows the impact data presented to panelists during the final horizontal and vertical moderation.

Figure 6.8: Example of Impact Data Across Subjects Within Class III for Horizontal Moderation

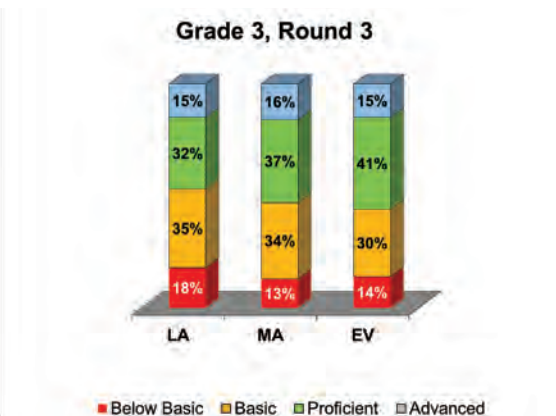
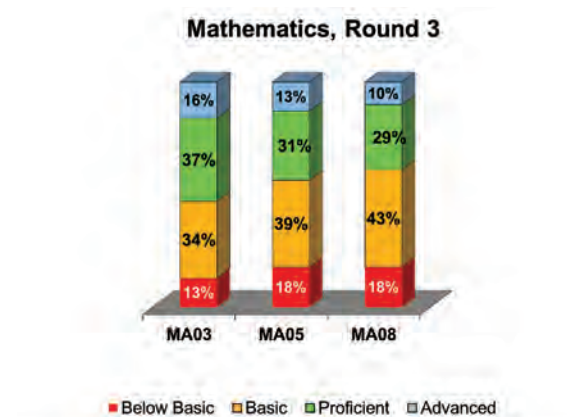


Figure 6.9: Example of Impact Data Across Classes Within Mathematics III for Vertical Moderation

The cut scores were made official after the review and approval by NCERT and the representatives of the

Education Offices of States/UTs. With these final cut scores, it was possible to produce NAS results based on performance levels. Table 6.2 shows the cut scores for each test for NAS and the results are presented in further sections of this document.

6.2 Overall National Performance Results for NAS 2017

Student performance can be expressed as a percentage of students classified in each performance level. The following graphs and tables show the NAS 2017 results at overall national level and disaggregated by gender, school location, school management and social groups. Table 6.3 and Figure 6.10 show the NAS results at the national level.

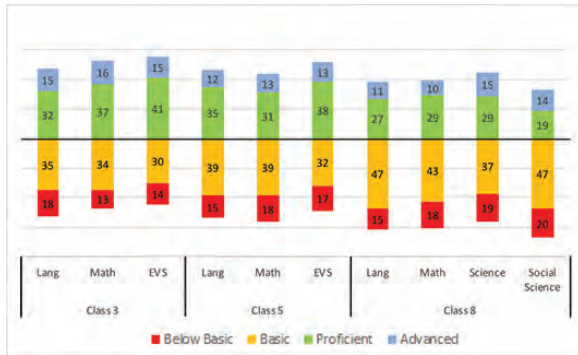
Table 6.2: Final cut scores for NAS tests

Test	Basic	Proficient	Advanced
Class III Language	285	339	395
Class III Mathematics	263	315	375
Class III Environmental Studies	268	315	370
Class V Language	264	320	383
Class V Mathematics	261	315	375
Class V Environmental Studies	260	306	370
Class VIII Language	255	320	370
Class VIII Mathematics	225	275	340
Class VIII Science	228	275	333
Class VIII Social Science	236	298	338

Table 6.3: Percentage of students at each performance level (National results)

Classes	Subjects	Below Basic	Basic	Proficient	Advanced
Class III	Language	18.0%	34.8%	32.1%	15.1%
	Math	12.8%	34.3%	36.7%	16.2%
	EVS	14.3%	30.1%	40.7%	14.9%
Class V	Class III Combined	15.0%	33.1%	36.5%	15.4%
	Language	15.0%	38.7%	34.5%	11.8%
	Math	18.0%	38.5%	30.9%	12.7%
	EVS	17.1%	31.7%	38.0%	13.2%
Class VIII	Class V Combined	16.7%	36.3%	34.5%	12.6%
	Language	14.8%	46.9%	26.8%	11.5%
	Math	17.9%	42.6%	29.0%	10.5%
	Science	18.5%	37.2%	28.9%	15.3%
	Social Science	19.8%	47.3%	19.0%	13.9%
All Classes & Subjects Combined	Class VIII Combined	17.8%	43.5%	25.9%	12.8%
	NAS	16.6%	38.2%	31.7%	13.5%

Figure 6.10: Percentage of students in each performance level (National Results)



6.3 National Results by Gender

The following figures span out the national results of students in different subjects by gender.

Figure 6.11: Class III National Results by Gender

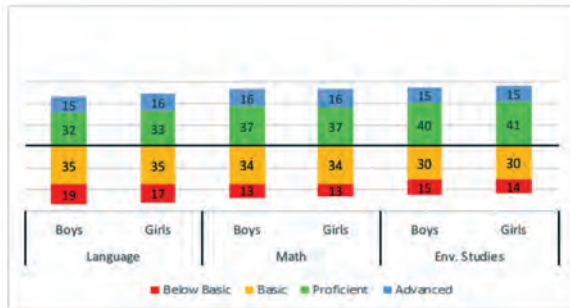


Figure 6.12: Class V National Results by Gender

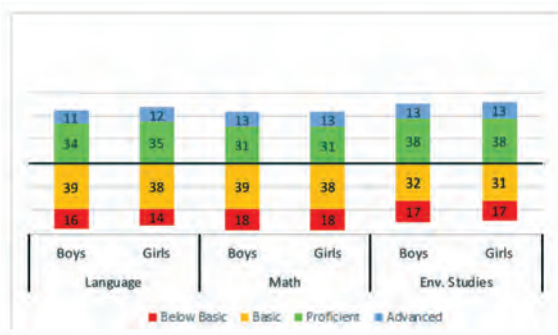
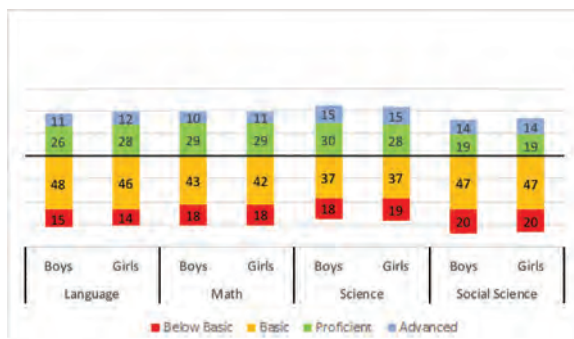


Figure 6.13: Class VIII National Results by Gender



6.4 National Results by School Location

The following figures span out the national results of students in different subjects by school location.

Figure 6.14: Class III National Results by School Location

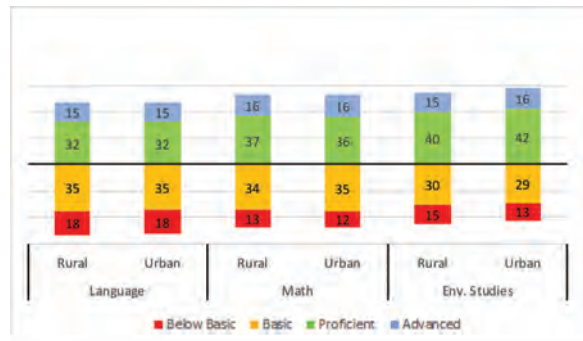


Figure 6.15: Class V National Results by School Location

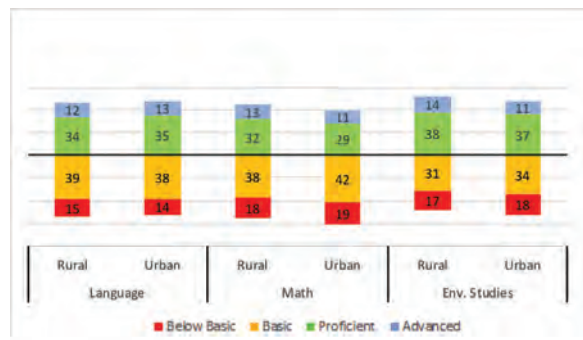
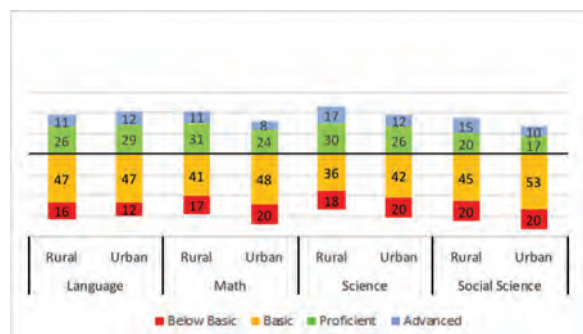


Figure 6.16: Class VIII National Results by School Location



6.5 National Results by School Management

The following figures span out the national results of students in different subjects by school management.

Figure 6.17: Class III National Results by School Management

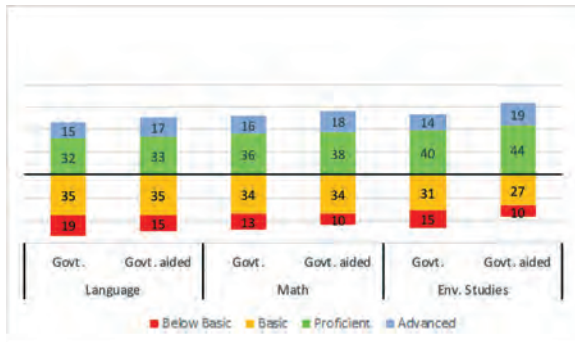


Figure 6.18: Class V National Results by School Management

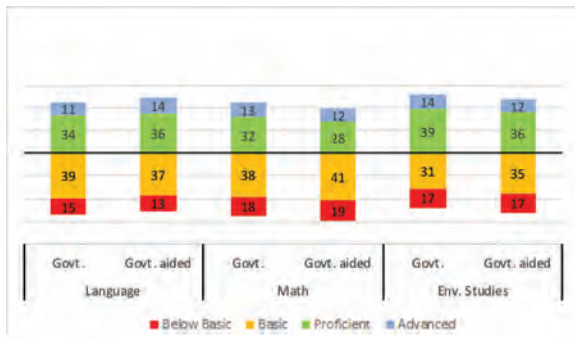
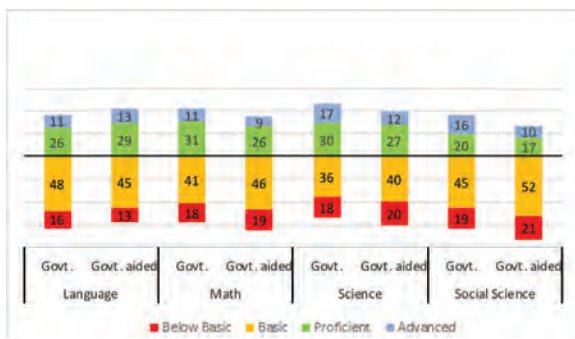


Figure 6.19: Class VIII National Results by School Management



6.6 National Results by Social Groups

The following figures span out the national results of students in different subjects by social groups.

Figure 6.20: Class III National Results by Social Groups

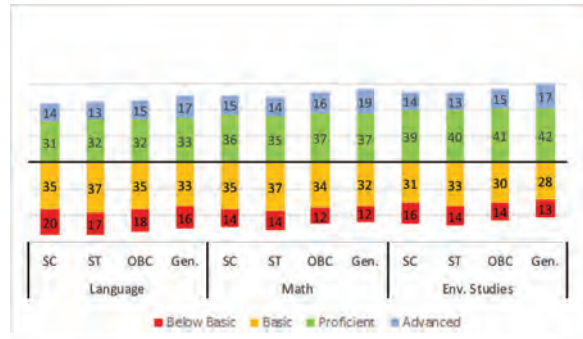


Figure 6.21: Class V National Results by Social Groups

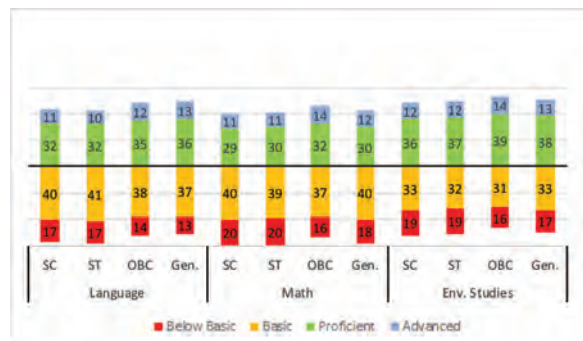
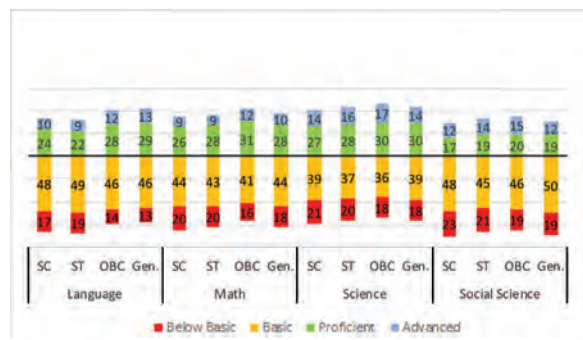


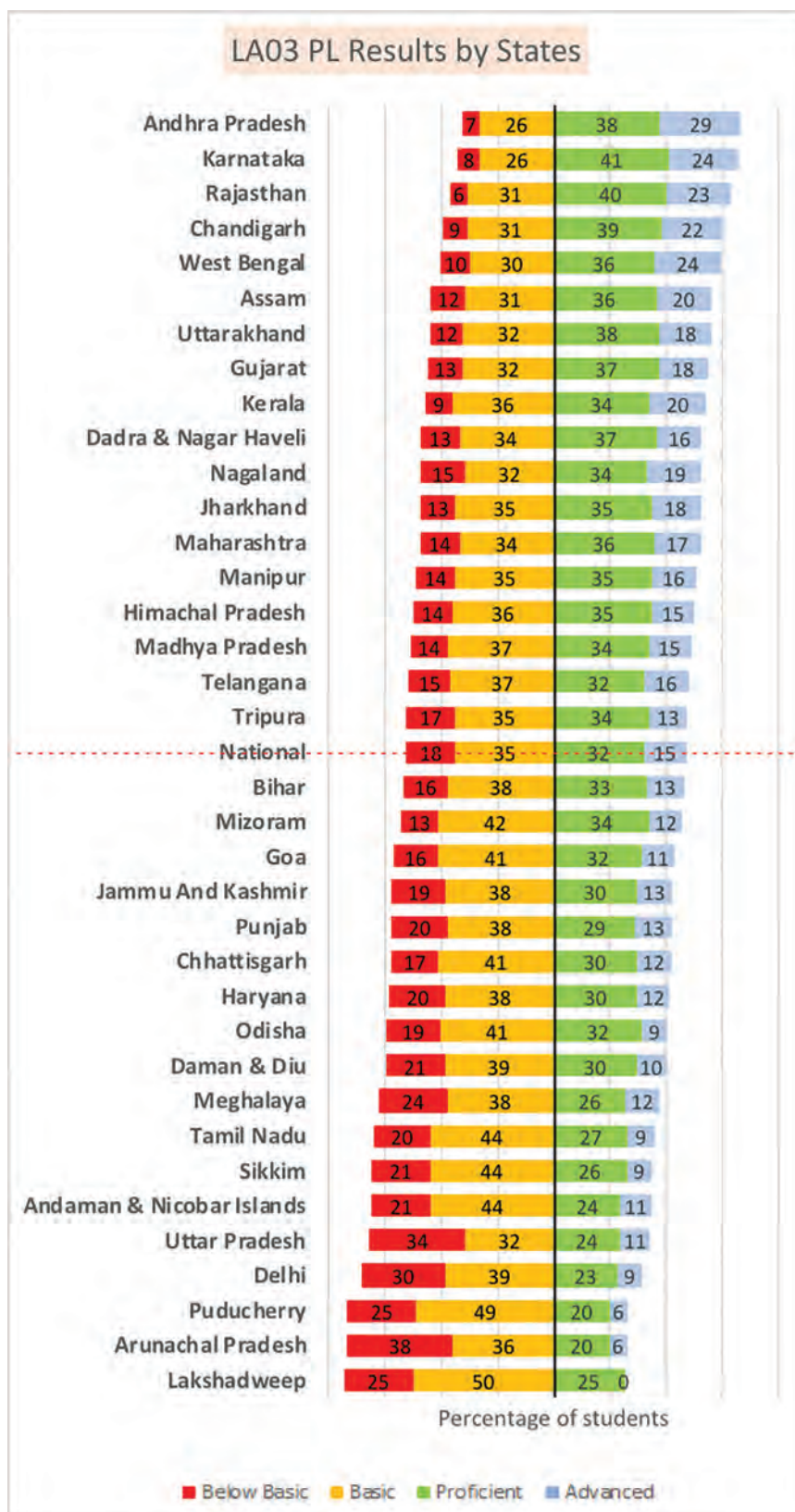
Figure 6.22: Class VIII National Results by Social Groups



6.7 State Results by Each Class and Subject

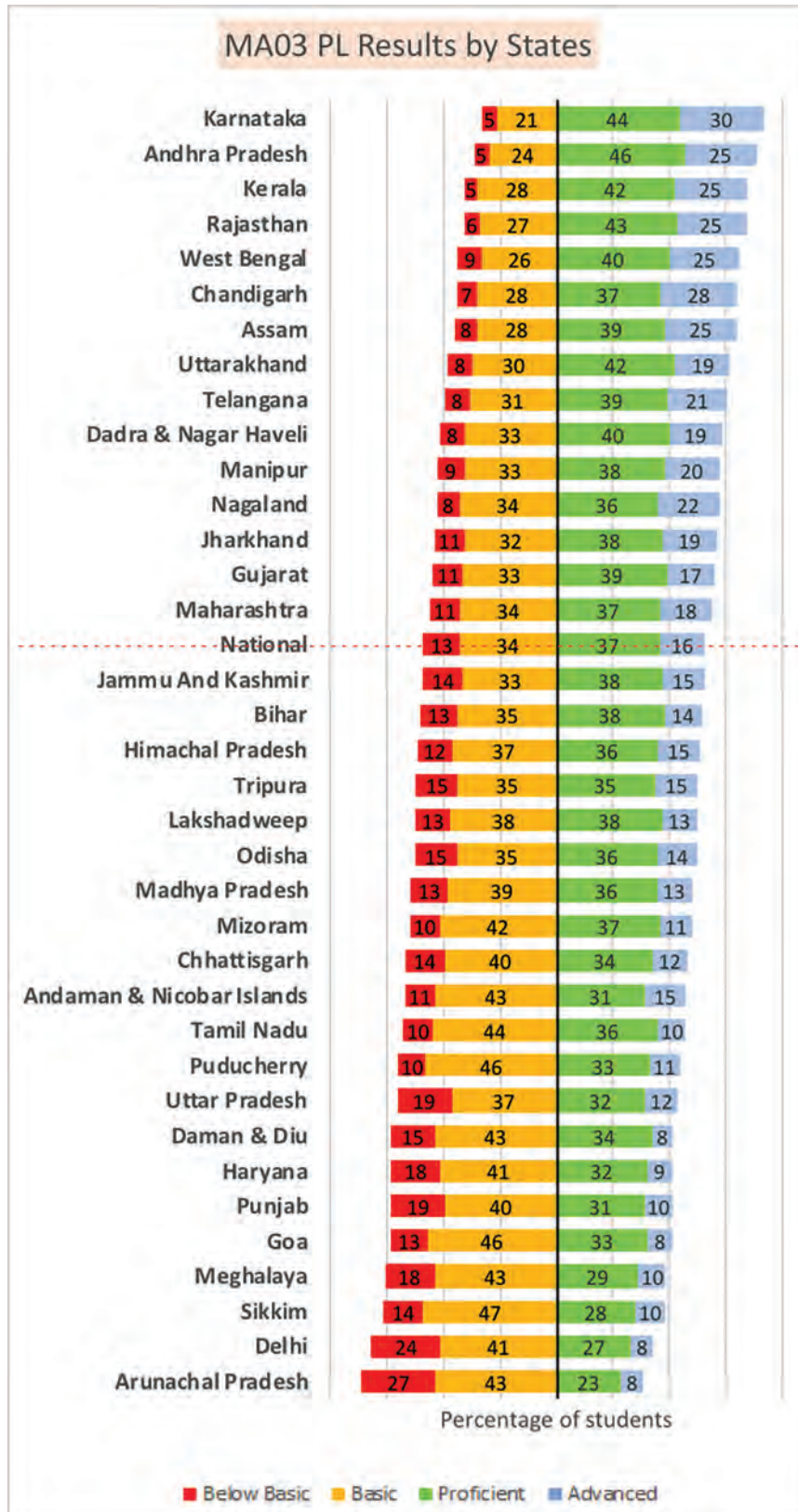
In Class III, overall achievement of students within the performance level Basic is higher (35%) than the achievement of students on other performance levels i.e. Below Basic (18%), Proficient (32%) and Advanced (15%), for the subject Language (as shown in Figure 6.23).

Figure 6.23: Language Class III (LA03) State Results by Performance Levels



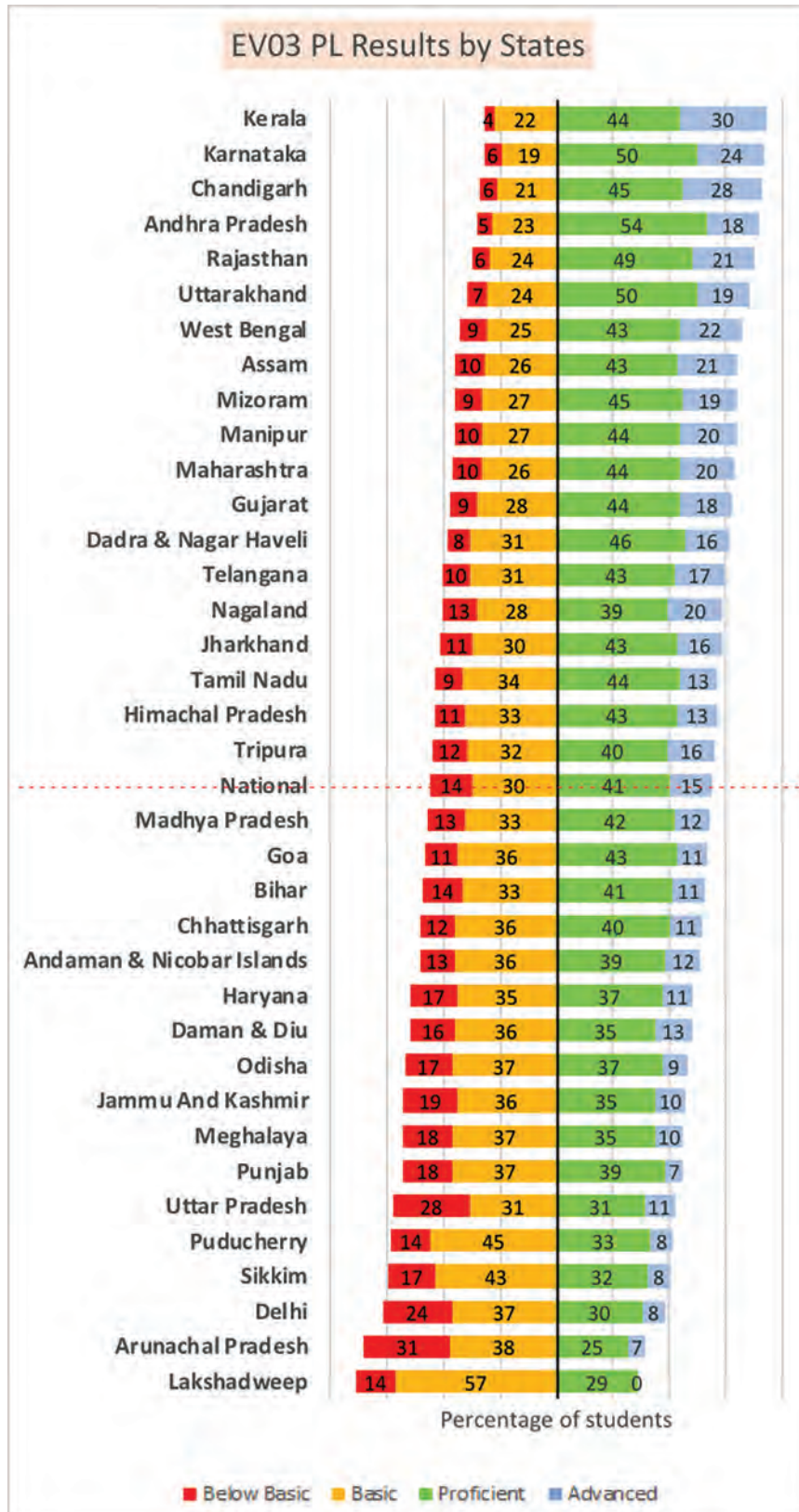
In Class III, overall achievement of students within the performance level Proficient is higher (37%) than the achievement of students on other performance levels i.e. Below Basic (13%), Basic (34%) and Advanced (16%), for the subject Mathematics (as shown in Figure 6.24).

Figure 6.24: Mathematics Class III (MA03) State Results by Performance Levels



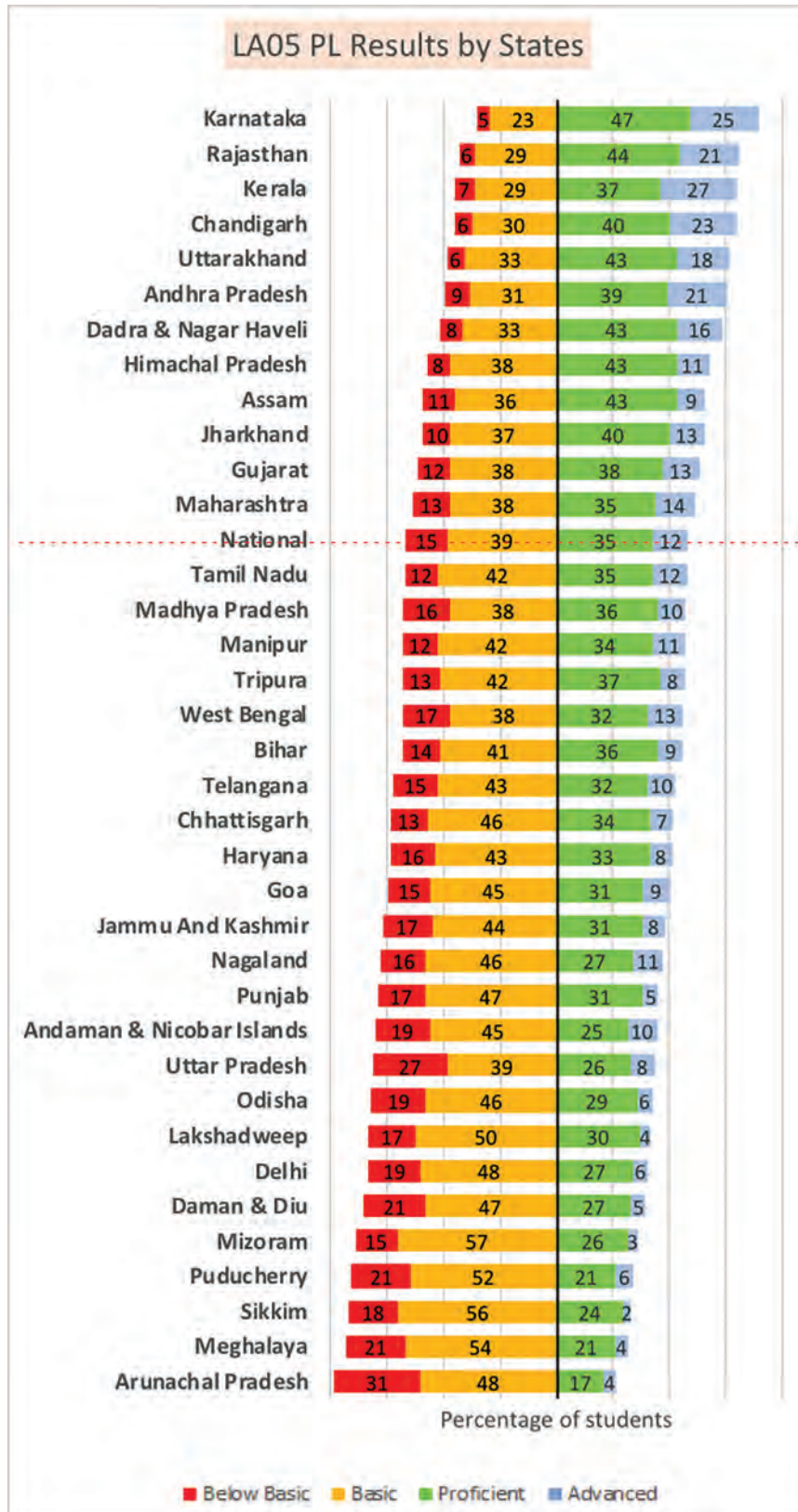
In Class III, overall achievement of students within the performance level Proficient is higher (41%) than the achievement of students on other performance levels i.e. Below Basic (14%), Basic (30%) and Advanced (15%), for the subject Environmental Studies (as shown in Figure 6.25).

Figure 6.25: Environmental Studies Class III (EV03) State Results by Performance Levels



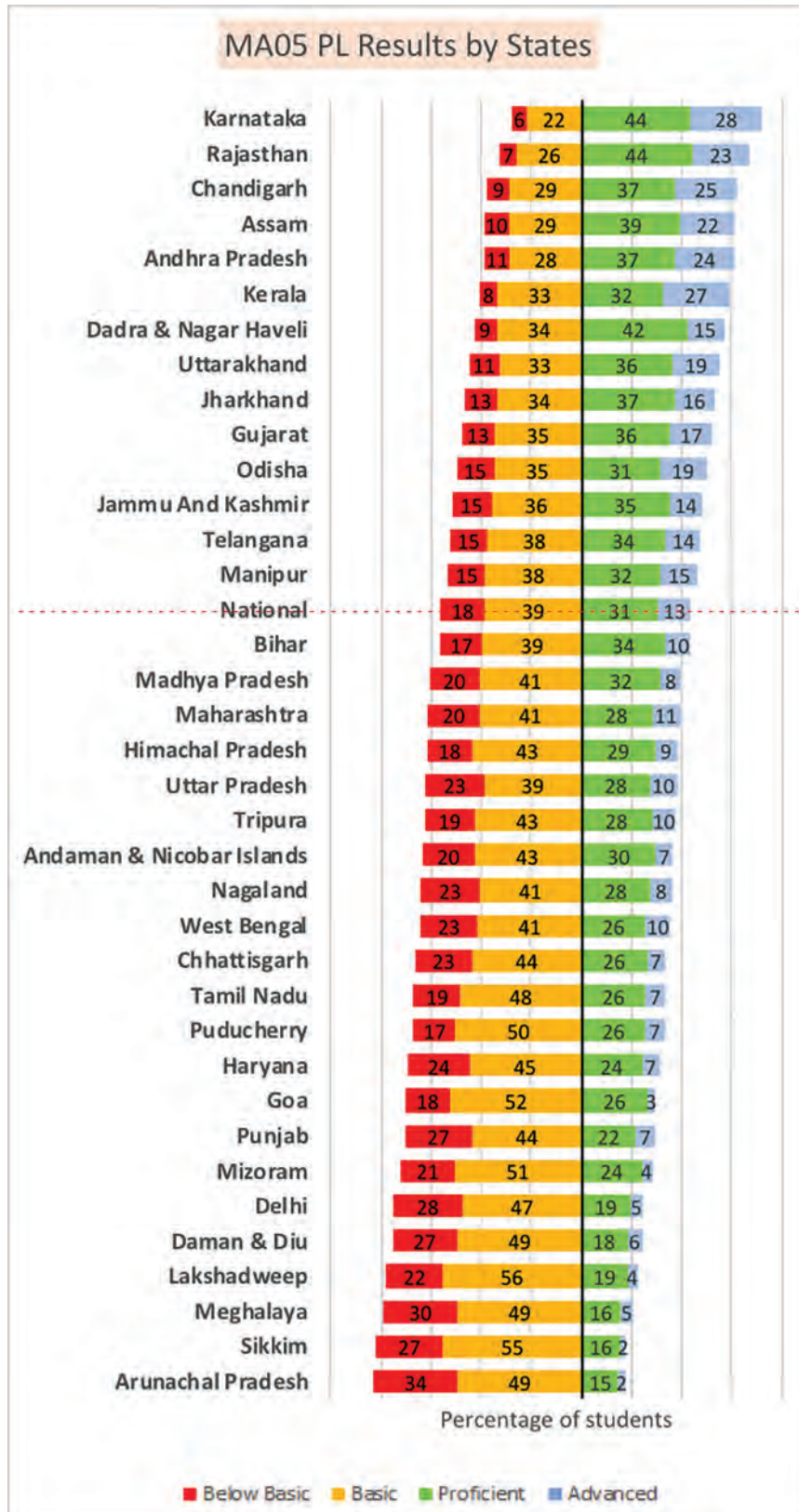
In Class V, overall achievement of students within the performance level Basic is higher (39%) than the achievement of students on other performance levels i.e. Below Basic (15%), Proficient (35%) and Advanced (12%), for the subject Language (as shown in Figure 6.26).

Figure 6.26: Language Class V (LA05) State Results by Performance Levels



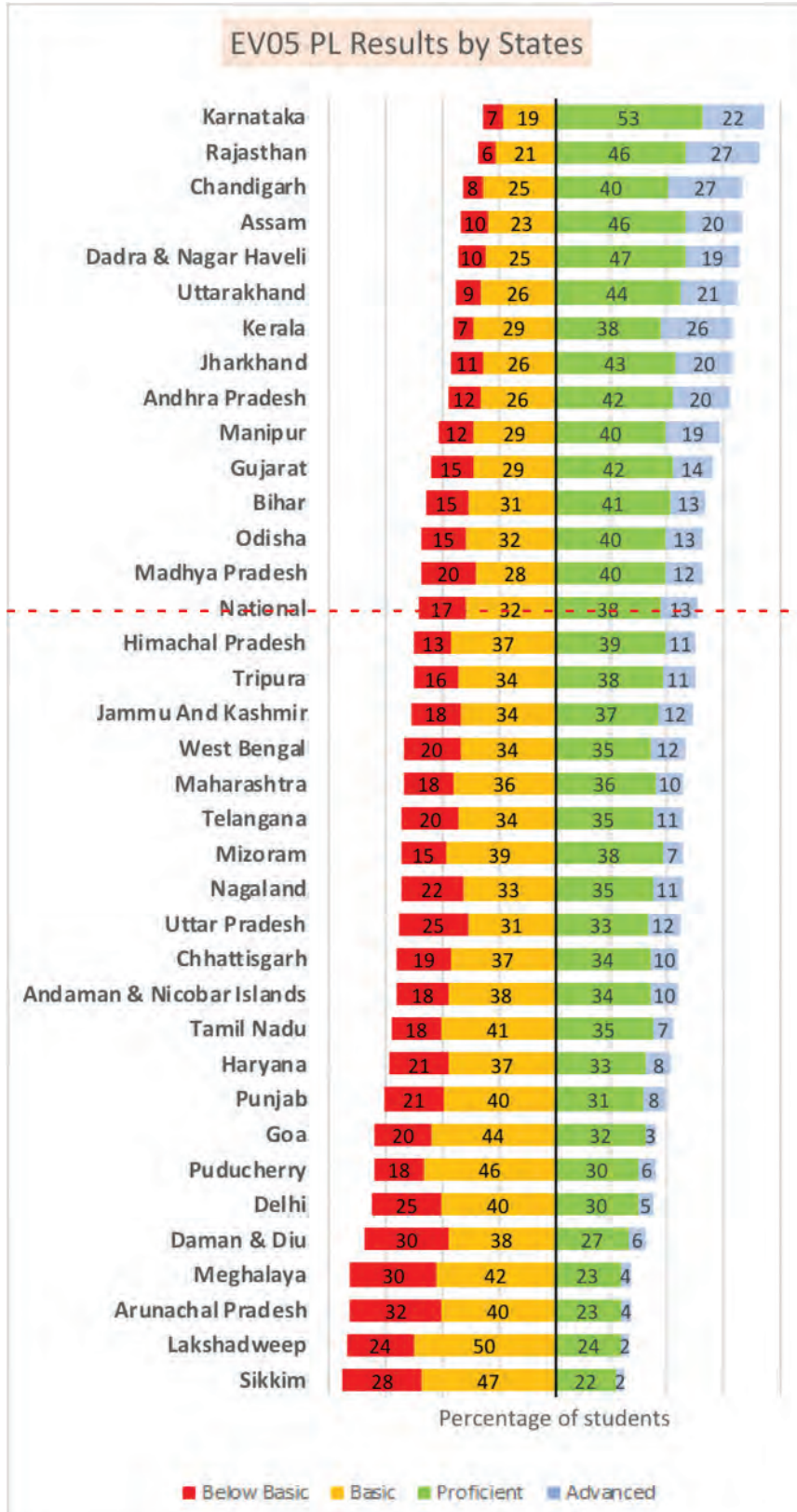
In Class V, overall achievement of students within the performance level Basic is higher (39%) than the achievement of students on other performance levels i.e. Below Basic (18%), Proficient (31%) and Advanced (13%), for the subject Mathematics (as shown in Figure 6.27).

Figure 6.27: Mathematics Class V (MA05) State Results by Performance Levels



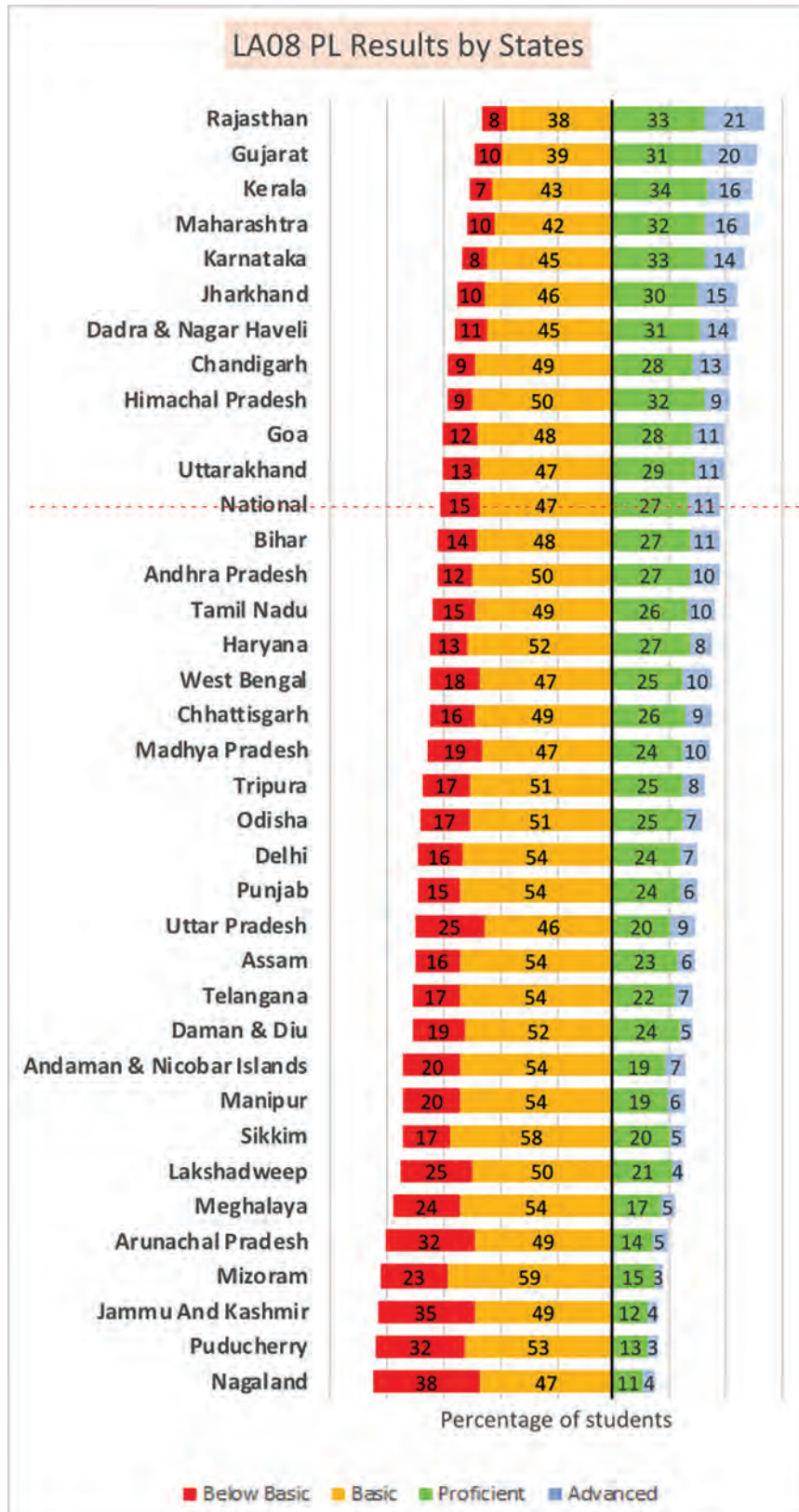
In Class V, overall achievement of students within the performance level Proficient is higher (38%) than the achievement of students on other performance levels i.e. Below Basic (17%), Basic (32%) and Advanced (13%), for the subject Environmental Studies (as shown in Figure 6.28).

Figure 6.28: Environmental Studies Class V (EV05) State Results by Performance Levels



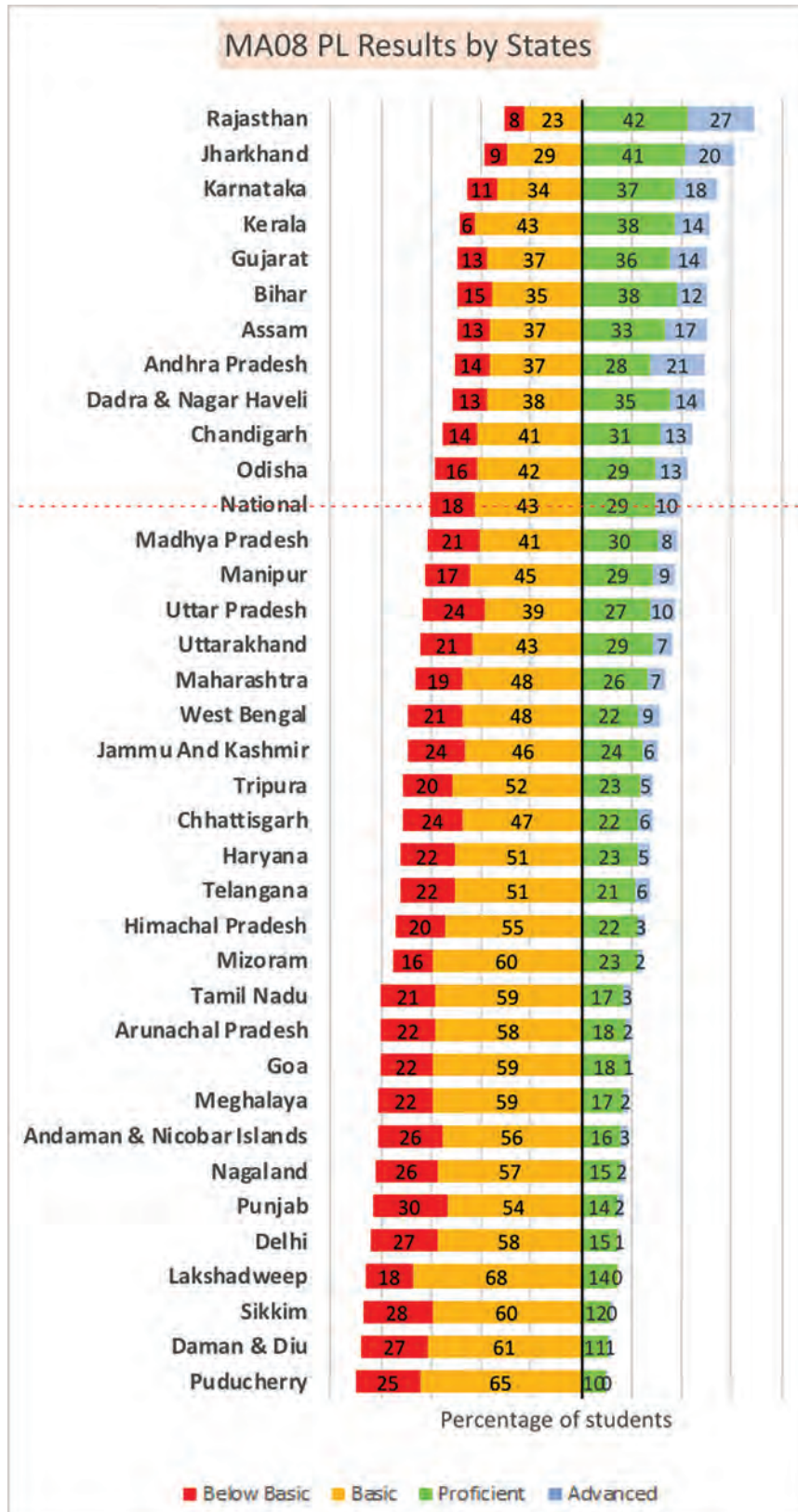
In Class VIII, overall achievement of students within the performance level Basic is higher (47%) than the achievement of students on other performance levels i.e. Below Basic (15%), Proficient (27%) and Advanced (11%), for the subject Language (as shown in Figure 6.29).

Figure 6.29: Language Class VIII (LA08) State Results by Performance Levels



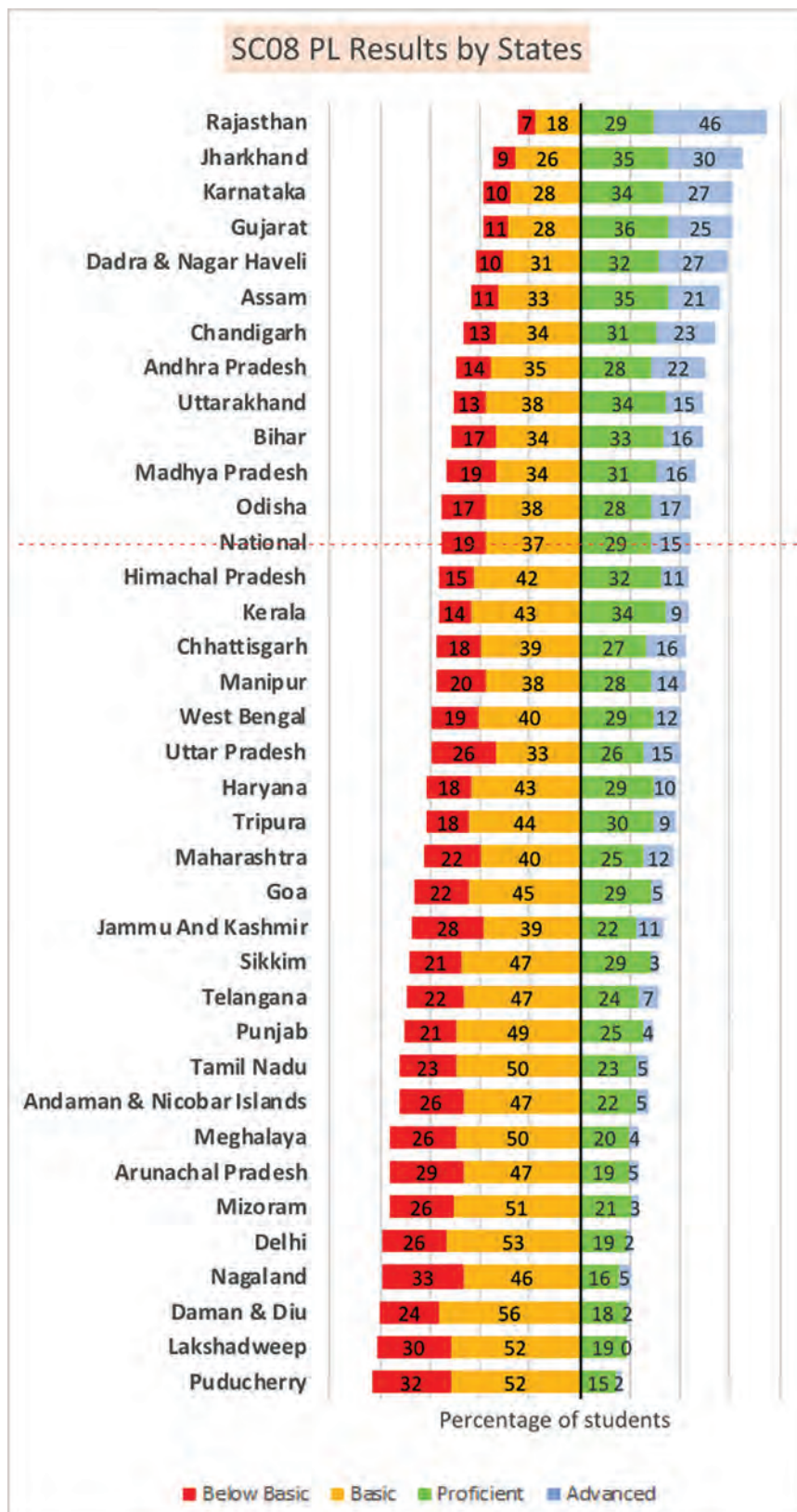
In Class VIII, overall achievement of students within the performance level Basic is higher (43%) than the achievement of students on other performance levels i.e. Below Basic (18%), Proficient (29%) and Advanced (10%), for the subject Mathematics (as shown in Figure 6.30).

Figure 6.30: Mathematics Class VIII (MA08) State Results by Performance Levels



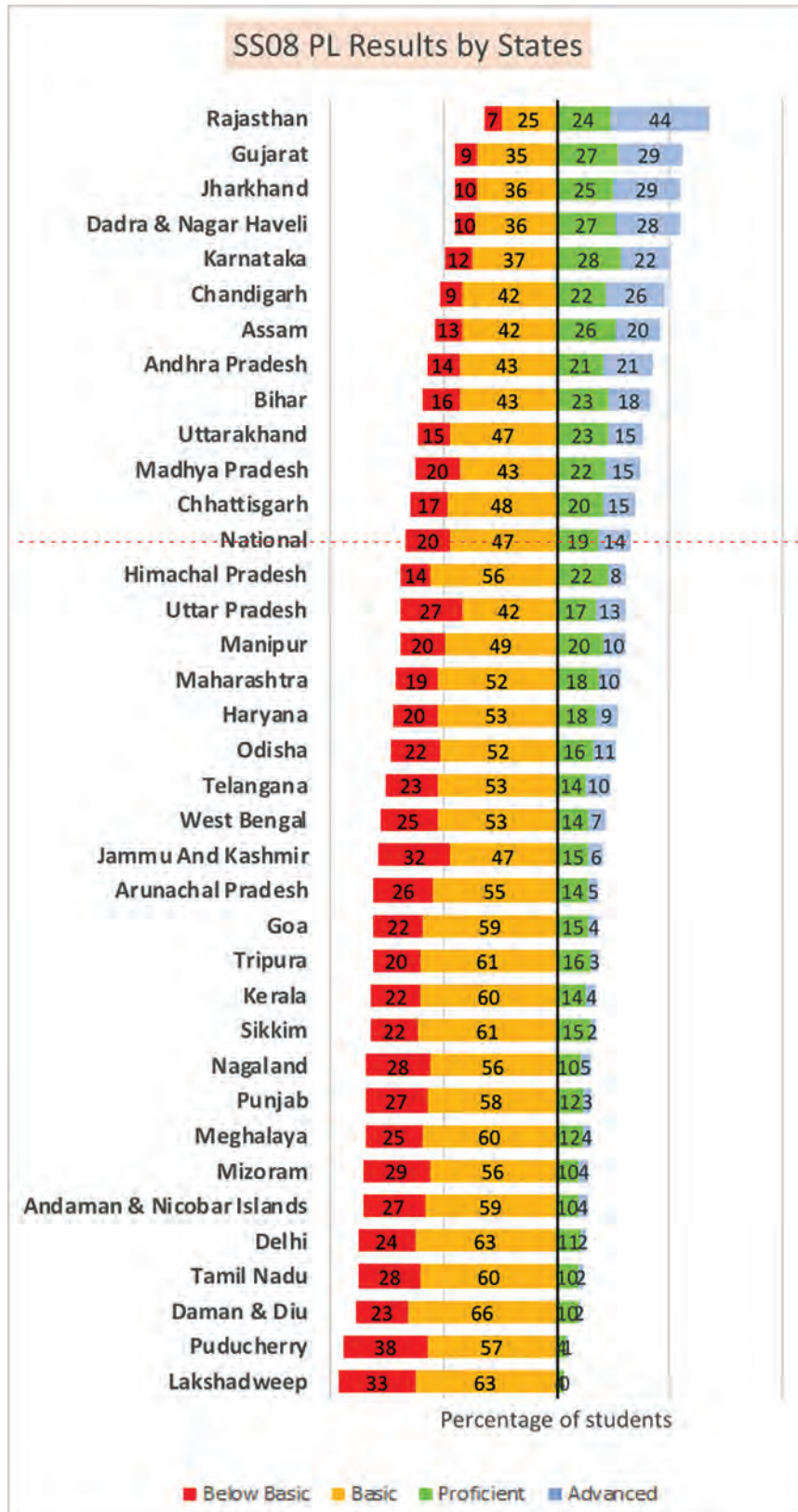
In Class VIII, overall achievement of students within the performance level Basic is higher (37%) than the achievement of students on other performance levels i.e. Below Basic (19%), Proficient (29%) and Advanced (15%), for the subject Science (as shown in Figure 6.31).

Figure 6.31: Science Class VIII (SC08) State Results by Performance Levels



In Class VIII, overall achievement of students within the performance level Basic is higher (47%) than the achievement of students on other performance levels i.e. Below Basic (20%), Proficient (19%) and Advanced (14%), for the subject Social Science (as shown in Figure 6.32).

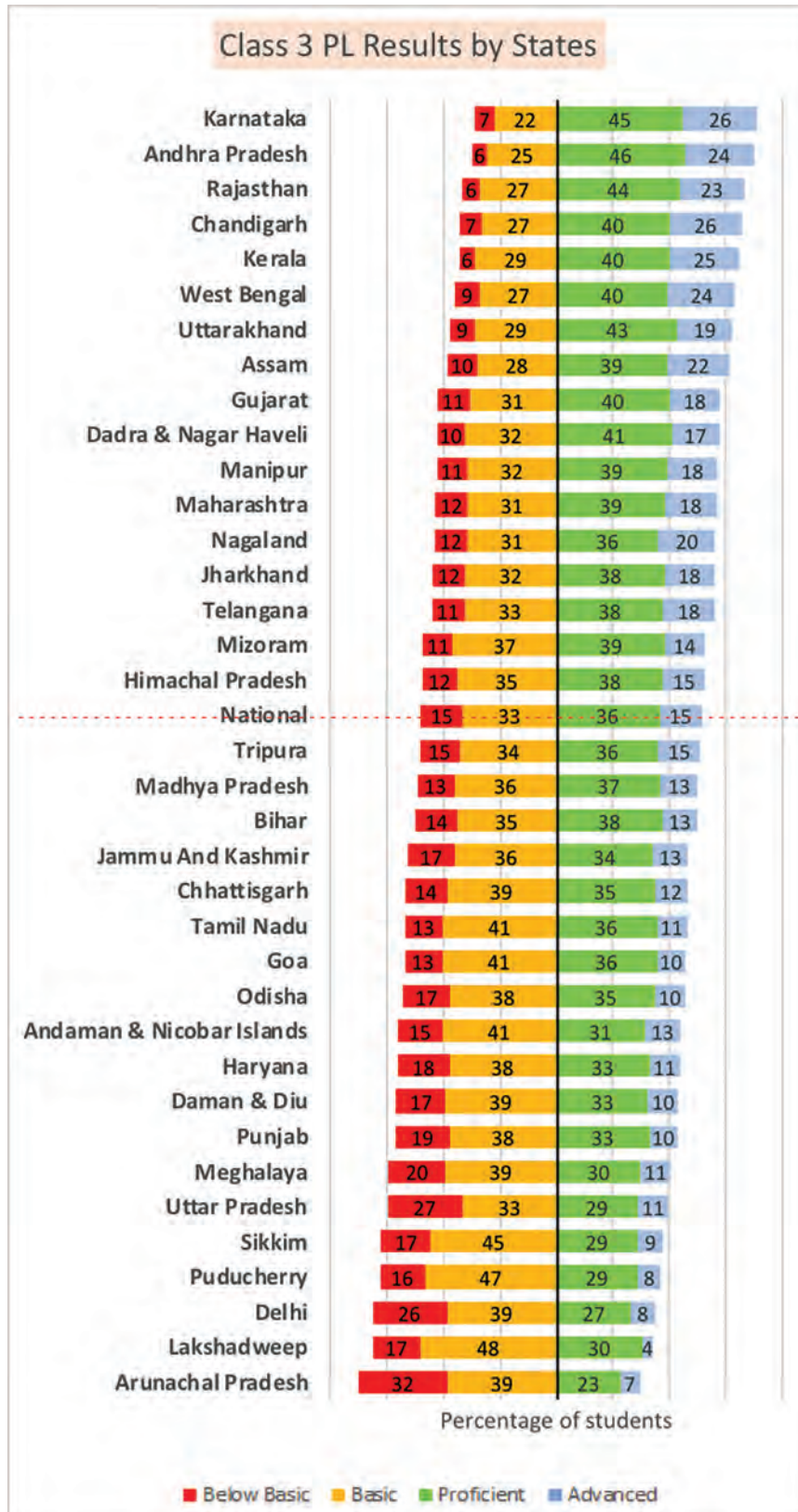
Figure 6.32: Social Science Class VIII (SS08) State Results by Performance Levels



6.8 State Results Combined by Class and Subject

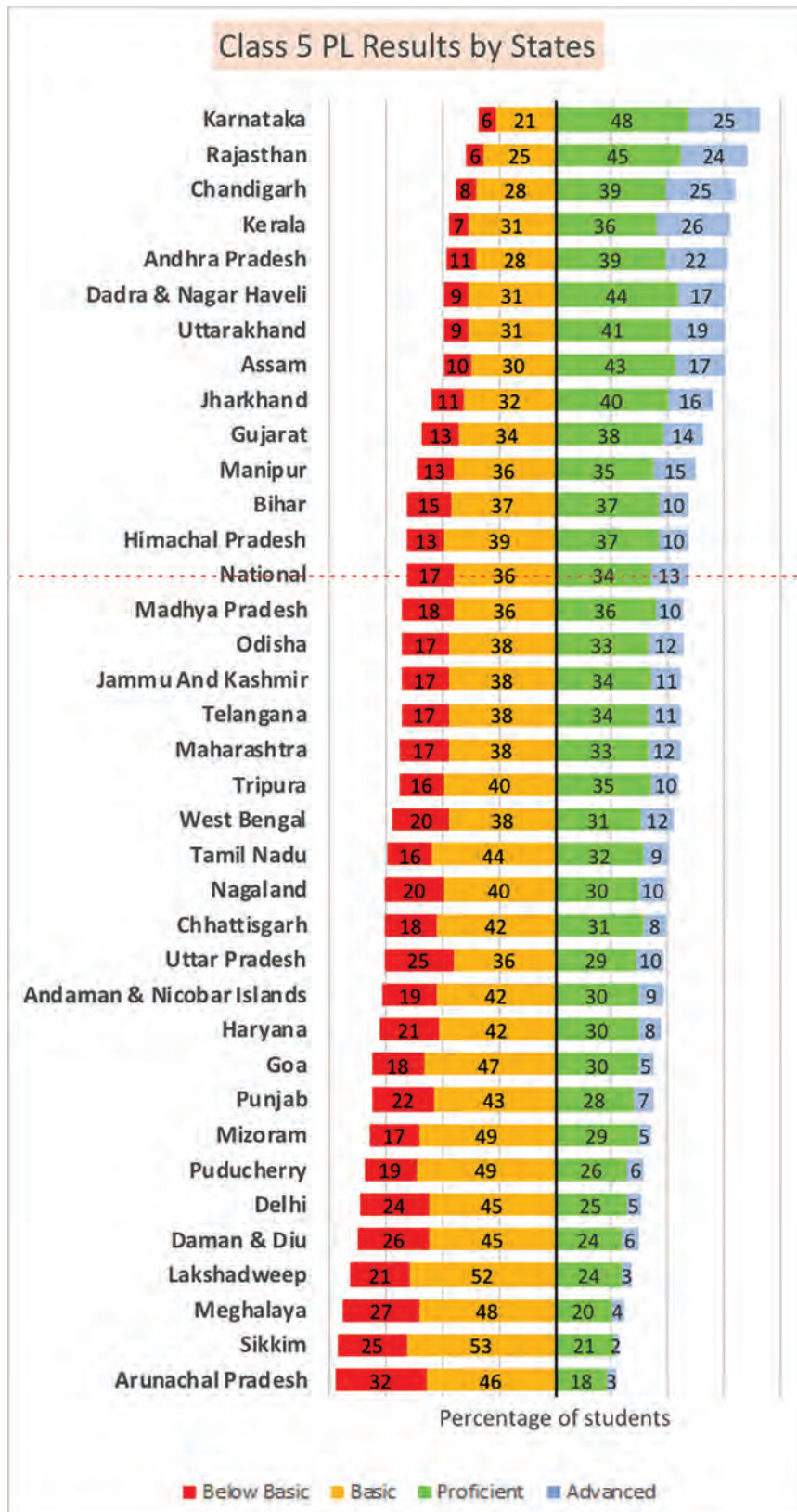
In Class III, overall performance of students in all the three subjects i.e. Language, Mathematics, Environmental Studies classified within the performance level proficient is comparable (36%) to that of performance level Basic (33%) which is greater than Below Basic (15%) and Advanced (15%) performance levels respectively (as shown in Figure 6.33).

Figure 6.33: Combined Results by Performance Levels for Class III



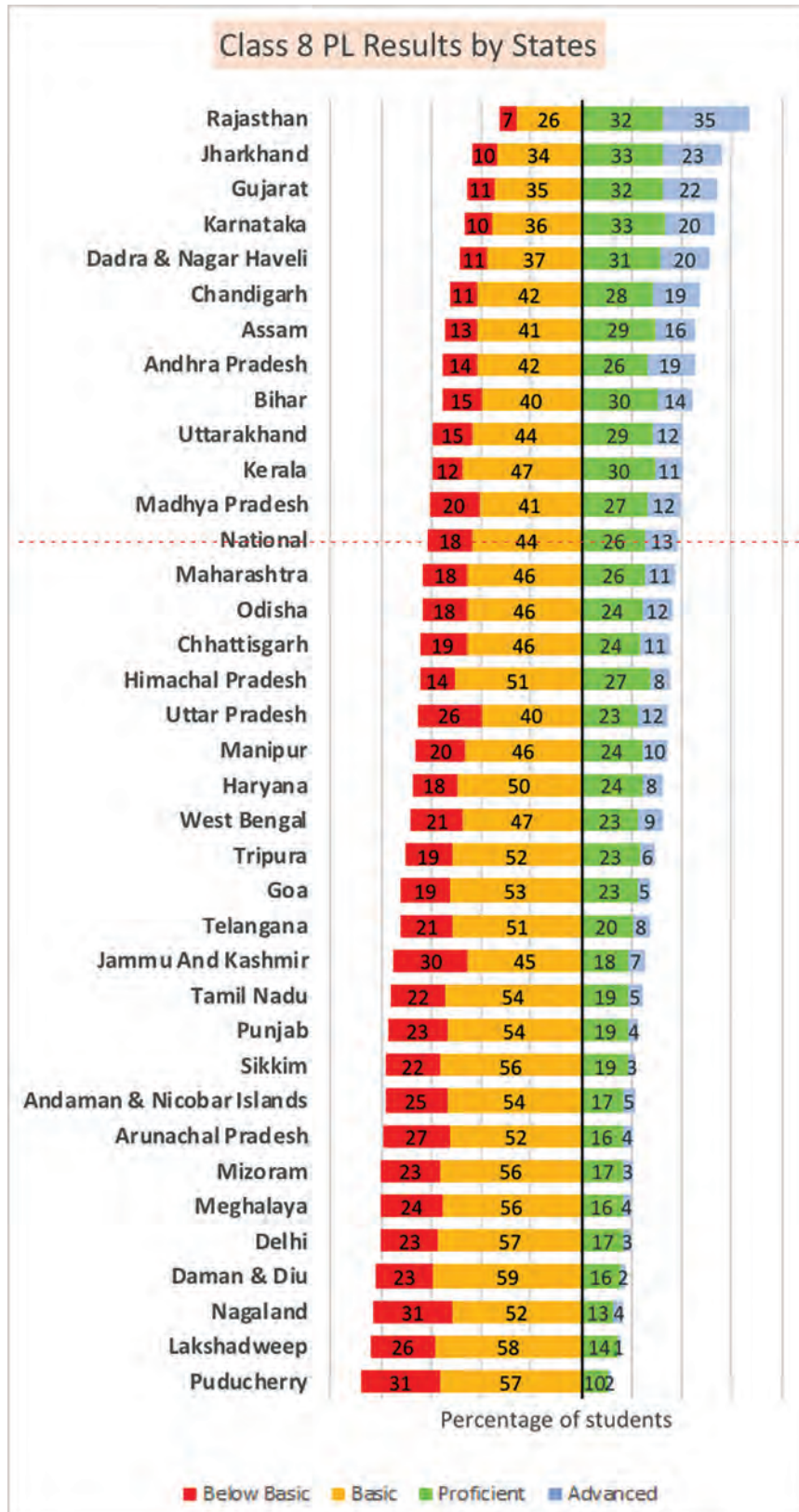
In Class V, overall performance of students in all the three subjects i.e. Language, Mathematics, Environmental Studies classified within the performance level Basic is comparable (36%) to that of performance level proficient (34%) which is greater than Below Basic (17%) and Advanced (13%) performance levels respectively (as shown in Figure 6.34).

Figure 6.34: Combined Results by Performance Levels for Class V



In Class VIII, overall performance of students in all the four subjects i.e. Language, Mathematics, Science and Social Science classified within the performance level Basic (44%) is greater than performance level proficient (26%), Below Basic (18%) and Advanced (13%) respectively (as shown in Figure 6.35).

Figure 6.35: Combined Results by Performance Levels for Class VIII



6.9 Key Findings of Students' Performance

This section presents major findings of student performance in NAS 2017. The results of student performance can be expressed in two major ways: by means of Scale Scores (SS), which are based on Item Response Theory (IRT) scaling and by means of Performance Levels (PL), which are determined by the process of setting performance standards.

The reporting IRT scale is designed in a way that sets the range of student scores between 100 and 500; it is centered to the overall mean of 300, with dispersion set to standard deviation of 50. Student scores are computed using the specific IRT method that is based on the pattern of student responses giving higher credits to correct answers on more difficult and more discriminative items.

The performance standards scale is designed to report student performance in four major performance levels: Advanced, Proficient, Basic and Below Basic. These PLs are based on conceptual and operational definitions developed by the team of national experts during the standard setting workshop. Conceptual definitions are referring to competencies, knowledge, and skills that students are expected to demonstrate at each PL, and operational definitions are given by cut scores on each test scale that are used for classification of student achievement into the 4 performance levels. Although the specific definitions are developed for each class and subject, the general meaning of PLs is the same across all subjects and classes, which makes the PL scale suitable for aggregating student results to express combined performance within a class or across all subjects and classes.

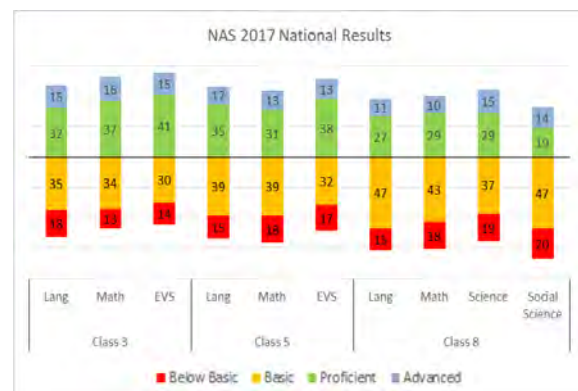
6.10 Student Performance Results – National

Student results on NAS 2017 are evaluated on the total of 10 tests (in Class III: Language, Mathematics and EVS; in Class V: Language, Mathematics and EVS; and in Class VIII: Language, Mathematics, Science and Social Science). National averages for reporting IRT scale vary between 336 for Language Class III, and 269 for Mathematics Class VIII. It can be observed that subjects in higher classes pose a greater challenge to students,

the national average scores in Class III being between 321 and 336, in Class V they are 310 to 319, whereas in Class VIII the national averages are between 269 and 307. It can be also observed that Language poses a lesser challenge than other subjects in all classes.

Student results on NAS 2017 in terms of performance standards are expressed by the percentage of students attaining each performance level. Since the targeted levels are Proficient and above, student performance is commonly expressed by a simple index – the percentage of students attaining the two top levels (Proficient and Advanced). The NAS 2017 national results expressed in terms of performance standards give similar, but slightly different insights (Figure 6.36) compared to scale scores.

Figure 6.36: Percentage of students in each performance level (National results)



The same as in SS metrics, based on PL metrics it can be also observed that higher classes pose a stronger challenge – in Class VIII overall 39% of students reached Proficient or above levels, whereas these percentages in Classes V and III are 47% and 52%, respectively. On the other hand, PL metrics does not indicate that Language poses lesser challenge than other subjects, on contrary, evaluated against performance standards set by national experts, it appears that it is rather difficult to attain targeted performance levels in Language in all classes (percentages of students reaching Proficient and above in Language in Classes III, V, and VIII are 47%, 46%, and 38%, respectively).

When looking at the overall national performance across all subjects and classes, the aggregated percentages of students demonstrating achievement at different levels are the following: Advanced 13.5%,

Proficient 31.7%, Basic 38.2% and Below Basic 16.6%. Thus, there is a total of 45.2% of students achieving the targeted performance levels (Proficient and Advanced), which leaves overall 54.8% of students that need improvements (Basic and Below Basic) as they are achieving below the desired levels. For the policy makers' orientation, it is important to note that the percentage of students that need improvement considerably vary between subjects and grades, thus, designing actions should be based on subject/class specific results.

National performance was also analyzed by student groups (gender, school management, location and social group) and the following results can be highlighted:

- Gender: Although girls perform slightly higher than boys in most of tests, the differences are very small and practically negligible. This finding demonstrates that there is gender equity in India.
- Location: Differences between urban and rural students are virtually non-existing in Class III, however, they become statistically significant in Class V and even stronger in Class VIII, indicating that urban students are higher performing in Language, whereas in Math, EVS, Science and Social Science performance in rural areas is significantly higher than in urban areas.
- School management: In Class III the Government aided schools perform higher than the government schools in all subjects, however, in Classes V and VIII the Government schools are outperforming the Government aided schools in all subjects but Language where the Government aided schools still perform higher.
- Social groups: General and OBC groups are performing slightly higher than other two social groups (SC and ST) in most of tests, but the differences are small with relatively low practical relevance.

6.11 Student Performance Results – by States

The highest performing states are Rajasthan, Karnataka, Chandigarh, Andhra Pradesh, Dadra & Nagar Haveli, Jharkhand, Kerala, Assam, Gujarat and Uttarakhand. These states have between 67% and 54% of students that are reaching desired performance levels of Proficient and above.

The states that perform substantially below the national average are Arunachal Pradesh, Lakshadweep, Puducherry, Sikkim, Meghalaya, Delhi and Daman & Diu. These States have about three quarters (70% to 76%) of students that are not reaching targeted levels of proficiency, so a higher attention should be placed for improving student performance. Although the combined results provide orientation to the overall performance, policy maker actions should be guided by results by each subject or even disaggregated by competencies or learning outcomes.

State highlights by student groups:

- Gender equity is present in all states, the differences between boys and girls are either statistically or practically insignificant.
- School location: Performance in Maths, EVS, Science and Social Science is superior in rural schools in most of states, whereas performance in Language is usually higher in urban areas in most of states.
- School management: Government aided schools perform better in most of states in Class III, however in Class V and Class VIII in most states Government schools perform better in all subjects except Language in most of states. Performance in Language is superior in Government aided schools in most of states.
- Social group: In nearly one quarter of all states the differences between social groups are not significant, whereas in most of states General and OBC groups perform significantly higher, but the differences are relatively small.



7. Association of Background Variables

The relationship between learning achievement of students and variables related to student's home background and school were analyzed by using different statistical technique. This chapter discusses the association of the different contextual variables with the achievement of the students.

7.1 Association Results for Class III: Student Profile

The given section details the association results regarding various student related variables.

Below Poverty Line (BPL)

Table 7.1: Association Results– Below Poverty Line

	Difference between scale scores			Sig
	III	V	VIII	
Below Poverty Line	-3.6	-2.8	-3.0	0.00

In Class III, V and VIII, students belonging to Below Poverty Line had statistically significant lower achievement compared to other students.

Education of Mother

Table 7.2: Association Results– Education of Mother

	Difference between scale scores			Sig
	III	V	VIII	
Educated vs. illiterate	12.7	11.5	1.7	0.00

In Class III, V and VIII there is statistically significant positive association between student achievement and their mother's education level. When compared to students having illiterate mother, those who had educated mothers demonstrate substantially higher achievement.

Like coming to School

Table 7.3: Association Results– Likes coming to school

	Difference between scale scores			Sig
	III	V	VIII	
Like coming to school	10.2	10.3	12.2	0.00

In Class III, V and VIII there is statistically significant positive association between the students' liking to come to school and their achievement on NAS. This association can be also considered as practically significant.

Games period Activity

Table 7.4: Association Results– Games period activity

	Difference between scale scores			Sig
	III	V	VIII	
Go out & play vs. sit in class	6.0	7.6	8.4	0.00

In Class III, V and VIII students who go out and play during games period had significantly higher achievement than students who remain sitting in the class.

Difficulty to travel to school

Table 7.5: Association Results–Find Difficult to travel to school

	Difference between scale scores			Sig
	III	V	VIII	
Difficult to travel to school	-4.6	-4.0	-6.9	0.00

Class III, V and VIII students' expression of difficulty to travel to school is significantly negatively associated with their achievement on NAS.

Student Absence over 10 days

Table 7.6: Association Results– Student Absence over 10 days

	Difference between scale scores			Sig
	III	V	VIII	
More than twice vs. never	-11.8	-13.8	-13.5	0.00

Class III, V and VIII students who reported absence over 10 days i.e. more than twice had significantly lower achievement than students who were never absent. The size of the difference can be considered as practically significant.

Language spoken at Home

Table 7.7: Association Results–Language spoken at home

	Difference between scale scores			Sig
	III	V	VIII	
Same as used by teacher	5.1	5.3	3.8	0.00

Class III, V and VIII students whose language spoken at home is the same as used by the teacher had significantly higher achievement than students whose language spoken at home is different than used by their teachers.

Able to understand what the teacher says

Table 7.8: Association Results–Able to understand teacher

	Difference between scale scores			Sig
	III	V	VIII	
Able to understand teacher	15.4	14.7	2.6	0.00

Class III, V and VIII students who reported they were able to understand what the teacher says are likely to perform better than those who are not able to understand what the teacher says. The results show that the students who reported they were able to understand what the teacher says in class had significantly higher achievement than students who reported they could not understand what the teacher says. The size of this association can be considered having a substantial practical relevance.

Number of siblings

Table 7.9: Association Results–Number of siblings

	Difference between scale scores			Sig
	III	V	VIII	
Number of siblings: Two/three	-6.5	-7.0	0.2	0.00

In Class III and V the number of siblings a student has is likely to affect the amount of attention which his or her parents can accord. It is also likely to affect the amount of resources available to each child. The results show that students having two to three siblings had negative association with their achievement on NAS (compared to those who have none). In class VIII the number of siblings a student has is likely to affect the amount of attention which his or her parents can accord. It is also likely to affect the amount of resources available to each child. Here the results show that students having two to three siblings had a significant association with their achievement on NAS.

Attended pre-primary classes/Anganwadi

Table 7.10: Association Results–Attended pre-primary classes/Anganwadi

	Difference between scale scores			Sig
	III	V	VIII	
Attended pre-primary classes/ Anganwadi	4.2	2.4	-1.3	0.00

Class III and V students who attended pre-primary classes/Anganwadi had significantly higher achievement than students who did not attend pre-primary classes/Anganwadi. Class VIII students who attended pre-primary classes/Anganwadi had significantly lower achievement than students who did not attend pre-primary classes/Anganwadi.

Discusses and shares the Lessons at Home

Table 7.11: Association Results–Discusses the Lessons at Home

	Difference between scale scores			Sig
	III	V	VIII	
Discusses the lessons at home	10.2	8.7	8.6	0.00

Class III, V and VIII students who discuss and share the lessons at home had significantly higher achievement than students who do not discuss or share at home, the lessons taught by the teacher. This association can also be considered as practically significant.

Reads other materials in addition to Textbooks

Table 7.12: Association Results–Reads other materials in addition to Textbooks

	Difference between scale scores			Sig
	III	V	VIII	
Reads other materials in addition to textbooks	10.9	11.7	11.4	0.00

Class III, V and VIII students who go through other materials also in addition to textbooks had significantly higher achievement than students who do not read other materials in addition to textbooks. The size of the difference can be considered as practically significant.

Gets help in study at Home

Table 7.13: Association Results–Gets help in study at home

	Difference between scale scores			Sig
	III	V	VIII	
Gets help in study at home	7.4	5.9	3.7	0.00

Class III, V and VIII students who get help in study at home had significantly higher achievement than students who do not get help in study at home.

Participates in Classroom Activities

Table 7.14: Association Results–Participates in Classroom Activities

	Difference between scale scores			Sig
	III	V	VIII	
Participates in classroom activities	14.3	16.3	14.7	0.00

Class III, V and VIII student's participation in classroom activities is significantly positively associated with their achievement on NAS. The size of this association can be considered having a substantial practical relevance.

Asks questions in the Class

Table 7.15: Association Results–Asks questions in the Class

	Difference between scale scores			Sig
	III	V	VIII	
Asks questions in the class	12.1	12.0	12.0	0.00

Class III, V and VIII students who are active in classroom and ask questions to the teacher had significantly higher achievement than students who do not ask questions in the class.

Most liked activity

Table 7.16: Association Results–Most liked activity

	Difference between scale scores			Sig
	III	V	VIII	
Playing sports games vs. none	10.4	14.8	9.1	0.00

Class III, V and VIII students, whose most liked activity is playing sports/games, had higher achievement than students who do not like any physical activities. The association can be also considered as practically significant.

7.2 Association Results for Class III: School Profile

The given section details the information gathered about schools regarding various school related variables.

Teachers aware about the Learning Outcomes Document

Table 7.17: Association Results– Teachers aware about the LO Document

	Difference between scale scores			Sig
	III	V	VIII	
Fully aware vs. Not aware	16.5	12.5	13.0	0.00

In Class III, V and VIII, teacher's awareness about the Learning Outcomes document had significantly higher association with achievement of students.

Use of Library

Table 7.18: Association Results– Use of Library

	Difference between scale scores			Sig
	III	V	VIII	
Use of Library (Most students vs. very few)	10.4	12.2	12.1	0.00

In Class III, V and VIII schools wherein most of the students use the library had significantly higher achievement than those schools wherein very few students use the library.

School Activities

Table 7.19: Association Results– School Activities

	Difference between scale scores			Sig
	III	V	VIII	
Science Exhibition	2.1	3.2	2.8	0.00
Art Club/ Art Activity	3.6	4.7	5.5	0.00
Sports Activity	7.5	9.8	9.9	0.00
Cultural Activity	8.3	11.2	11.6	0.00
School Fair	5.3	5.8	2.6	0.00

In Class III, V and VIII, school's participation in various activities like science exhibition, art activity, sports activity, cultural activity and school fair had significantly positive association with the achievement of students.

School's activities affected by Instructional Materials, Teaching Staff, Supporting Staff etc.

Table 7.20: Association Results– Activities of School affected by Instructional Materials, Teaching Staff, Supporting Staff etc.

	Difference between scale scores			Sig
	III	V	VIII	
Lack of Instructional Materials	4.2	4.6	1.5	0.00
Lack of Teaching Staff	5.9	5.2	2.5	0.00
Lack of Supporting Staff	5.5	4.0	2.1	0.00
Lack of Audio Visual Resources	1.1	0.2	0.8	0.03
Lack of Library Resources	5.8	5.4	5.0	0.00
Lack of Student Discipline	6.8	6.6	2.7	0.00

In Class III, V and VIII, schools wherein the activities were not at all affected by the shortage of instructional materials, teaching staff, supporting staff, audio-visual resources, library resources and student discipline had significant positive association with the achievement of students.

School Perception

Table 7.21: Association Results– School Perception

	Difference between scale scores			Sig
	III	V	VIII	
Teacher Satisfaction	17.9	15.2	13.0	0.00
Opportunities for professional development	12.1	11.5	10.4	0.00
Teachers' expectation of students' achievement	16.0	17.4	16.5	0.00
Teachers working together to improve achievement	15.0	16.8	13.4	0.00
Parental involvement in school activities	10.9	12.8	13.5	0.00
Parental support for student's achievement	10.8	10.8	11.1	0.00
Student's desire to achieve	9.5	9.3	10.8	
Student's absenteeism	-3.3	1.7	1.3	

In Class III a range of school-related variables as assessed by the Principals were considered. Teacher satisfaction, opportunities for professional development, teacher's expectation of students' achievement, their working together to improve achievement, parental support, parental involvement in school activities and students' desire to do well were found to have positive influence on achievement scores, however, students' absenteeism had a negative impact on students' achievement. In class V and VIII a range of school-related variables as assessed by the Principals were considered. Teacher satisfaction, opportunities for professional development, Teacher's expectation of students' achievement, their working together to improve achievement, parental support, parental involvement in school activities and students' desire to do well and students' absenteeism were found to have significant positive influence on achievement scores.

Frequency of Monitoring

Table 7.22: Association Results– Frequency of Monitoring

	Difference between scale scores			Sig
	III	V	VIII	
Frequency of monitoring	5.9	9.6	9.0	0.00

In Class III, V and VIII monitoring of school monthly by the Department of Education in the academic year 2016-17 had significant positive association with students' achievement.

7.3 Association Results for Class III: Teacher Profile

Teachers are a vital component of the educational process and it is very important to know the characteristics of teachers, the strategies they use in the classroom and their general attitudes towards teaching in schools, etc.

The given section details the association results regarding various teacher related variables.

Professional Qualification

Table 7.23: Association Results– Professional Qualification

	Difference between scale scores			Sig
	III	V	VIII	
Professional Qualification- B.Ed.	6.4	9.4	4.8	0.00

In Class III, V and VIII, teacher's professional qualification, i.e.; Secondary Teacher Training (B.Ed.) had significant positive association with students' attainment.

Teaching same subject as Highest Degree

Table 7.24: Association Results– Teaching same subject as Highest Degree

	Difference between scale scores			Sig
	III	V	VIII	
Teaching same subject as highest degree	0.7	1.0	3.0	0.00

In Class III, V and VIII, teachers teaching the same subject that they pursued during their highest degree course had significantly positive impact over students' attainment.

Employment Status

Table 7.25: Association Results– Employment Status

	Difference between scale scores			Sig
	III	V	VIII	
Employment Status- Permanent vs. Part time/Contractual	9.1	9.6	7.4	0.00

In Class III, V and VIII, teachers having permanent employment status as compared to part time/contractual were positively associated to students' attainment.

Learning Outcome document available at school

Table 7.26: Association Results– LO document available at school

	Difference between scale scores			Sig
	III	V	VIII	
LO document available at school	11.8	13.2	8.0	0.00

In Class III, V and VIII, schools wherein learning outcome document was available at school had significant positive association with students' achievement.

Interacted with School Management Committee (SMC) in last six months

Table 7.27: Association Results– Interaction with SMC

	Difference between scale scores			Sig
	III	V	VIII	
Interaction with SMC	6.3	12.3	11.2	0.00

In Class III, V and VIII, teacher's interaction with the SMC members in the last six months had significant positive association with students' achievement.

Attitudes and Views

Table 7.28: Association Results– Attitudes and Views

	Difference between scale scores			Sig
	III	V	VIII	
Teachers' job satisfaction	16.4	14.6	8.6	0.00
Understanding school curricular goals	17.8	15.8	9.6	0.00
Teacher expectation on student achievement	16.2	14.3	9.0	0.00
Parental involvement in school activities	6.0	6.8	7.2	0.00

In Class III, V and VIII, teachers' job satisfaction, understanding of curricular goals, parental involvement in school activities and teachers' expectation for student achievement had a statistically significant relationship with students' attainment in the school.

Challenges in the Classroom Transactions

Table 7.29: Association Results– Challenges in the Classroom Transactions

	Difference between scale scores			Sig
	III	V	VIII	
Large class size	-4.2	-5.9	-3.4	0.00
Classroom indiscipline	-8.4	-9.9	-7.6	0.00
Absenteeism of students	-6.5	-5.9	-5.0	0.00

In Class III, V and VIII, teachers perceive that large class size, classroom indiscipline and absenteeism of students had negative association with students' achievement.

Problems with Facilities

Table 7.30: Association Results– Problems with Facilities

	Difference between scale scores			Sig
	III	V	VIII	
Lack of instructional materials (Not a problem vs. serious problem)	9.6	9.6	8.0	0.00
Work overload (Not a problem vs. serious problem)	5.1	2.7	-0.2	0.00
Lack of adequate workspace (Not a problem vs. serious problem)	3.5	3.2	2.1	0.00
Lack of drinking water (Not a problem vs. serious problem)	4.7	6.1	3.5	0.00

In Class III and V, teachers were asked about the severity of some possible problems with the school facilities. Teachers considered lack of instructional materials; work overload, lack of adequate workspace and lack of drinking water were not a problem and it showed significant positive association with students' achievement. Class VIII teachers were asked about the severity of some possible problems with the school facilities. Teachers considered lack of instructional materials, lack of adequate workspace and

lack of drinking water as not a problem and it showed significant positive association with students' achievement. Whereas, teachers work overload had a significant negative association with students' achievement.

Tools and Techniques used in Assessing Students

Table 7.31: Association Results– Tools and Techniques

	Difference between scale scores			Sig
	III	V	VIII	
Observation (Almost every lesson vs. never)	10.4	12.1	9.0	0.00
Student self-assessment (Almost every lesson vs. never)	11.2	13.6	9.2	0.00

In Class III, V and VIII, teachers consider that observation and student self-assessment on almost every lesson had significant positive association with achievement of students.

Availability of resources to implement the strategies

Table 7.32: Association Results– Availability of resources to implement the strategies

	Difference between scale scores			Sig
	III	V	VIII	
Peer and group learning (Almost always vs. Not at all)	13.0	13.8	10.4	0.00
Problem solving (Almost always vs. Not at all)	9.9	12.6	8.2	0.00

In Class III, V and VIII when the resources for peer and group learning and problem solving to be implemented were almost always available, it showed a statistically significant positive association with the achievement of students.

Teaching Resources

Table 7.33: Association Results– Teaching Resources

	Difference between scale scores			Sig
	III	V	VIII	
Teacher's Handbook (Regularly vs. Never)	11.5	14.3	12.2	0.00
Educational Kits (Regularly vs. Never)	13.5	17.8	12.0	0.00
Self-prepared TLM (Regularly vs. Never)	10.4	15.4	9.0	0.00
Books other than textbooks (Regularly vs. Never)	10.1	6.8	10.3	0.00

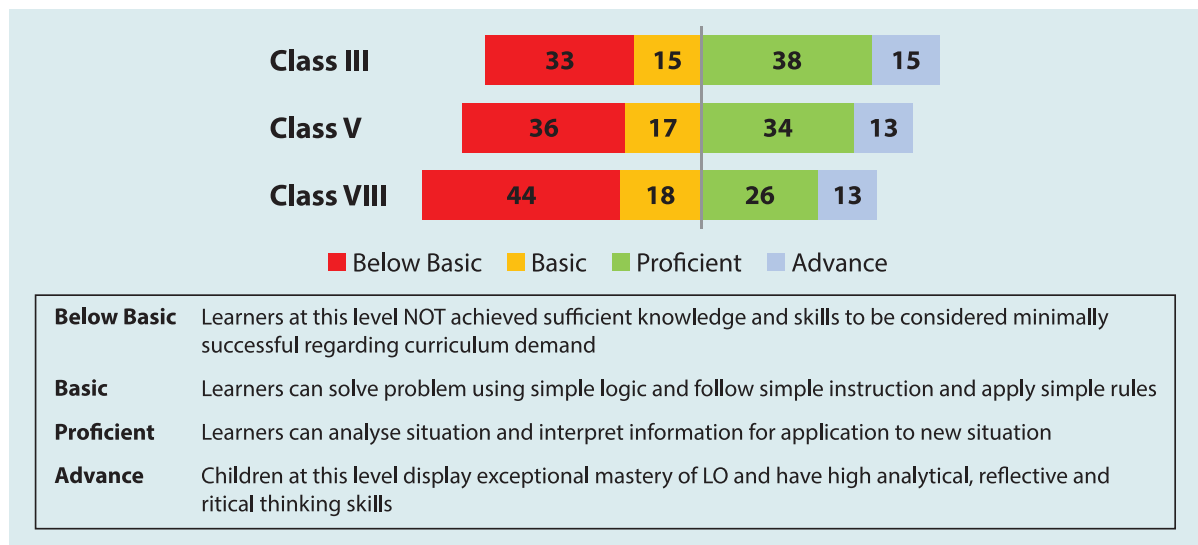
In Class III, V and VIII having proper teaching resources is an important adjunct of successful teaching. Teacher's having a teacher's handbook, educational kits, self-prepared TLM and books other than textbooks had a statistically significant positive relation with the achievement of students.

7.4 Policy implications of the National Achievement Survey

Quality of learning:

While in Class III, nearly 53% children achieved grade appropriate proficiency level, this proportion of children reduced to 47% in Class V and further reduced to 39% children in Class VIII. These cohort of children can solve problem using simple logic, apply simple rules, follow simple instruction and use simple language to express themselves.

Figure 7.6: Proficient level of learning achievement



Large geographical and social disparities:

The achievement of boys and girls is at par. Gap in learning achievement exists between southern and northern states of India. For example Southern states such as Kerala, Karnataka and Andhra Pradesh are performing better than northern states like Jammu & Kashmir, Delhi and Punjab. Gaps in learning achievement exist between different districts in the same state. For example in the state of Himachal Pradesh the district Sirmour is performing lowest and brings lower the performance of the state.

Effective teacher professional development:

NAS results shows that teacher quality is the most deciding factor that distinguished a high performing education system from a low performing education system. Teacher quality includes here are the teachers ability to engage children in classroom practices, teachers' high expectations from children job satisfaction and their understanding of curricular goals. However, education system in India is struggling with low system capacity to prepare teachers in engaging children in teaching learning process and delivering child-centered pedagogies scaling up of workable models and utilizing ICT to support teacher for improving teaching learning practices. To improve teaching learning practice and learning outcomes of children must design or develop evidence based teacher development programme.

Optimizing the utilization of learning resources:

The learning achievement of schools improved by 12% points when schools use library and laboratory effectively. However, most of the teachers, pointed out that the resources were neither adequate nor utilized optimally due to several reasons. Attractive and quality instruction materials are essential to appropriate utilization of learning resources. Thus, the priority should be given to allocating more fund for the learning resources, guidelines for their optimal utilization and maintenance of library and laboratory for better learning outcomes of children.

7.5 Determinants of high or low level of learning achievement

Students' learning achievement is influenced by numerous factors such as:

- Socio-economic background
- Context and institutional factors like school, teachers and learning environment

NAS 2017 reiterates that facilitations of students' learning, teacher quality and institutional resources are the prominent determinants of the learning levels of students. Multiple regression analysis found that students' attendance, participation in pre-school, their understanding of what teacher says in class and their engagement in the classroom are significantly associated with the learning achievement. School related factors such as functional library, monitoring of the schools by the department of education and participation of school in literary activities influences the learning achievement of students. Similarly, teacher related factors such as their engagement in professional development, peer support and networking, and job satisfaction significantly contribute to learning achievement of students.

Table 7.34: Profiles of HIGH and LOW Performing States

10 Highest Performing States (those with over 40% of students in top performing bands)	10 Lowest Performing States (over 35% of students performing in bottom bands)
Rajasthan	Arunachal Pradesh
Karnataka	Delhi
Chandigarh	Puducherry
Andhra Pradesh	Meghalaya
Jharkhand	Lakshadweep
Dadra & Nagar Haveli	Daman & Diu
Assam	Uttar Pradesh
Gujarat	Sikkim
Kerala	Punjab
Uttarakhand	Nagaland

Evidence from NAS exhibits that teacher quality is the predominant factor that determines the learning level of students. It is observed that teachers' high expectations on student's learning, teachers' understanding of curricular goals and teachers' job satisfaction are the key factors amongst many factors depicted in the following graphs that mostly influence the learning levels of students. Further, multiple indicators from high and low achieving states were processed to understand what are the key contributing factors that separate out low achieving states from high achieving states. Thus, States and Union territories were grouped as high and low achievers on the basis of criteria enumerated below.

Teachers' High Expectation of Students' Achievement:

It is evident from NAS that teachers' high expectations have a significant effect on student achievement. When a teacher regards students as capable and expects them to do well, it creates a positive environment leading to higher achievement. National Achievement Survey found that in low achieving states, only 28% teachers have high expectations from students, however, in high achieving states 68% teachers have high expectations from their students.

Teacher's understanding of Curricular Goal:

Teachers' understanding of curricular goal is critical to learning achievement of students. It eliminates gaps in classroom instruction and improves students' engagement, participation and motivation to perform better. This is the first time that the National Achievement survey was linked to learning outcomes which was aligned with curricular goals in each subject in respective grades. It was observed from the NAS data that in low performing states only 26% teachers understood curricular goals however in high achieving states 71% teachers understood the curricular goals.

Teachers' Job Satisfaction and Students' Learning:

Evidence suggests that teachers who are satisfied with their jobs tend to be more effective in promoting better learning, which could lead to better student performance. Teachers' job satisfaction is one of the key deciding factors for high or low achievement of students. In low achieving states only one out of 4 teachers are satisfied with their jobs, however, in high achieving states three out of four teachers are satisfied with their jobs.

School Monitoring by the Department of Education:

It is observed from the NAS that schools being monitored monthly by the Department of Education acts as a deciding factor for low or high achievement of students in high performing States 44% school are being monitored monthly by Department of Education however in low performing States 30% school are being monitored monthly by Department of Education.

Schools having a Library:

Schools having a functional library is a very effective factor in promoting better learning. Results suggest that in high achieving States, 91% schools have a library where as in low achieving States 62% schools have a library.

School's Participation in Literary Activities and School Fair:

Evidence suggests that the schools' participation in literary activities and school fair motivates students to achieve higher. It is observed from the NAS findings that in low performing States 50% schools participate in literary activities however in high performing States 72% schools participate in literary activities.

Students Attending Pre-Primary Schools:

It is observed from the NAS results that students having attended pre-primary schools leads to their higher achievement. In low performing States 60% students have attended pre-primary schools, however, in high performing States 73% students have attended pre-primary schools.

Students' Understanding of 'What Teacher Says?':

It is evident from NAS that students' understanding of what the teacher says in class, acts as a factor to their higher achievement. Results suggest that in high achieving States 88% students understand what the teacher says in class as compared to 79% students in low achieving States.

Student Participation in Classroom Activities:

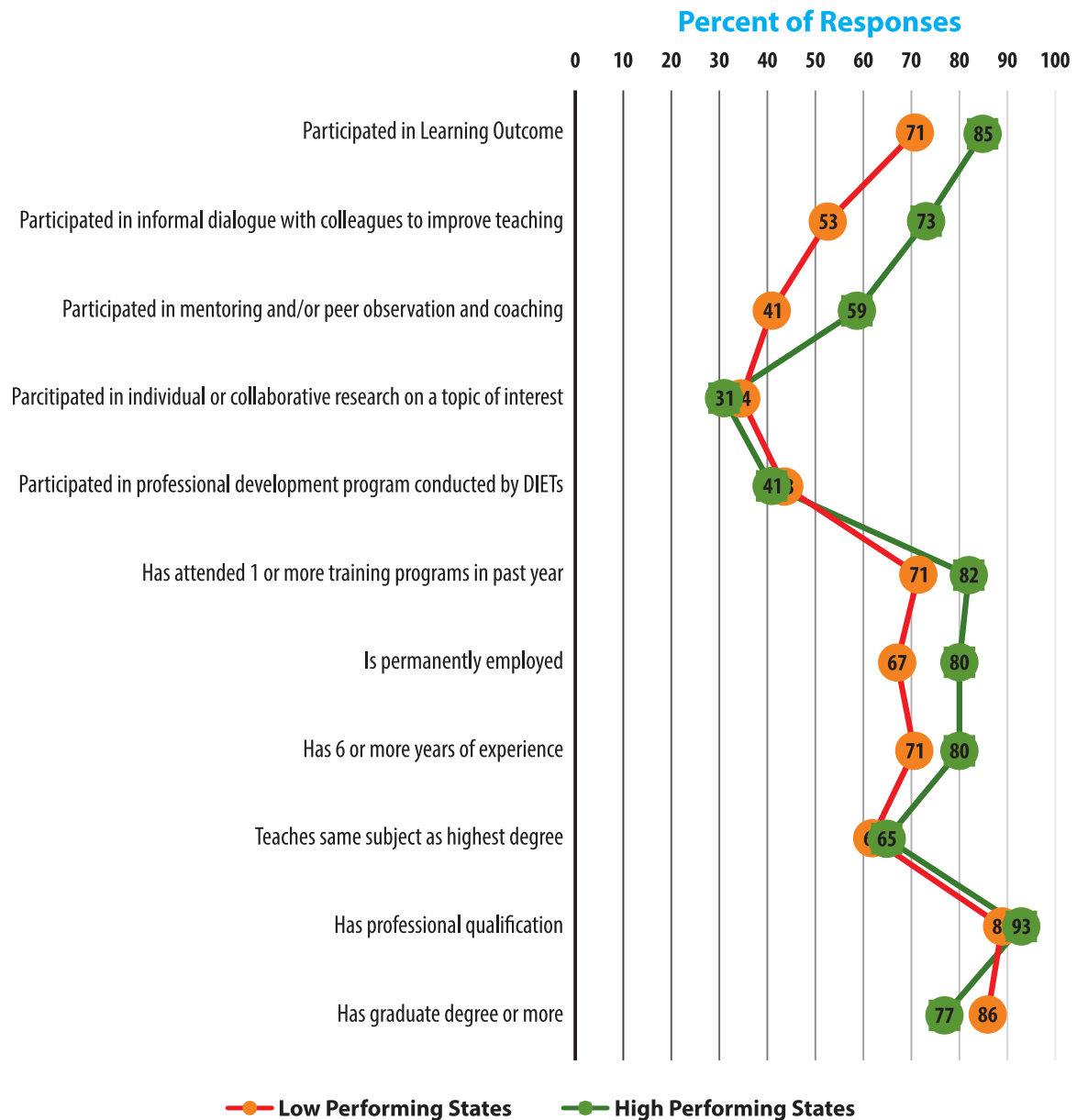
It is observed that students who participate in classroom activities have a higher achievement. Evidence suggests that in low performing States 80% students participate in classroom activities, whereas in high performing States about 88% students participate in classroom activities.

Student Absenteeism:

NAS results suggest that students' absenteeism has a significant effect on student achievement. In low performing States 56% students were present in class in past 10 days, however, in high performing States 65% students were present in class in past 10 days.

The graphical interpretation of the contextual analysis of variables for determining high performing and low performing States/UTs and the factors associated with their performance, is as given below:

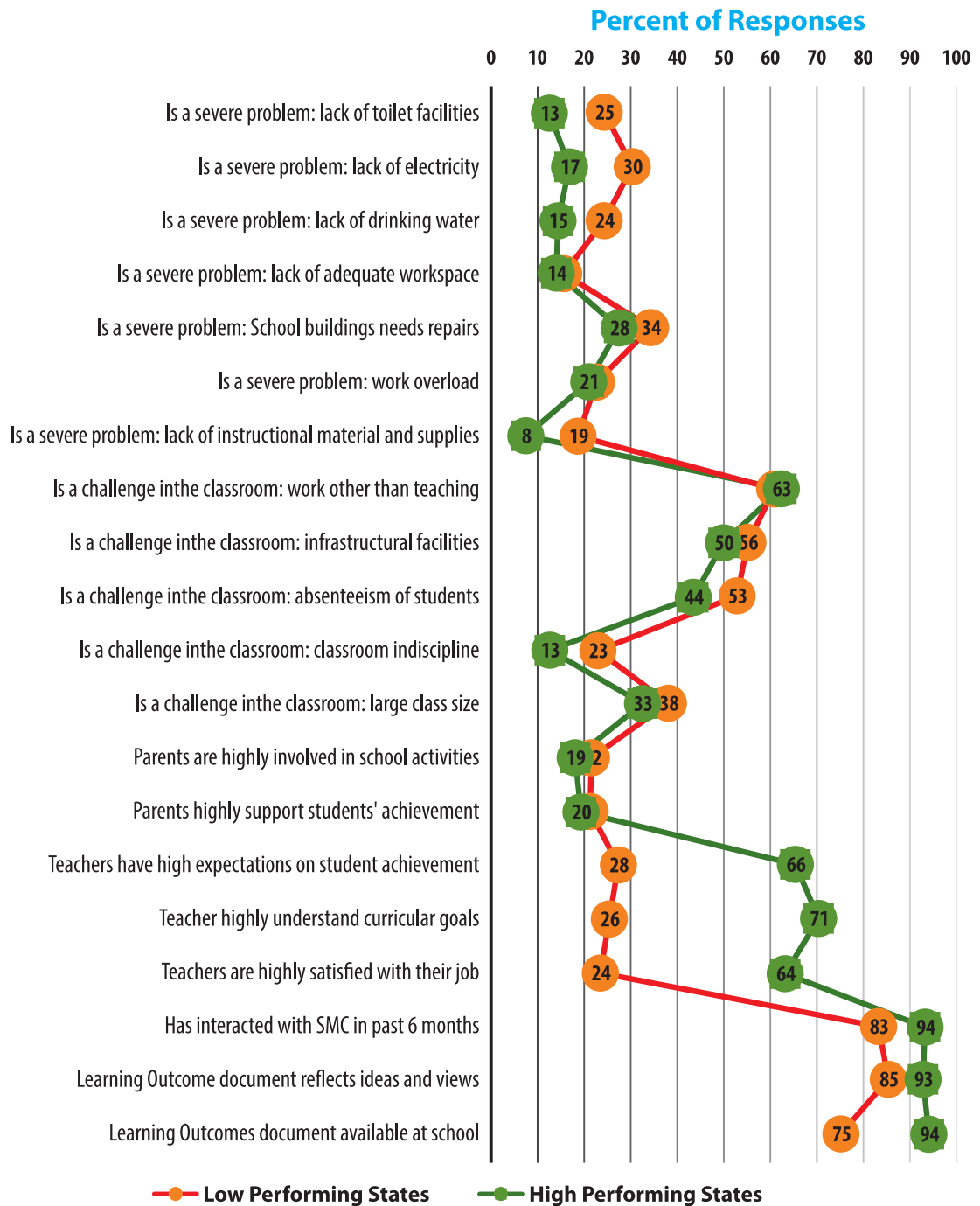
Figure 7.1: High-Low State Profiles by Teacher Background - School Environment



Teachers having professional qualification, are permanently employed, have six or more years of experience and have attended training programs show higher impact on students' achievement.

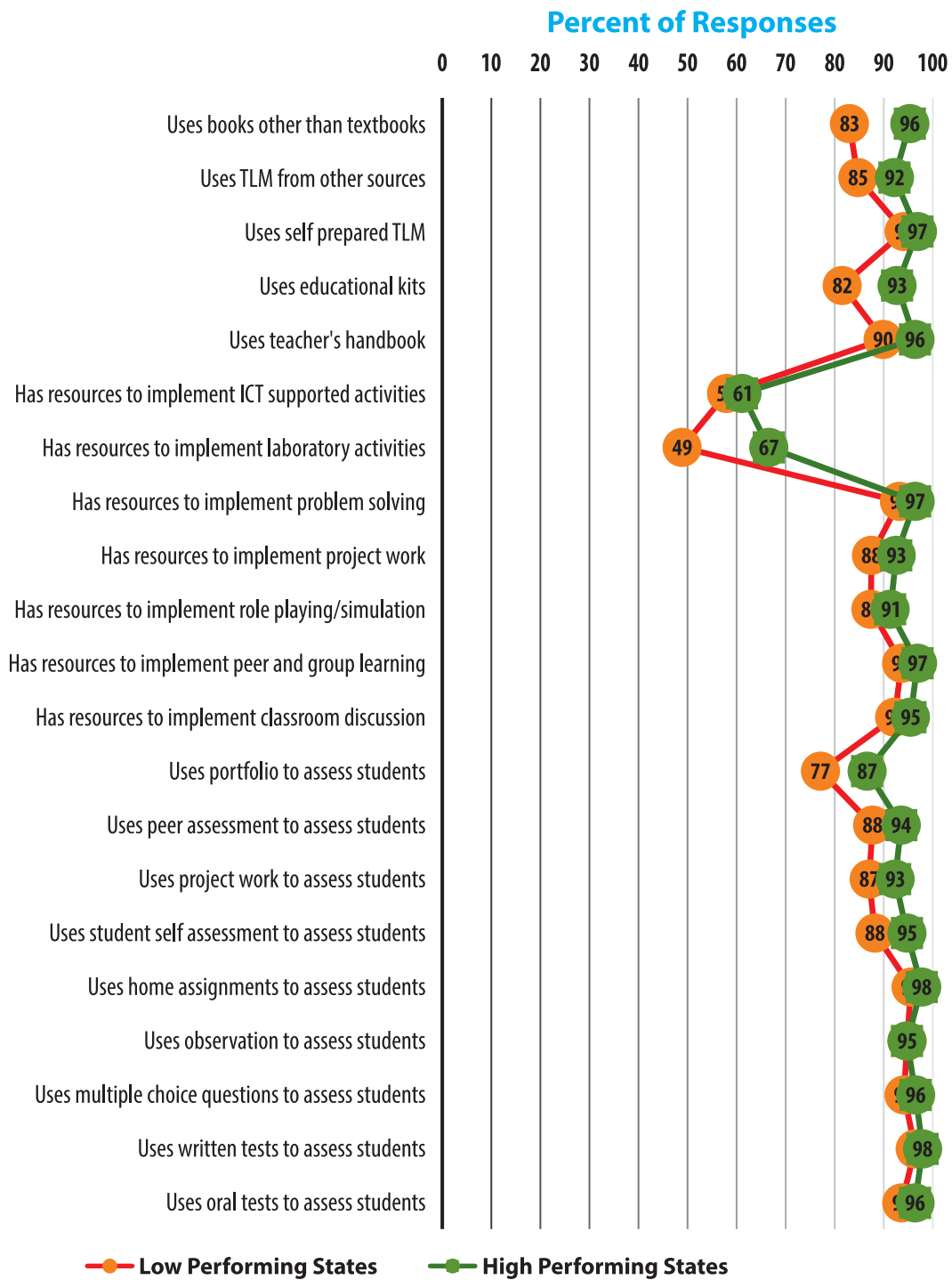
Also, teachers' participation in learning outcomes and their participation in informal dialogues with colleagues to improve teaching have higher association with students' achievement.

Figure 7.2: High-Low State Profiles by Teacher Perception - School Environment



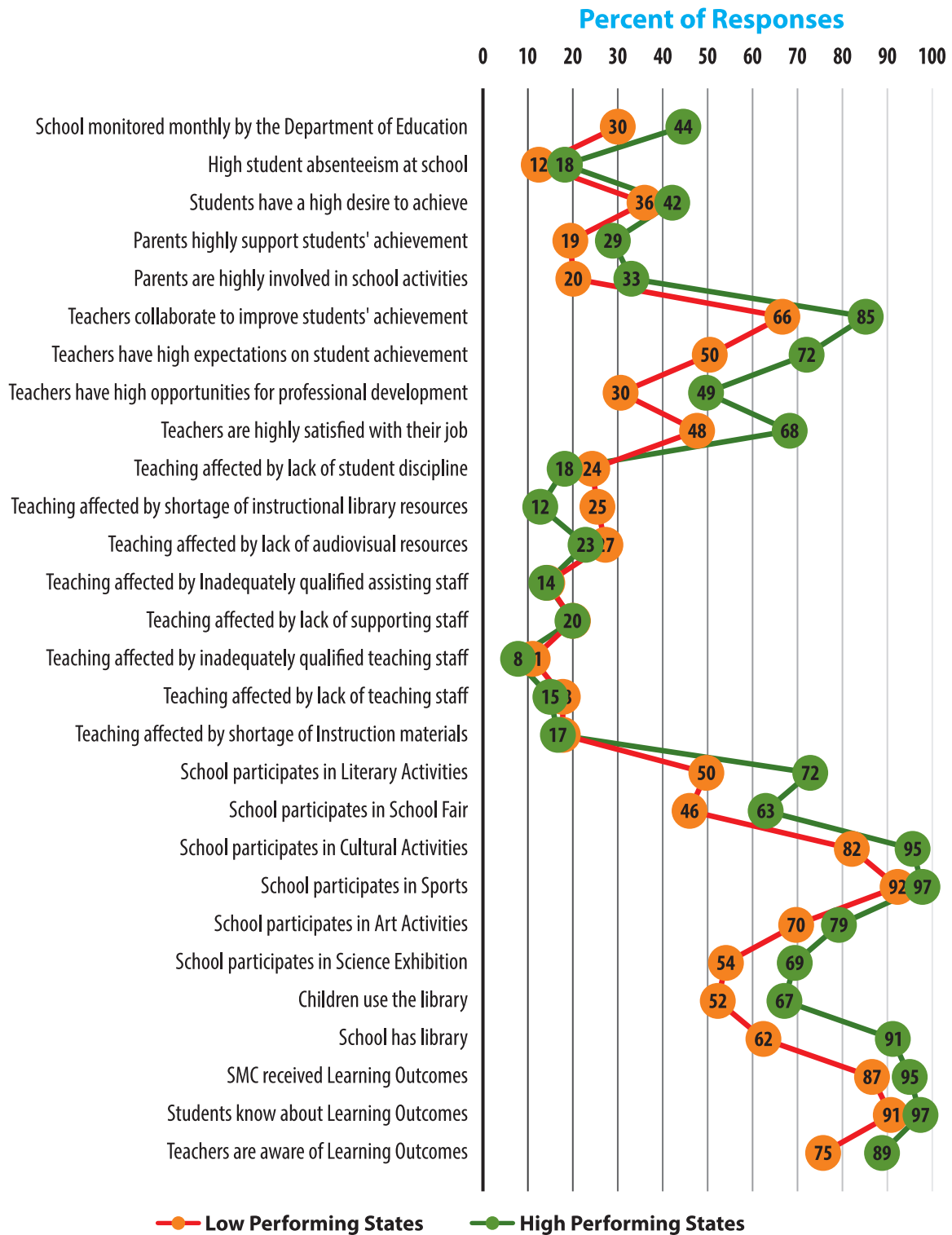
Teachers' expectations on students' achievement, their understanding of curricular goals, their satisfaction with jobs and availability of learning outcomes document at school show higher affect on the States/UTs where in students are performing better.

Figure 7.3: High-Low State Profiles by Teacher Activities



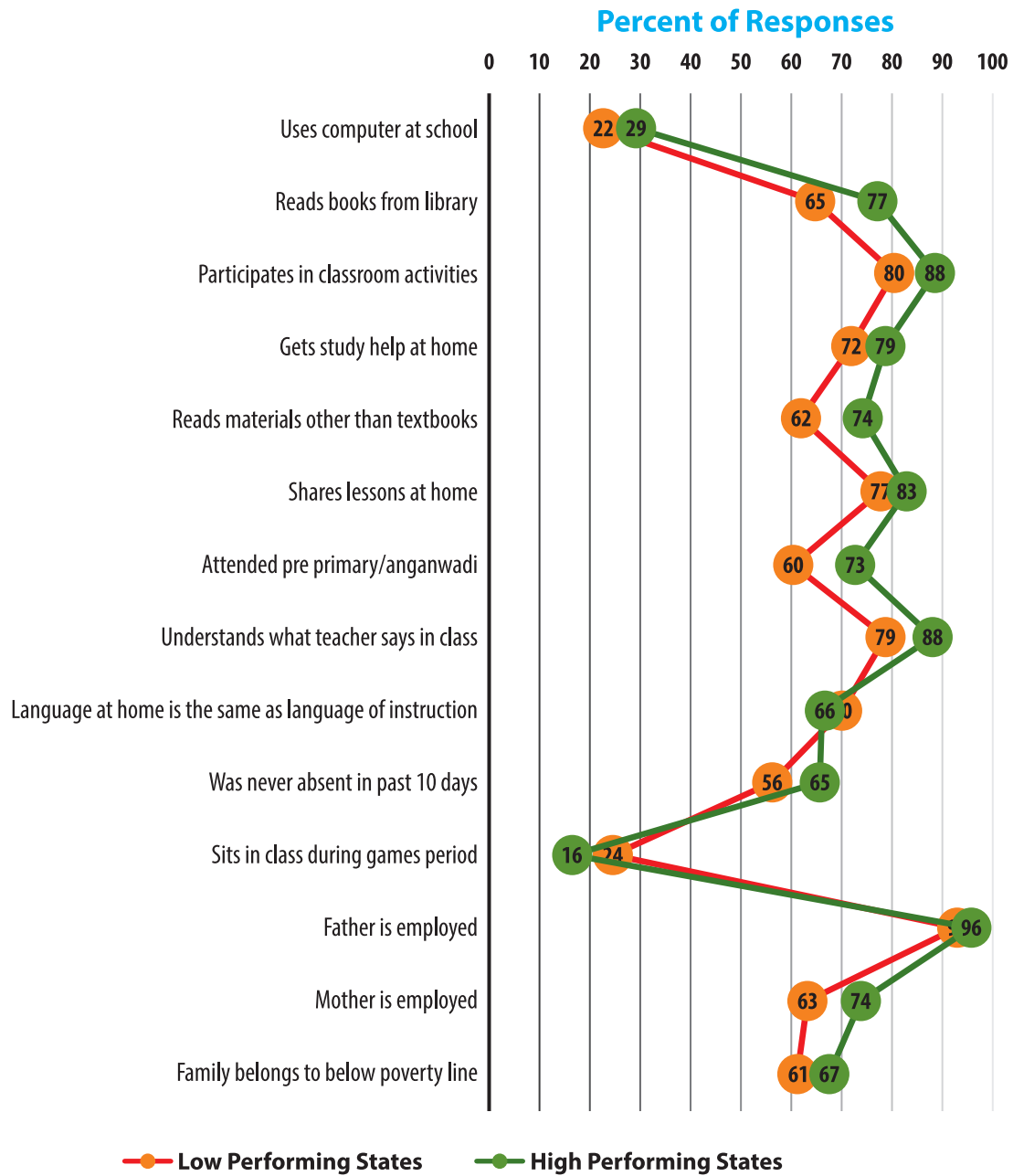
When we observe the affect of teachers’ activities on students’ achievement, we see that for most of the teachers’ activities high performing States/UTs are in-line with low performing States/UTs. Teachers’ usage of books other than the text books shows impact on higher performing States/UTs.

Figure 7.4: High-Low State Profiles by School Background



School being monitored monthly by the Department of Education, teachers' collaboration to improve students' achievement, their high expectations on students' achievement, their job satisfaction, schools' participation in literary activities, school fair and school having library have a greater impact on States/UTs where in students' achievement is higher.

Figure 7.5: High-Low State Profiles by Student Background



Students' participation in classroom activities, attending pre-primary schools/anganwadi, their understanding of what the teacher says in class, their being present in class and reading books other than the text books have higher impact on the States/UTs where in students are performing better.



8. Reporting and Dissemination

A well designed, stakeholder specific reporting and dissemination strategy is required to make findings of a large scale assessment such as NAS, impact policy-making and in turn, improve teaching learning to achieve the required competencies at each class level. NCERT has taken care to effectively communicate results of NAS 2017 to its different stakeholders enabling them to understand and use the results. This chapter deals with the description of reports and their dissemination strategies.

8.1 NAS Reports

The following reports were developed to communicate results and findings of NAS 2017:

- District Report Cards (DRCs)
- State Learning Reports (SLRs)
- National Report to inform Policy, Practices and Teaching Learning (NPPTL)
- NAS Highlights and Policy Briefs

The above reports have been developed for different audiences, keeping in view the following factors:

- Use of data
- Areas of interest
- Availability of time
- Background interest in assessments
- Technical expertise to understand and use assessment data

District Report Cards (DRCs)

Under NAS 2017, for the first time, District was taken as the unit of reporting. Within 2 months of the administration of NAS 2017, District level results, communicated through the DRCs, were put in the public domain (<http://www.ncert.nic.in/programmes/NAS/DRC.html>).

DRCs were developed with the primary purpose of communicating to Districts, the performance of their students on competencies spelt out on the Learning Outcomes (LOs). DRCs also indicates the LOs on which students performed the lowest and required maximum support.








District level officials were expected to organize sub District level meetings and apprise their block level officials and teachers about the NAS results. They were also expected to contribute towards the design, implementation and monitoring of interventions which in turn would help improve student achievement in the LOs.

To ensure that the above stated support could be tailored to each tested class and subjects, NCERT provided Class and Subject specific DRCs to each district. Each District received a total of 10 DRCs i.e. 3 DRCs each for Classes III and V in Language, Mathematics and EVS and 4 DRCs for classes VIII i.e. in Language, Mathematics, Science and Social Science. Each DRC showed a district's performance on all LOs tested for a Subject, across both the test booklets.

Each DRC included information on the following heads expressed in either percentage/ numbers:

- Overall learning levels of the district, shown by the overall performance of the District in a subject i.e. a 55% on Science meant that students of a particular district correctly responded to 55% of the items in Science
- Disaggregated learning levels by gender, location, social group and school management, depicted by the percentage of questions which various sub groups for e.g. boys and girls correctly responded to in a subject
- Performance against each of the learning outcomes, reported by student achievement against a particular LO for e.g. a 45% against a LO meant that 45% of the students in a district could correctly answer the questions measuring a particular LO
- Distribution of learning level shown by the range/number of students who correctly responded to questions in a class and a subject. Number of students scoring within each of the following four performance slabs were shown - below 30%; 30-50%, 50-75% and above 75%
- Five learning outcomes on which children required maximal support

Figure 8.1: Exemplar of DRC for Andamans District for Class III in EVS

 NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING NATIONAL ACHIEVEMENT SURVEY - NAS (Survey of Learning Outcomes) 											
District Report Card: 2017											
State: Andaman & Nicobar Islands						District: Andamans					
Class: 3						Subject: EVS					
Schools: 70						Students: 739					
Participation/Coverage											
Students											
GENDER 	Boys				Girls						
	Number		%		Number		%				
	360		48.71		379		51.29				
AREA 	Rural				Urban						
	Number		%		Number		%				
	518		70.09		221		29.91				
CATEGORY 	SC		ST		OBC		GEN				
	Number	%	Number	%	Number	%	Number	%			
	0	0.00	34	4.60	130	17.59	575	77.81			
CWSN 	LD	VI	HI	S&LD	ID	Oth					
	0	1	0	1	4	1					
Management 	Government				Government-aided						
	Number		%		Number		%				
	686		92.83		53		7.17				
Average Performance of Students in EVS (%)											
Overall	Gender		Area		Management		Social Group				
	Male	Female	Rural	Urban	Govt.	Aided	SC	ST	OBC	GEN	
	60.18	59.67	60.67	60.46	59.52	59.95	63.14	0.00	58.04	57.85	60.83

Performance on Learning Outcomes (LOs)

Learning Outcomes	Description	Average Performance(%)
E302	Identifies simple features (e.g. movement, at places found/ kept, eating habits, sounds) of animals and birds in the immediate surroundings.	48.04
E303	Identifies relationships with and among family members	45.98
E304	Identifies objects, signs (vessels, stoves, transport, means of communication, transport, signboards etc.), places (types of houses/shelters, bus stand, petrol pump etc.) activities (works people do, cooking processes, etc.) at home/school/neighborhoods	62.74
E305	Describes need of food for people of different age groups, animals/birds, availability of food and water and use of water at home and surroundings	66.24
E307	Groups objects, birds, animals, features, activities according to differences/similarities using different senses. (e.g. appearance/place of living/ food/ movement/ likes-dislikes/ any other features)	65.53
E309	Identifies directions, location of objects/places in simple maps using signs/symbols/verbally	54.76
E310	Guesses properties, estimates quantities of materials/activities in daily life and verifies using symbols/non-standard units	53.18
E311	Records observations, experiences, information on objects/activities/places visited in different ways and predicts patterns etc.	47.09
E313	Observes rules in games (local, indoor, outdoor)	36.29
E314	Voices opinion on good/bad touch , stereotypes for tasks/play/food in family w.r.t gender, misuse/wastage of food and water in family and school.	74.02

Range of Performance of Students who Answered Correctly							
Below 30%		30% - 50%		50% - 75%		Above 75%	
Number	%	Number	%	Number	%	Number	%
81	10.96	175	23.68	285	38.57	198	26.79

Lowest Performing Learning Outcomes (LOs)

- 1 - Observes rules in games (local, indoor, outdoor) (36.29)
- 2 - Identifies relationships with and among family members (45.98)
- 3 - Records observations, experiences, information on objects/activities/places visited in different ways and predicts patterns etc. (47.09)
- 4 - Identifies simple features (e.g. movement, at places found/ kept, eating habits, sounds) of animals and birds in the immediate surroundings. (48.04)
- 5 - Guesses properties, estimates quantities of materials/activities in daily life and verifies using symbols/non-standard units (53.18)

CSWN: **LD-** Locomotor Disability; **VI-** Visual Impairment; **HI-** Hearing Impairment; **S&LD-** Speech and Language Disability; **ID-** Intellectual Disability; **Oth-** Other Disability.

State Learning Reports (SLRs)

Post the production of the DRCs, a single State Learning Reports (SLRs) was developed for each State (and UTs), Each SLR gave an overview of the State's performance on all the tested LOs for each class and subject. Based on the SLR results, State level officials were expected to provide academic support towards the District wise implementation of interventions designed to improve student attainment of LOs. (<http://www.ncert.nic.in/programmes/NAS/SRC.html>)

SCERTs/ SIEs were also expected to provide necessary hand-holding to Districts to plan and design classroom and pedagogical interventions meant to improve student achievement against LOs.

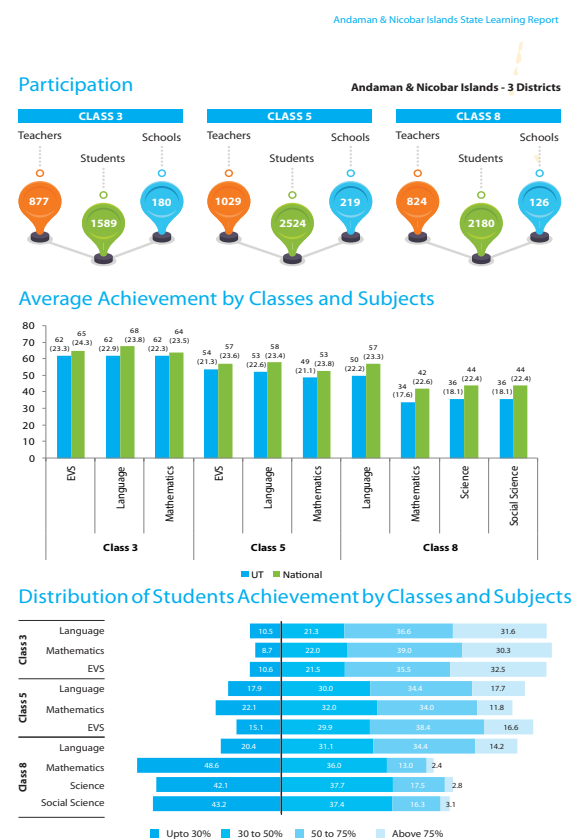
Each SLR provides information on the following points:

- Class wise participation of students/ teachers and school principals in the survey
- Average State/UT achievement by classes and subjects against the National Achievement
- Distribution of student in different achievement levels (0-30%, 30-50%, 50-75%, 75% above) by classes and subjects
- Disaggregated performance in term of gender, location, management and social groups
- Students' perceptions about coming to school, difficulty faced in traveling to school, understand what the teacher says in the class etc.
- Teachers' responses to a few aspects of schools and schooling such as infrastructure; availability of instructional material; classroom assessment practices and parental involvement etc. (school and teacher questionnaires)
- A composite score to indicate the average performance of a district across classes and subjects
- Performance of the LOs in the state

All the results in the SLRs were computed using the Classical Test Theory (CTT) and reported through percentages. Prior to the application of CTT, the entire data set was weighted and achievement tests were validated through checks on difficulty, discrimination, reliability and item functioning across languages.

Snapshot of an exemplar SLR is given below in Figure 8.2.

Figure 8.2: Snapshot of an exemplar SLR



E.g. In Class 3 language, percentage of students achieving upto 30% is 10.5, between 30%-50% is 21.3, between 50%-75% is 36.6 and above 75% is 31.6.

National Report to inform Policy, Practices and Teaching Learning

National Report to inform Policy, Practices and Teaching Learning (current document) is developed to communicate the results and findings of NAS 2017. This report is meant for reference of researchers/ assessment specialists with existing technical understanding of assessments and in large quantitative data sets.

This report provides information on the following aspects of the assessment:

- History and objectives of NAS
- Assessment framework and NAS tools (tests and questionnaires)
- Procedures followed, including sampling, field operations, data analysis and limitations
- Descriptions of student achievement, including differences between subgroups
- Correlation of achievement with background factors

- Proficiency bands for student achievement
- Reporting and dissemination
- Overall summary of findings, recommendations and conclusion

Results in the National Report were computed using the IRT. While, use of CTT bound student achievement within the continuum of 0-100%, IRT enabled achievement to be treated as a latent trait with no limits.

National Report includes the following analysis:

- Representation of achievement in scale scores
- Computation of percentiles
- Computation of achievement proficiency bands
- Association of Background Variables which correlate against achievement
- Achievement shown against proficiency bands

NAS Highlights and Policy Briefs

The objective of policy briefing was to report the performance of students in different subjects and classes on specific learning outcomes, along with comparison of average performances between girls and boys, rural and urban children, students studying in government and government aided schools and amongst students belonging to different social backgrounds. Also, it intended to identify the key learning gaps in achievement of LOs and identify the institutional and background factors which affect the learning achievement of students. This briefing is meant for policy makers at the national, state and district levels. This is also meant to enlighten the MPs regarding the status of student learning in various classes in their respective constituencies for better policy making.

8.2 NAS Dissemination

NAS reports were disseminated using the following mediums/platforms:

- MHRD and NCERT websites
- Meeting with members of the parliament and discussing the NAS result as well as submission of report pertaining to their constituency
- Sharing of reports with Secretaries and Chief Ministers of 36 States/ UTs

- Workshops organized for district and state level officials
- NAS Mobile Application

MHRD and NCERT Websites

All the DRCs and SLRs can be downloaded from the NCERT and MHRD websites. For a month, following the release of the DRCs, the DRCs could also be downloaded from the web application.

Personal Delivery of Reports to MPs from the Lower and Upper Houses of the Parliament

NCERT delivered the DRCs to all the MPs. Each of the MP received hard copies of the class and subject wise DRCs of the district which he/she represented. The meetings were an opportunity for the MPs to get acquainted with the health of the education system in the districts which they represent.

Sharing of NAS Reports with Chief Secretaries and Chief Ministers of 36 States/ UTs

NCERT shared the reports with all the Chief Secretaries and Chief Ministers of 36 States/ UTs.

Workshops Organized for District and State/ UT Level Officials

Several workshops were organized to develop a common understanding on how NAS data will be used in policy, planning and improving pedagogical interventions both at district as well as state level. DRC and SLRs were extensively discussed at these workshops. District and State level workshops were organized by NCERT.

8.3 District level Workshops

District level workshops were organized with the following objectives:

- To sensitize the participants on how assessment helps to transform education systems
- To share the experiences of the States/ UTs in the conduct of the NAS
- To develop a common understanding on how NAS data will be used in policy, planning and improving pedagogical interventions

These workshops were organized in different regions of the country. Initially, the post NAS intervention workshops were developed at the regional level,

later on at the state level and subsequently at the district and block level with different objectives. At the regional level, workshops were organized to help the state functionaries in developing of their AWPB. The state level interventions were planned at understanding the DRCs and SLRs to devise innovative pedagogical processes to cater to the attainment of the grade specific learning outcomes. The district and the block level interventions helped in formulating differential planning with a roadmap for implementation.

The district level workshops were led by the NCERT. Using copies of DRCs as exemplars, districts were hand held to understand and interpret the DRCs. Apart from modeling ways in which DRCs could be comprehended, the NCERT also resolved several queries of district level officials regarding the use of DRCs.

LOs specific exemplar activities were shared with districts to help them develop pedagogical interventions to improve the attainment of subject specific LOs. These activities included presentation of the following material to the Districts – Class and subject wise LOs, guiding principles of teaching learning processes for attainment of LOs, suggesting pedagogical processes along with their rationale and assessment practices to assess LO attainment.

Using the know-how given by NCERT, Districts had to develop exemplar pedagogical activities and interventions for Subjects and Classes not covered by NCERT. The activities and interventions developed by Districts were reviewed by NCERT and feedback on the same was shared with Districts.

8.4 State/ UT level Workshops

NAS results were extensively discussed during the state level workshops. At every regional State/ UT level workshop, SLRs pertaining to those States/ UTs who attended the workshop were shared by NCERT with the State/ UT representatives. Apart from field questions on the State/ UT specific results, NCERT also explained to the State/ UT officials, ways to use DRC/ SLRs results and carry out District and State/ UT wise differential planning.

NCERT had scheduled district level post NAS workshops to further the understanding of NAS in the different States/ UTs. The agenda for these workshops were:

DAY 1

1. Understanding of the District and State Report
2. Working in groups to develop further insights (relating achievement with learning outcomes in the different subjects)
3. Understanding the assessment of the learning Outcomes for Classes III, V, VIII and X as per the report card
4. Working in groups to develop tasks for assessing the attainment of the learning outcomes

DAY 2

5. Working with Mathematics kit – Demonstration and interactive session
6. Group work to clarify problems in mathematics kit to further understanding
7. Developing questions in higher order thinking skills to assess the learning outcomes in Mathematics – Demonstration and interactive session
8. Group work to develop assessment tasks in mathematics based on learning outcome to further understanding

DAY 3

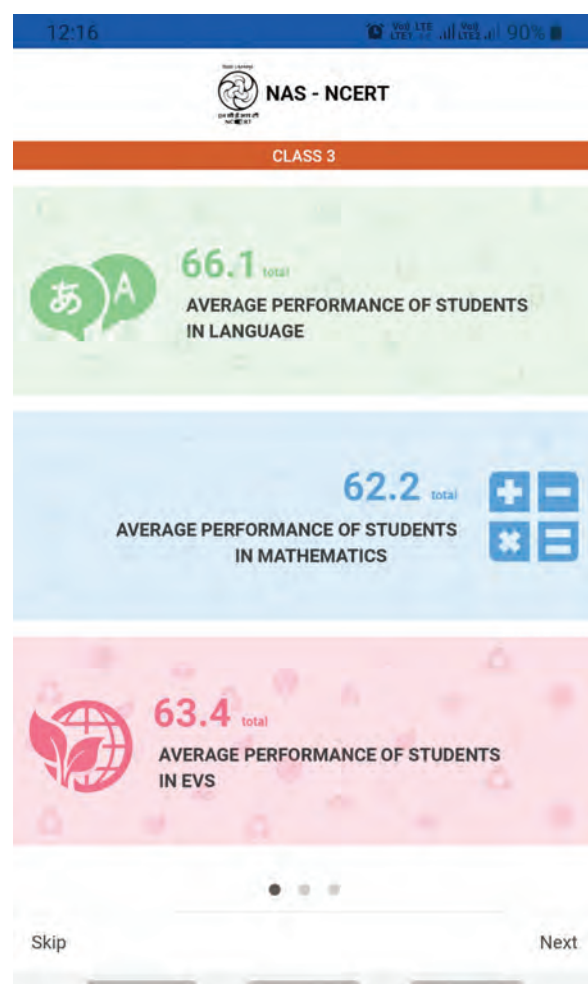
9. Working with Science kit - Demonstration and interactive session
10. Group work to clarify problems in Science kit to further understanding
11. Developing questions in higher order thinking skills to assess the learning outcomes in Sciences – Demonstration and interactive session
12. Group work to develop assessment tasks in Sciences based on learning outcome to further understanding

All the resource persons present acted as facilitators during the group work.

8.5 NAS Mobile Application

NCERT in collaboration with UNICEF developed a user friendly mobile application (Figure 8.3) for NAS 2017. The application enabled users to run queries on the NAS 2017 data and reported results in a visually appealing manner.

Figure 8.3: Snapshot of Web Application



8.6 Way Forward

NCERT has developed a comprehensive document on Post NAS Interventions: Communication and Understanding of the DRCs, which explains in detail the ways to interpret and use district level findings and report cards (http://www.ncert.nic.in/programmes/NAS/pdf/DRC_report.pdf). The document also encapsulates the steps which need to be taken up at various levels (National, State, District, Block and School) as a follow up of NAS 2017. Complete details on the same can be taken from the document, Post NAS Interventions: Communication and Understanding of the DRCs.

The interventions based on NAS findings have been phased out into:

- Immediate/short term
- Mid term
- Long term

Immediate/ Short term (Up to March 2018)

The focus of this phase was to:

- Communicate the District Report Cards, and
- Develop and Implement Pedagogical Interventions to Support Classroom Transaction Based on Learning Outcomes

The above two objectives were realised by conducting training workshops for the State Level Master Trainers (SLMTs) (from Dec to Jan 2018). The objectives of these workshops were:

- Communicate the NAS results as per the District Report Cards (DRCs) in the States/UTs
- Assist States/ UTs to understand the NAS District Report Cards
- Demonstrate the exemplar pedagogical interventions developed by NCERT
- Encourage the Master Trainer's (SLMTs) to develop other classroom transactions based on the five Learning Outcomes identified in the Districts of the State

The SLMTs further disseminated the understanding of the NAS District Report Cards at the District level (from Jan - Mar 2018). This included:

- Sharing of findings with District level functionaries such as DIETs, DEOs, teachers, head teachers, parents, SMC members and other stakeholders
- Encouraging District Level Master Trainer's (DLMTs) to develop other Classroom transactions based on the five Learning Outcomes identified in the Districts of the State
- Identifying learning gaps and understanding of the same by the teachers in the Districts
- Facilitating by the DLMTs for use of alternative instructional strategies by the teachers in the

schools to overcome learning gaps with the support of BRC/CRC) and peer support (e.g. Teacher– Teacher & Student – student support)

- Training of teachers on evolving learning strategies to achieve learning outcomes
- Seeking support from parents or other important members in the community
- Organizing awareness programs for community

Mid Term Interventions (Up to March 2019)

The midterm interventions include in its ambit:

- **Development of an Intervention Handbook:** NCERT in collaboration with supporting agencies/ partners is consolidating a final version of the intervention handbook. This is also having a compilation of some of the good exemplary pedagogy materials for achieving Learning Outcomes (LOs) developed by the State, Districts level functionaries and teachers.
- **Use of NAS findings to develop State AWPBs:** NCERT is developing various NAS based indices which are associated with other datasets such as UDISE. Reports are being generated to find associations of the teacher quality index, infrastructure index and State and District fund allocation indices with student achievement. The afore-mentioned stated associations are helping States/UTs in developing evidence based AWPBs.
- **Development of an Item Bank (Dynamic):** Items are being developed for Classes III, V and VIII for all subjects in English and then being translated into other regional languages. Items are being piloted and finalized.
- **Development of ICT based Learning Resources/ Material:**
 - a. ICT based resources are being developed for classroom transactions of LOs
 - b. Existing NCERT's ICT based learning material are being adapted

- c. E-content and interactive modules on learning outcomes identified as difficult are being developed. Exemplary resources are also being developed and shared with states for replication in their regional languages and further development in other subject areas
 - d. Role of ICT based interventions are being linked to NAS findings to increase outreach
 - e. Supplementary learning resource materials for students and teachers are being developed
 - f. Material for Orientation of school leaders is being prepared
- **Data Sharing with States/ UTs:** NAS 2017 weighted and scaled data are being shared with States/ UTs to help them carry out independent research on variables of interest.

Long Term Interventions (Up to March 2021)

The long term interventions specifically focus on:

- Policy implications
- Curriculum Review and Reform

This includes the following:

- NCERT is developing policy briefs for systemic review and reform
- NCERT is coming out with guidelines/suggested practices for teacher education/training and school curriculum review and reform, for e.g. review of curriculum of pre-service teacher education programme
- Review of curriculum of pre-service teacher education programmes
- Review of school curriculum in States/UTs
- Revisiting the curriculum/syllabi and textbooks
- Developing a web based application to address the needs and concerns of teachers, students, and parents.

Appendix A

Class III Learning Outcomes

Table A-1: Environmental Studies LOs Class III

Learning Outcomes	Description
E302	Identifies simple features (e.g. movement, at places found/ kept, eating habits, sounds) of animals and birds in the immediate surroundings.
E303	Identifies relationships with and among family members
E304	Identifies objects, signs (vessels, stoves, transport, means of communication, transport, signboards etc.), places (types of houses/shelters, bus stand, petrol pump etc.) activities (works people do, cooking processes, etc.) at home/school/ neighborhoods
E305	Describes need of food for people of different age groups, animals/birds, availability of food and water and use of water at home and surroundings
E307	Groups objects, birds, animals, features, activities according to differences/ similarities using different senses. (e.g. appearance/place of living/ food/ movement/ likes-dislikes/ any other features)
E309	Identifies directions, location of objects/places in simple maps using signs/symbols/ verbally
E310	Guesses properties, estimates quantities of materials/activities in daily life and verifies using symbols/non-standard units
E311	Records observations, experiences, information on objects/activities/places visited in different ways and predicts patterns etc.
E313	Observes rules in games (local, indoor, outdoor)
E314	Voices opinion on good/bad touch, stereotypes for tasks/play/food in family w.r.t gender, misuse/wastage of food and water in family and school.

Table A-2: Language LOs Class III

Learning Outcomes	Description
L304	Reads small texts with comprehension i.e., identifies main ideas, details, sequence and draws conclusions
L312	Reads printed scripts on the classroom walls: poems, posters, charts etc.

Table A-3: Mathematics LOs Class III

Learning Outcomes	Description
M301	Reads and writes numbers up to 999 using place value
M302	Compares numbers up to 999 based on their place values
M303	Solves simple daily life problems using addition and subtraction of three digit numbers with and without regrouping
M304	Constructs and uses the multiplication facts (up till 10) in daily life situations
M305	Analyses and applies an appropriate number operation in the situation/ context
M306	Explains the meaning of division facts by equal grouping/sharing and finds it by repeated subtraction
M309	Identifies and makes 2D-shapes by paper folding, paper cutting on the dot grid, using straight lines etc.
M311	Fills a given region leaving no gaps using a tile of a given shape
M312	Estimates and measures length and distance using standard units like centimeters or meters & identifies relationships
M317	Reads the time correctly to the hour using a clock/watch
M318	Extends patterns in simple shapes and numbers
M319	Records data using tally marks, represents pictorially and draws conclusions

Class V Learning Outcomes

Table A-4: Environmental Studies LOs Class V

Learning Outcomes	Description
E403	Identifies relationship with and among family members in extended family
E410	Records observations/experiences/information for objects, activities, phenomena, places visited in different ways and predicts patterns and activities/ phenomena
E501	Explains the super senses and unusual features (sight, smell, hear, sleep, sound, etc.) of animals and their responses to light, sound, food etc.
E503	Describes the interdependence among animals, plants and humans
E504	Explains the role and functions of different institutions in daily life (Bank, Panchayat, cooperatives, police station, etc.)
E505	Establishes linkages among terrain, climate, resources (food, water, shelter, livelihood) and cultural life. (e.g. life in distant/difficult areas like hot/cold deserts)
E506	Groups objects, materials, activities for features/properties such as shape, taste, color, texture, sound, traits etc.
E507	Traces the changes in practices, customs, techniques of past and present through coins, paintings, monuments, museum etc. and interacting with elders
E508	Guesses (properties, conditions of phenomena), estimates spatial quantities (distance, area, volume, weight etc.) and time in simple standard units and verifies using simple tools/set ups
E509	Records observations/experiences/information in an organized manner (e.g. in tables/ sketches/ bar graphs/ pie charts) and predicts patterns in activities/ phenomena (e.g. floating, sinking, mixing, evaporation, germination, spoilage) to establish relation between cause and effect.
E510	Identifies signs, directions, location of different objects/landmarks of a locality / place visited in maps and predicts directions w.r.t. positions at different places for a location
E512	Voices opinions on issues observed/experienced and relates practices/happenings to larger issues of society
E513	Suggests ways for hygiene, health, managing waste, disaster/emergency situations and protecting/saving resources

Table A-5: Language LOs Class V

Learning Outcomes	Description
L504	Reads and comprehends independently storybooks, news items/ headlines, advertisements etc.
L508	Reads text with comprehension, locates details and sequence of events

Table A-6: Mathematics LOs Class V

Learning Outcomes	Description
M401	Applies operations of numbers in daily life situations
M412	Explores the area and perimeter of simple geometrical shapes (triangle, rectangle, square) in terms of given shape as a unit
M418	Calculates time intervals/duration of familiar daily life events by using forward or backward counting/addition and subtraction
M421	Represent the collected information in tables and bar graphs and draws inferences from these
M501	Reads and writes numbers bigger than 1000 being used in her/his surroundings
M504	Estimates sum, difference, product and quotient of numbers and verifies the same using different strategies like using standard algorithms or breaking a number and then using operation
M505	Finds the number corresponding to part of a collection
M506	Identifies and forms equivalent fractions of a given fraction
M508	Converts fractions into decimals and vice versa
M509	Classifies angles into right angle, acute angle, obtuse angle and represents the same by drawing and tracing
M512	Relates different commonly used larger and smaller units of length, weight and volume and converts larger units to smaller units and vice versa
M513	Estimates the volume of a solid body in known units.
M514	Applies the four fundamental arithmetic operations in solving problems involving money, length, mass, capacity and time intervals
M515	Identifies the pattern in triangular numbers and square number
M516	Collects data related to various daily life situations, represents it in tabular form and as bar graphs and interprets it

Class VIII Learning Outcomes

Table A-7: Language LOs Class VIII

Learning Outcomes	Description
L813	Read textual/non-textual materials with comprehension and identifies the details, characters, main idea and sequence of ideas and events while reading

Table A-8: Mathematics LOs Class VIII

Learning Outcomes	Description
M601	Solves problems involving large numbers by applying appropriate operations
M606	Solves problems on daily life situations involving addition and subtraction of fractions / decimals
M620	Finds out the perimeter and area of rectangular objects in the surroundings like floor of the class room, surfaces of a chalk box etc.
M621	Arranges given/collected information in the form of table, pictograph and bar graph and interprets them
M702	Interprets the division and multiplication of fractions
M705	Solves problems related to daily life situations involving rational numbers
M706	Uses exponential form of numbers to simplify problems involving multiplication and division of large numbers
M707	Adds/subtracts algebraic expressions
M710	Solves problems related to conversion of percentage to fraction and decimal and vice versa
M717	Finds out approximate area of closed shapes by using unit square grid/graph sheet
M719	Finds various representative values for simple data from her/his daily life contexts like mean, median and mode
M721	Interprets data using bar graph
M801	Generalizes properties of addition, subtraction, multiplication and division of rational numbers through patterns
M802	Finds rational numbers between two given rational numbers
M803	Proves divisibility rules of 2, 3, 4, 5, 6, 9 and 11
M804	Finds squares, cubes, square roots and cube roots of numbers using different methods
M808	Uses various algebraic identities in solving problems of daily life
M812	Verifies properties of parallelogram and establishes the relationship between them through reasoning
M818	Finds surface area and volume of cuboidal and cylindrical object
M819	Draws and interprets bar charts and pie charts

Table A-9: Science LOs Class VIII

Learning Outcomes	Description
SCI703	Classifies materials and organisms based on properties/characteristics
SCI704	Conducts simple investigation to seek answers to queries
SCI705	Relates processes and phenomenon with causes
SCI708	Measures and calculates e.g., temperature; pulse rate; speed of moving objects; time period of a simple pendulum, etc.
SCI710	Plots and interprets graphs
SCI711	Constructs models using materials from surroundings and explains their working
SCI801	Differentiates materials, organism and processes
SCI804	Relates processes and phenomenon with causes
SCI805	Explains processes and phenomenon
SCI807	Measures angles of incidence and reflection, etc.
SCI811	Applies learning of scientific concepts in day-to-day life
SCI813	Makes efforts to protect environment

Table A-10: Social Science LOs Class VIII

Learning Outcomes	Description
SST605	Identifies latitudes and longitudes, e.g., poles, equator, tropics, States/UTs of India and other neighboring countries on globe and the world map
SST610	Locates important historical sites, places on an outline map of India.
SST625	Describes the functioning of rural and urban local government bodies in sectors like health and education
SST703	Explains preventive actions to be undertaken in the event of disasters
SST704	Describes formation of landforms due to various factors
SST722	Explains the significance of equality in democracy
SST726	Describes the process of election to the legislative assembly
SST731	Explains the functioning of media with appropriate examples from newspapers
SST733	Differentiates between different kinds of markets
SST734	Traces how goods travel through various market places
SST802	Describes major crops, types of farming and agricultural practices in her/his own area/state
SST805	Locates distribution of important minerals e.g. coal and mineral oil on the world map
SST807	Justifies judicious use of natural resources
SST809	Draws interrelationship between types of farming and development in different regions of the world
SST810	Distinguishes the modern period from the medieval and the ancient periods through the use of sources
SST815	Explains the origin, nature and spread of the revolt of 1857 and the lessons learned from it.
SST816	Analyses the decline of pre-existing urban centers and handicraft industries and the development of new urban centers and industries in India during the colonial period
SST818	Analyses the issues related to caste, women, widow remarriage, child marriage, social reforms and the laws and policies of colonial administration towards these issues
SST823	Applies the knowledge of the Fundamental Rights to find out about their violation, protection and promotion in a given situation
SST827	Describes the process of making a law. (e.g. Domestic Violence Act, RTI Act, RTE Act)
SST831	Identifies the role of Government in providing public facilities such as water, sanitation, road, electricity etc., and recognizes their availability
SST833	Draws bar diagram to show population of different countries/India/states

Appendix B

List of Languages in which Test got Translated

Sl.No.	Medium of Instruction	Code
1	Assamese	11
2	Bengali	12
3	English	13
4	Gujarati	14
5	Garo	15
6	Hindi	16
7	Kannada	17
8	Khasi	18
9	Konkani	19
10	Marathi	20
11	Malayalam	21
12	Manipuri	22
13	Mizo	23
14	Odia	24
15	Punjabi	25
16	Tamil	26
17	Telugu	27
18	Urdu	28
19	Bodo	29
20	Kokborok	30

Appendix C

Sample Forms 1, 2 & 3

Example 1: State/UT desired target population using fictitious scenario

SAMPLING FORM 1

State/UT desired target population

State or union territory: State A

Person completing this form:

[a] 212350

1. Specify the medium(s) of instruction for your state or union territory desired target population:

Hindi and English

2. Total state or union territory enrolment in the target class:

3. Describe any population(s) to be omitted from the state or union territory target class population (if applicable):

Students taught in a medium of instruction other than Hindi or English

4. Total enrolment omitted from the state or union territory desired target population:
(corresponding to the omissions listed in the previous item)

[b] 4525

5. Total enrolment in the state or union territory desired target population:

box [a] – box [b]

[c] 207825

6. Percentage of coverage in the state or union territory desired target class population:

box [c] ÷ box [a]

[d] 97.86

7. Describe your data source:

UDISE

SAMPLING FORM 2**State/UT desired target population**

State or union territory: State A

Person who completed this form:

1. Total enrolment in the state or union territory desired target population:

From box [c] on sampling form 1

[a] 207825

2. School-level exclusions:

Description of exclusions	# of students
Invalid School Category	0
<5	21
Total Exclusion	[b] 21

Percentage of school-level exclusions:

box [b] ÷ box [a]

[b] 0.000101

3. Total enrolment in the state or union territory defined target population:

box [a] – box [b]

[c] 207804

4. Describe your data source:

UDISE

SAMPLING FORM 3

Stratification

State or union territory: State A

Person who completed this form:

Explicit stratification

1. List and describe the variables used for explicit stratification:

Explicit stratification variables		# of levels
1	District	1
2		
3		

2. Total number of explicit strata:

Implicit stratification

3. List the implicit variables by order of importance and describe their levels:

Implicit stratification variables (List by order of importance)		# of levels
1	Block	12
2	Area	2
3	Management	2
4	Type of school	3
5	Medium of instruction	2

4. Total number of implicit strata:

Appendix D

Procedure for IRT Scaling of NAS

For the IRT calibration of NAS 2017 data, multiple options were considered related to the choice of IRT models, method for computing scale scores, selection of language used for calibration, IRT software, and characteristics of reporting scale (e.g., range, center point, and standard deviation).

Regarding the choice of IRT model, considering the nature of NAS items, the choice was narrowed to either the one-parameter logistic (1-PL) or two-parameter logistic (2-PL) model as most frequently used IRT models in the practice of educational assessment. The decision about the IRT model to be used for calibration of NAS data was informed by the following evidence:

- Fit between the provisions of the theoretical model and empirical data is considered as one of the major criteria for making decisions about models to be used in practice. No mathematical model can perfectly describe natural phenomena; however, mathematical models can be tested for their fit to empirically collected data, and those that demonstrate better fit can be considered as more fruitful in describing nature (J.P. Box: "All the models are wrong, but some are useful.").
- Convergence between models stemming from different conceptual domains can be considered another criterion for the selection of models, for example, convergence between IRT and CTT models of measurement, including reasonableness, common sense, and logical acceptability.

Regarding the selection of language data, two main options were considered: 1) conducting calibration on one selected language (considering English or Hindi), or 2) conducting calibration on a random sample of cases from the entire data file so that each language would be proportionally represented.

In order to supply evidence that will inform the decisions described above, two NAS 2017 tests (Mathematics Class III and Reading Class V) were calibrated under both IRT models (1-PL and 2-PL) using three different samples of students: 1) students taking the English version, 2) students taking the Hindi version, and 3) 10% randomly selected students from the complete data set of all language versions of the test.

Each NAS tests is designed in two forms of 15 items with 5 items that are common between forms. This makes a total of 25 unique items, which were calibrated concurrently in order to place both forms onto the same scale. Thus, 12 calibrations were carried out on 25 items from two NAS tests, using two IRT models, and three different language samples of students (presented in Table 1).

Table D-1: Overview of Calibrations

Language Sample	NAS Test			
	Math Class III		Reading Class V	
English	1-PL	2-PL	1-PL	2-PL
Hindi	1-PL	2-PL	1-PL	2-PL
All (10%)	1-PL	2-PL	1-PL	2-PL

The results of testing model-data fit obtained for each test, sample, and IRT model are presented in Table 2. As can be seen, the values of Chi-square, which represent differences between frequencies based on the model and

frequencies observed in data, are substantially lower for the 2-PL model. Thus, it can be concluded that the 2-PL model consistently demonstrates better model-data fit in both calibrated tests across all three language samples.

Table D-2: Overview of Calibrations

Test	Language Sample	1-PL		2-PL		Difference 1-PL vs 2-PL
		Chi-Square	D.F.	Chi-Square	D.F.	
Math Class III	English	16352.01	225	13621.08	225	2730.93
	Hindi	16491.02	225	12730.55	225	3760.48
	All (10%)	15511.89	225	12542.65	225	2969.24
Reading Class V	English	19442.90	250	13492.29	250	5950.60
	Hindi	15607.12	240	10405.92	225	5201.21
	All (10%)	14269.86	225	10589.65	225	3680.21

Factor analyses of items from these two tests were carried out using different language samples. A general observation from these factor analyses is that the number of meaningful factors extracted was always one (proving uni-dimensionality of data), and that factor loadings (associations of items with the measured latent construct) obtained on different language samples were highly similar (this corresponds to the result of IRT calibration showing that discrimination parameters were similar between language samples). Another similarity with IRT analysis, the differences observed in item means in the Reading Class V test suggest that the English version of the test might be more challenging.

Based on obtained results of model-data fit, and alignment between item parameters stemming from IRT and CTT concepts of measurement, it was decided that the 2-PL IRT model will be used for calibrations and the creation of the IRT scale for NAS 2017 and further assessment cycles.

Regarding the choice of language data used for calibration, minor or negligible differences in item parameters obtained on different language samples for the Math Class III test were observed. On the other hand, differences between difficulty parameters for the Reading Class V tests are substantial, suggesting that the English version of the test poses a greater challenge than versions in other languages. Thus, regarding the language sample, it was decided that the sample of all cases will be used for calibrations allowing each language to be proportionately represented.

Regarding the IRT calibration method, estimation of the student ability scores, and characteristics of the reporting scale (e.g., range and anchor points), based on extensive evidence of the construction and utilization of IRT scales, the following options were accepted:

- Reporting scale for NAS 2017 will be constructed using IRT calibration with the distribution of item difficulty centered to zero, which leaves the distribution of student ability estimates to be determined based on difficulty posed by each test.
- For estimation of student ability scores will be carried out by IRT pattern-scoring method using a Weighted Maximum Likelihood (WML) algorithm. A general characteristic of IRT ability estimation is that person score estimates are independent of any particular set of items (test-free scores), and, provided that the parameters of the two forms are placed on the same scale, the scores on the two forms obtained by pattern-scoring are directly comparable. The IRT scores (ability estimates) are initially generated in logit metrics, but they are linearly converted into a meaningful and publicly communicable scale that facilitates score interpretation.
- Linear transformation from the logit scale (LS) to the reporting Scale Score (SS) will be done by specifying a linear transformation function that sets the reporting scale to the desired mean and standard deviation. The

mean of the reporting scale was set to 300 and standard deviation to 50, with a range 100-500, so the linear transformation from LS to SS was done using the following expression:

$$SS = 300 + 50 * LS$$

In such a case of simple transformation, the cut scores obtained through setting performance standards have different value for each test.

Regarding IRT software, it was agreed to use a versatile software package that can run multi-parameter models and that can be used for estimating ability scores, as well as for future equating purposes. Specifically, it was agreed to use PARSCALE for Windows version 4.1.

PARSCALE (Muraki & Bock, 1996) is a program that performs estimation of item parameters and test scoring under a variety of IRT models. It allows for the inclusion of different item types, and consequently different IRT models, into the framework of the same analysis. This unique feature makes it especially useful for the calibration of educational tests, which typically consist of various item formats (e.g., multiple choice, short answer, open-ended, and writing prompt items). Further, it allows parameters for some items to be specified to fixed values defining the metrics to which the parameters of other items will be estimated. This feature is especially useful for equating designs that employ anchor items.

The program can estimate parameters under the 1P, 2P, and 3P models for dichotomous items, and for polytomous items it can apply the graded response model, a rating scale version of the graded response model, the partial credit model, and the generalized partial credit model. It can also perform the multigroup item calibration offering testing for the rater's effect, the differential item functioning, and the trend.

The PARSCALE offers abundant output providing a large number of classical and IRT statistics. For example, for any model, it allows the computation of item information at numerous theta points and saves the values into an external text file. It also provides advanced chi-square item and test fit statistics. All these features make this program extremely useful in the development and psychometric analyses of educational tests.

Appendix E

Weighting Procedure

The following technical steps were carried out to obtain the final sampling weights:

1. Matching the research file (containing the scores in both Pct-correct and IRT metrics) with the sampling frame to obtain school enrolment information. For schools that did not match with sampling frame the average school enrolment in the corresponding district was imputed.
2. Computing School Probability defined as the ratio between the number of participating students in the school (actual number of students in data) and the MOS (measure of size or enrolment) in corresponding school.
3. Computing School Weight defined as a ratio: $1/\text{School Probability}$.
4. Computing the representation of each district in the state population (district enrolment /state enrolment), and the representation of each district in the state sample (district participation/state participation).
5. Computing District Weight as the following ratio: district representation in the population/district representation in the sample.
6. Calculating representation of each state in the national population (state enrolment/national enrolment) and the representation of each state in the national sample (state participation/national participation).
7. Computing State Weight as the following ratio: state representation in the population/state representation in the sample.
8. Trimming all 3 weights based on (median * 4) range.
9. Calculating the Total Weight as a product of the three trimmed weights (school, district, and state).
10. Trimming the Total Weight based on (median * 4) range.
11. Calculating the final Proportional Total Weight by dividing the trimmed Total Weight by its mean. This procedure centers the weight distribution of the total sample to 1, which avoids increasing of Type I error in statistical tests.

All the statistical procedures were carried out using the final sampling weights.

Appendix F

Results for Class III Subjects by States

Table F-3: Weighted Means, N-counts, Standard Deviations, and Standard Errors

State	Language III				Mathematics III				Environmental Studies III			
	Mean	N	SD	SE	Mean	N	SD	SE	Mean	N	SD	SE
Jammu & Kashmir	332	3498	54	0.9	318	3460	55	0.9	310	3480	47	0.8
Himachal Pradesh	341	1620	51	1.3	320	1608	51	1.3	322	1618	44	1.1
Punjab	330	6732	55	0.7	306	6625	52	0.6	308	6700	42	0.5
Chandigarh	354	1071	52	1.6	339	1069	54	1.7	343	1070	46	1.4
Uttarakhand	347	3315	54	0.9	330	3305	51	0.9	333	3311	45	0.8
Haryana	329	11907	53	0.5	307	11780	50	0.5	313	11842	47	0.4
Delhi	316	17382	53	0.4	299	17207	51	0.4	303	17299	47	0.4
Rajasthan	358	20012	50	0.4	339	19996	52	0.4	337	19996	44	0.3
Uttar Pradesh	314	109063	64	0.2	309	109876	54	0.2	303	109690	55	0.2
Bihar	336	112062	53	0.2	318	110511	51	0.2	317	111212	46	0.1
Sikkim	325	154	50	4	307	154	50	4	308	154	42	3.4
Arunachal Pradesh	307	1281	53	1.5	295	1269	52	1.5	295	1272	47	1.3
Nagaland	345	1194	57	1.6	330	1193	53	1.5	327	1193	49	1.4
Manipur	341	1293	52	1.4	329	1292	52	1.4	331	1292	47	1.3
Mizoram	337	395	48	2.4	315	395	46	2.3	331	395	47	2.4
Tripura	336	2955	54	1	318	2912	55	1	323	2932	48	0.9
Meghalaya	327	3410	56	1	307	3400	49	0.8	311	3412	47	0.8
Assam	350	20291	56	0.4	337	20193	55	0.4	331	20243	48	0.3
West Bengal	356	31008	57	0.3	337	30665	55	0.3	334	30896	48	0.3
Jharkhand	344	29074	53	0.3	327	28741	54	0.3	325	28882	47	0.3
Odisha	326	23464	45	0.3	316	23284	52	0.3	311	23324	44	0.3
Chhattisgarh	332	11899	51	0.5	314	11837	49	0.5	318	11879	44	0.4
Madhya Pradesh	340	36685	52	0.3	316	36410	50	0.3	320	36533	45	0.2
Gujarat	347	32377	54	0.3	325	32286	52	0.3	329	32351	46	0.3
Daman & Diu	330	105	53	5.2	310	106	48	4.7	314	106	46	4.5
Dadra & Nagar Haveli	343	190	52	3.8	328	189	51	3.7	328	190	44	3.2
Maharashtra	344	62652	55	0.2	325	62250	53	0.2	330	62478	48	0.2
Andhra Pradesh	364	13362	53	0.5	342	13350	48	0.4	336	13361	40	0.3
Karnataka	360	23066	54	0.4	348	22959	52	0.3	341	23013	44	0.3
Goa	333	913	49	1.6	309	909	45	1.5	319	915	42	1.4
Lakshadweep	313	7	44	16.6	308	7	45	17	301	7	38	14.4
Kerala	349	17959	53	0.4	340	17926	51	0.4	346	17947	47	0.4
Tamil Nadu	325	33884	49	0.3	314	33854	45	0.2	323	33875	43	0.2
Puducherry	316	239	46	3	314	239	45	2.9	310	239	41	2.7
A & N Islands	326	163	52	4.1	318	164	50	3.9	318	164	46	3.6
Telangana	340	11401	54	0.5	332	11397	53	0.5	327	11402	46	0.4
National Mean	336	646085	57	0.1	321	642816	53	0.1	321	644673	49	0.1

Results for Class V Subjects by States

Table F-4: Weighted Means, N-counts, Standard Deviations, and Standard Errors

State	Language V				Mathematics V				Environmental Studies V			
	Mean	N	SD	SE	Mean	N	SD	SE	Mean	N	SD	SE
Jammu & Kashmir	310	1949	53	1.2	315	1947	56	1.3	307	1951	52	1.2
Himachal Pradesh	328	1397	51	1.4	305	1393	51	1.4	310	1395	47	1.3
Punjab	306	9644	50	0.5	293	9542	54	0.6	297	9621	49	0.5
Chandigarh	345	1243	59	1.7	336	1242	59	1.7	335	1243	57	1.6
Uttarakhand	338	2562	56	1.1	326	2561	56	1.1	327	2561	53	1
Haryana	310	12190	54	0.5	294	12041	51	0.5	298	12199	52	0.5
Delhi	303	19221	50	0.4	287	19113	49	0.4	292	19219	46	0.3
Rajasthan	344	20360	58	0.4	338	20331	53	0.4	339	20348	54	0.4
Uttar Pradesh	300	86172	61	0.2	301	85851	58	0.2	300	86163	58	0.2
Bihar	316	108910	52	0.2	309	107692	53	0.2	311	108675	52	0.2
Sikkim	297	380	42	2.2	281	379	40	2.1	282	380	40	2.1
Arunachal Pradesh	287	999	49	1.6	278	996	43	1.4	282	998	46	1.5
Nagaland	312	807	56	2	300	807	52	1.8	302	808	52	1.8
Manipur	320	764	54	2	316	763	56	2	321	764	55	2
Mizoram	301	361	40	2.1	293	361	44	2.3	302	361	44	2.3
Tripura	316	2568	52	1	304	2558	53	1	308	2564	51	1
Meghalaya	296	2349	45	0.9	284	2348	47	1	283	2350	45	0.9
Assam	322	16008	49	0.4	333	15914	57	0.5	327	15984	52	0.4
West Bengal	317	69859	62	0.2	301	69191	57	0.2	304	69698	54	0.2
Jharkhand	326	28219	54	0.3	321	28071	56	0.3	326	28181	55	0.3
Odisha	304	24435	49	0.3	321	24334	62	0.4	311	24430	51	0.3
Chhattisgarh	313	15458	49	0.4	298	15407	51	0.4	303	15454	50	0.4
Madhya Pradesh	313	32266	59	0.3	303	31328	52	0.3	305	32668	60	0.3
Gujarat	324	38459	55	0.3	321	38148	57	0.3	314	38424	51	0.3
Daman & Diu	300	132	48	4.2	290	131	49	4.3	288	131	48	4.2
Dadra & Nagar Haveli	335	234	56	3.7	325	234	50	3.3	325	234	50	3.3
Maharashtra	323	80583	60	0.2	305	80082	55	0.2	304	80406	50	0.2
Andhra Pradesh	339	14744	61	0.5	333	14710	60	0.5	324	14751	55	0.5
Karnataka	351	21816	57	0.4	345	21772	55	0.4	335	21800	49	0.3
Goa	313	1474	53	1.4	295	1471	40	1	292	1474	40	1
Lakshadweep	304	54	49	6.7	291	54	40	5.4	285	54	39	5.3
Kerala	353	22603	71	0.5	342	22591	67	0.4	336	22614	62	0.4
Tamil Nadu	321	36158	54	0.3	300	36134	48	0.3	300	36147	44	0.2
Puducherry	300	280	50	3	302	279	47	2.8	296	279	43	2.6
A & N Islands	309	202	58	4.1	302	202	49	3.4	303	202	48	3.4
Telangana	314	13037	54	0.5	316	13020	55	0.5	303	13033	52	0.5
National Mean	319	687898	59	0.1	310	682995	57	0.1	310	687566	54	0.1

Results for Class VIII Subjects by States

Table F-5: Weighted Means, N-counts, Standard Deviations, and Standard Errors

State	Language VIII				Mathematics VIII				Science VIII				Social Science VIII			
	Mean	N	SD	SE	Mean	N	SD	SE	Mean	N	SD	SE	Mean	N	SD	SE
Jammu & Kashmir	275	2383	50	1.0	256	2383	49	1.0	258	2367	58	1.2	258	2359	51	1.1
Himachal Pradesh	312	2369	45	0.9	254	2366	40	0.8	273	2365	53	1.1	279	2357	43	0.9
Punjab	299	12120	48	0.4	243	12012	39	0.4	257	12003	44	0.4	258	11895	42	0.4
Chandigarh	315	1333	51	1.4	277	1332	55	1.5	292	1330	65	1.8	302	1331	56	1.5
Uttarakhand	309	4484	52	0.8	262	4473	49	0.7	281	4461	55	0.8	285	4434	52	0.8
Haryana	305	13159	49	0.4	256	13124	44	0.4	268	13058	52	0.5	273	13010	49	0.4
Delhi	299	19198	48	0.3	244	19132	36	0.3	248	19057	38	0.3	258	18915	38	0.3
Rajasthan	329	16173	57	0.4	304	16141	55	0.4	326	16124	68	0.5	327	16112	62	0.5
Uttar Pradesh	293	98133	58	0.2	262	97466	55	0.2	266	96739	63	0.2	271	95690	60	0.2
Bihar	307	96726	52	0.2	277	96137	53	0.2	277	95155	58	0.2	287	94206	55	0.2
Sikkim	294	406	46	2.3	241	407	32	1.6	257	406	42	2.1	263	406	39	1.9
Arunachal Pradesh	280	1006	51	1.6	248	1001	37	1.2	250	997	47	1.5	261	989	45	1.4
Nagaland	273	479	49	2.2	246	478	39	1.8	247	477	46	2.1	259	477	43	2.0
Manipur	293	534	49	2.1	267	532	50	2.2	272	530	56	2.4	275	524	49	2.1
Mizoram	284	319	42	2.4	256	319	34	1.9	250	318	39	2.2	257	318	42	2.4
Tripura	300	3097	49	0.9	258	3089	45	0.8	266	3079	48	0.9	265	3062	39	0.7
Meghalaya	288	2439	47	1.0	249	2438	36	0.7	252	2434	43	0.9	260	2427	40	0.8
Assam	298	23758	48	0.3	283	23735	57	0.4	289	23706	57	0.4	294	23594	53	0.3
West Bengal	303	58252	53	0.2	261	57908	52	0.2	269	57662	54	0.2	265	57031	49	0.2
Jharkhand	317	24939	54	0.3	293	24907	54	0.3	302	24853	61	0.4	307	24735	57	0.4
Odisha	299	23947	50	0.3	273	23878	56	0.4	277	23807	61	0.4	272	23652	51	0.3
Chhattisgarh	303	16732	51	0.4	255	16677	47	0.4	275	16641	58	0.4	282	16589	53	0.4
Madhya Pradesh	301	44736	57	0.3	264	44597	51	0.2	274	44231	60	0.3	280	43907	56	0.3
Gujarat	325	32924	57	0.3	281	32926	54	0.3	295	32895	59	0.3	306	32873	54	0.3
Daman & Diu	295	127	47	4.2	242	126	32	2.9	248	126	39	3.5	257	126	36	3.2
Dadra & Nagar Haveli	314	282	52	3.1	279	281	54	3.2	296	281	61	3.6	305	281	54	3.2
Maharashtra	320	89644	54	0.2	263	89394	48	0.2	266	88939	55	0.2	274	88467	48	0.2
Andhra Pradesh	308	25345	51	0.3	286	25328	62	0.4	286	25286	62	0.4	291	25225	54	0.3
Karnataka	318	36872	50	0.3	287	36842	55	0.3	297	36803	59	0.3	297	36741	51	0.3
Goa	311	978	50	1.6	248	975	34	1.1	258	973	44	1.4	265	971	41	1.3
Lakshadweep	289	28	49	9.3	247	28	30	5.7	245	28	40	7.6	247	28	33	6.2
Kerala	322	35595	50	0.3	286	35591	51	0.3	271	35575	45	0.2	264	35517	41	0.2
Tamil Nadu	305	53300	50	0.2	251	53273	39	0.2	256	53258	44	0.2	256	53169	39	0.2
Puducherry	277	635	44	1.7	241	634	30	1.2	242	633	38	1.5	245	634	35	1.4
A & N Islands	294	245	48	3.1	248	245	40	2.6	254	245	44	2.8	257	244	42	2.7
Telangana	297	18596	47	0.3	257	18566	47	0.3	259	18539	47	0.3	270	18444	50	0.4
National Mean	307	761292	54	0.1	269	758740	53	0.1	274	755383	58	0.1	278	750741	54	0.1

Combined Results for Classes by States

Table F-6: Weighted Means, N-counts, Standard Deviations, and Standard Errors

State	Class III				Class V				Class VIII				All Classes			
	Mean	N	SD	SE	Mean	N	SD	SE	Mean	N	SD	SE	Mean	N	SD	SE
Jammu & Kashmir	320	3480	52	0.9	311	1949	54	1.2	262	2373	52	1.1	296	2578	52	1.0
Himachal Pradesh	328	1615	49	1.2	314	1395	50	1.3	280	2364	46	0.9	300	1849	47	1.1
Punjab	315	6686	50	0.6	299	9602	51	0.5	264	12007	44	0.4	285	9689	47	0.5
Chandigarh	345	1070	51	1.6	339	1243	58	1.7	297	1332	57	1.6	322	1227	56	1.6
Uttarakhand	337	3310	50	0.9	331	2561	55	1.1	284	4463	52	0.8	309	3547	52	0.9
Haryana	317	11843	50	0.5	301	12144	52	0.5	275	13087	49	0.4	295	12431	50	0.4
Delhi	306	17296	50	0.4	294	19185	48	0.3	262	19076	40	0.3	284	18574	46	0.3
Rajasthan	345	20001	49	0.3	341	20346	55	0.4	321	16137	61	0.5	335	18559	55	0.4
Uttar Pradesh	308	109543	58	0.2	300	86062	59	0.2	273	97007	59	0.2	292	97484	59	0.2
Bihar	324	111262	50	0.2	312	108426	52	0.2	287	95556	55	0.2	307	104129	52	0.2
Sikkim	313	154	48	3.8	287	380	41	2.1	264	406	40	2.0	279	322	42	2.3
Arunachal Pradesh	299	1274	50	1.4	282	998	46	1.5	260	998	45	1.4	280	1081	47	1.4
Nagaland	334	1193	53	1.5	305	808	54	1.9	256	478	45	2.0	306	791	51	1.8
Manipur	334	1292	50	1.4	319	763	55	2.0	277	530	51	2.2	315	829	52	1.8
Mizoram	328	395	47	2.4	299	361	42	2.2	262	318	39	2.2	295	354	43	2.3
Tripura	326	2933	52	1.0	309	2563	52	1.0	272	3082	46	0.8	299	2881	50	0.9
Meghalaya	315	3407	51	0.9	288	2349	46	0.9	262	2435	42	0.8	289	2701	46	0.9
Assam	339	20242	53	0.4	327	15969	53	0.4	291	23698	54	0.3	314	20343	53	0.4
West Bengal	342	30856	54	0.3	308	69583	58	0.2	274	57713	52	0.2	299	53217	55	0.2
Jharkhand	332	28899	52	0.3	324	28157	55	0.3	305	24859	57	0.4	320	27060	54	0.3
Odisha	318	23357	47	0.3	312	24400	54	0.3	281	23821	54	0.4	301	23855	52	0.3
Chhattisgarh	321	11871	48	0.4	304	15439	50	0.4	279	16659	52	0.4	297	14857	51	0.4
Madhya Pradesh	325	36543	49	0.3	307	32087	57	0.3	280	44368	56	0.3	300	38336	54	0.3
Gujarat	334	32338	51	0.3	320	38343	54	0.3	302	32904	56	0.3	317	34366	54	0.3
Daman & Diu	318	106	49	4.8	293	131	48	4.2	260	126	39	3.5	286	122	45	4.1
Dadra & Nagar Haveli	333	190	49	3.6	328	234	52	3.4	299	281	55	3.3	315	240	53	3.4
Maharashtra	333	62460	52	0.2	311	80357	55	0.2	281	89111	51	0.2	302	78489	53	0.2
Andhra Pradesh	347	13358	47	0.4	332	14735	59	0.5	293	25296	58	0.4	314	18546	56	0.4
Karnataka	349	23013	50	0.3	344	21796	54	0.4	300	36814	54	0.3	322	28168	53	0.3
Goa	321	912	45	1.5	300	1473	45	1.2	270	974	42	1.4	295	1105	44	1.3
Lakshadweep	308	7	42	15.6	293	54	43	5.8	257	28	39	7.3	281	30	41	7.6
Kerala	345	17944	50	0.4	344	22603	67	0.4	286	35570	47	0.2	313	26392	54	0.3
Tamil Nadu	321	33871	45	0.2	307	36146	49	0.3	267	53250	43	0.2	290	42305	45	0.2
Puducherry	313	239	44	2.8	299	279	47	2.8	251	634	37	1.5	272	409	41	2.0
A & N Islands	321	164	49	3.8	305	202	52	3.6	263	245	44	2.8	289	208	47	3.3
Telangana	333	11400	51	0.5	311	13030	54	0.5	271	18536	48	0.4	296	14743	50	0.4
National Mean	326	644525	53	0.1	313	686153	57	0.1	282	756539	55	0.1	303	701819	55	0.1

Appendix G

Specific Performance Level Descriptors and Percentages of Students at Each Level

Specific Performance Level Descriptors for Language, Class III: Advanced, Proficient, Basic and Below Basic

Table G-1: Specific Performance Level Descriptors for Language, Class III: Advanced

Competency	Specific Performance Level Descriptors
Listening and Speaking	Listen, comprehend, analyse critically and respond on their own with clarity of expression to instructions, commands, announcements using creative thinking. Listen, comprehend unfamiliar text such as short passages, poems and stories and express in their own words with proper pronunciation and intonation
Reading Aloud	Read familiar and unfamiliar text aloud with proper pronunciation, stress and pause, appropriate speed with critical comprehension and reflection.
Silent Reading	Read familiar and unfamiliar text such as wall posters, pictures, charts and comprehend the details of main idea and draws logical conclusions after critical appreciation of the text. Read, analyze and infer logical details based on comprehension and reflect on the text.
Vocabulary	Familiar with at least 250 words in active vocabulary and able to use in day to day expression in sentences.
Writing	Write 5-6 sentences on a given topic/own experience with appropriate diction, grammatical accuracy and with creative expression.

Table G-2: Specific Performance Level Descriptors for Language, Class III: Proficient

Competency	Specific Performance Level Descriptors
Listening and Speaking	Listen, comprehend, analyse and respond to instructions, commands, announcements on their own. Listen and comprehend familiar short texts such as stories, poems and express their opinions in their own words. Participate in peer interaction and respond appropriately.
Reading Aloud	Read familiar and unfamiliar text aloud with proper pronunciation, stress and pause, appropriate speed with comprehension.
Silent Reading	Read text such as wall posters, pictures, charts and comprehend the details of main idea and draw logical conclusions of the text. Read, analyse and infer logical details based on comprehension.
Vocabulary	Have adequate active vocabulary and apply them in known familiar situations.
Writing	Write sentences on a given topic/own experience with appropriate diction, grammatical accuracy.

Table G-3: Specific Performance Level Descriptors for Language, Class III: Basic

Competency	Specific Performance Level Descriptors
Listening and Speaking	Listen to instructions, commands, announcements and comprehend on their own / and respond with the support of teacher. Listen and comprehend very short familiar text and respond with the support of teacher.
Reading Aloud	Read familiar text aloud with proper pronunciation, stress and pause but without appropriate speed and literal comprehension.
Silent Reading	Read familiar text and comprehend the details of main idea and draws logical conclusions based on literal comprehension. Read and locate central idea of the text.
Vocabulary	Familiar with at least 100 words in active vocabulary but unable to use in day to day expression in sentences.
Writing	Write 2-3 sentences on a familiar given topic with simple diction.

Table G-4: Specific Performance Level Descriptors for Language, Class III: Below Basic

Competency	Specific Performance Level Descriptors
Listening and Speaking	Listen but unable to comprehend instructions, commands, announcements even with the continuous support of teacher. Listen but unable to comprehend short familiar text and respond even with the support of teacher.
Reading Aloud	Unable to read familiar text aloud with proper pronunciation, stress and pause without appropriate speed and literal comprehension.
Silent Reading	Unable to read familiar text and comprehend. Unable to read and locate central idea of the text.
Vocabulary	Unable to be familiar with at least 100 words in active vocabulary and use in day to day expression in sentences.
Writing	Unable to write a complete sentence on a familiar topic.

Specific Performance Level Descriptors for Language, Class V: Advanced, Proficient, Basic and Below Basic

Table G-5: Specific Performance Level Descriptors for Language, Class V: Advanced

Competency	Specific Performance Level Descriptors
Listening and Speaking	<p>Listen to oral questions, audio tapes, news, announcements, comprehend and analyse critically and respond independently with creative thinking and clarity of expression.</p> <p>Listen, comprehend unfamiliar text such as short passages, poems, riddles, rules of games and stories and express coherently in their own words with proper pronunciation, stress, pause and intonation.</p> <p>Conduct role plays, interviews with strangers, narrate incidents giving details in sequential order with connected ideas.</p> <p>Appreciate verbally the visual descriptions such as posters, cartoons, hoardings, advertisements along with drawing logical inferences.</p>
Reading Aloud	<p>Read aloud familiar and unfamiliar text with proper pronunciation, stress and pause, appropriate speed with critical comprehension.</p> <p>Guess meaning and verify by consulting dictionary to find meaning of familiar but passive vocabulary.</p>
Silent Reading	<p>Read familiar and unfamiliar texts such as letters, newspapers, articles and comprehend the details of main idea and draws logical conclusions after critical appreciation of the text.</p> <p>Read, analyse and infer logical details based on comprehension and reflect on the complexity of the text material.</p>
Vocabulary	<p>Familiar with at least 500 words in active vocabulary and able to use in day to day expression in sentences.</p>
Writing	<p>Write a paragraph on a given topic/own experience with appropriate diction, grammatical accuracy and with creative expression.</p> <p>Write short stories, profiles, descriptions, informal letters, poems, riddles, slogans with creative expressions using linkers/ punctuation marks.</p>

Table G-6: Specific Performance Level Descriptors for Language, Class V: Proficient

Competency	Specific Performance Level Descriptors
Listening and Speaking	<p>Listen to questions, audio tapes, news, announcements, comprehend and respond independently.</p> <p>Listen, comprehend only simple text such as short passages, poems, riddles, rules of games and stories and express coherently in their own words with proper pronunciation, stress, pause and intonation.</p> <p>Conduct role plays, interviews with familiar groups, narrates incidents giving details in sequential order.</p> <p>Appreciate verbally the visual descriptions such as posters, cartoons, hoardings, advertisements and respond to them in their own words.</p>
Reading Aloud	<p>Read aloud familiar text with proper pronunciation, stress and pause, appropriate speed with analytical comprehension.</p> <p>Consult dictionary to find meaning of unfamiliar words.</p>
Silent Reading	<p>Read text and comprehend the details of main idea and infer logical conclusions.</p> <p>Read, locate central idea and infer logical conclusions based on comprehension.</p>
Vocabulary	<p>Have adequate active vocabulary and apply them in new situations.</p>
Writing	<p>Write a paragraph on a given topic/own experience with verbal/visual cues using correct diction and grammatical accuracy</p> <p>Write descriptions, informal letters, poems, riddles in a coherent manner.</p>

Table G-7: Specific Performance Level Descriptors for Language, Class V: Basic

Competency	Specific Performance Level Descriptors
Listening and Speaking	<p>Listen to oral questions, audio tapes, news, announcements, comprehend and respond with some external support.</p> <p>Listen, comprehend only familiar text such as short passages, poems, riddles, rules of games and stories and manage to express in their own words.</p> <p>Participate in role plays, interviews with familiar groups with the peer support, participate in narrating activities with the peer group.</p> <p>Respond verbally to the visual descriptions such as posters, cartoons, hoardings, advertisements with the peer support.</p>
Reading Aloud	<p>Read aloud familiar text with proper pronunciation, stress and pause with less speed and literal comprehension.</p> <p>Consult dictionary to find reinforce the meaning of familiar words with the help of peer support.</p>
Silent Reading	<p>Read familiar text and comprehend the details of main idea and infer logical conclusions based on literal comprehension.</p> <p>Read and locate central idea of the text.</p>
Vocabulary	<p>Familiar with at least 250 words in active vocabulary but unable to use in day to day expression in sentences.</p>
Writing	<p>Write a paragraph on a given topic with verbal /visual cues and peer support.</p> <p>Write only short stories and descriptions, informal letters in a coherent manner.</p>

Table G-8: Specific Performance Level Descriptors for Language, Class V: Below Basic

Competency	Specific Performance Level Descriptors
Listening and Speaking	<p>Unable to comprehend and respond to simple oral questions.</p> <p>Listen but unable to comprehend even familiar text such as short passages, poems, riddles, games and stories and express in their own words.</p> <p>Find difficult to conduct interviews with familiar groups even with the peer support, unable to narrate activities with the peer group support.</p> <p>Unable to respond verbally to the visual descriptions even with the teacher / peer support.</p>
Reading Aloud	<p>Unable to read aloud familiar text with proper pronunciation, stress and pause with less speed and literal comprehension.</p> <p>Unable to consult dictionary to find the meaning of familiar words even with the help of teacher support.</p>
Silent Reading	<p>Unable to read familiar text and comprehend.</p> <p>Unable to read and locate central idea of the text.</p>
Vocabulary	<p>Unable to be familiar with at least 250 words in active vocabulary and use in day to day expression in sentences.</p>
Writing	<p>Unable to write a paragraph on a given topic.</p> <p>Unable to write short stories and descriptions.</p>

Specific Performance Level Descriptors for Language, Class VIII: Advanced, Proficient, Basic and Below Basic

Table G-9: Specific Performance Level Descriptors for Language, Class VIII: Advanced

Competency	Specific Performance Level Descriptors
Listening and Responding (Oral and Written)	<p>Listen to news, announcements, speeches, debates, discussions, running commentaries, comprehend and analyze critically and respond independently with clarity of expression using creative thinking.</p> <p>Conduct interviews with people of various professions using various language elements like polite expressions, offers, requests.</p> <p>Narrate incidents, recite poems, practice dialogues, make announcements, compere for school programmers using proper pronunciation, stress, intonation and voice modulation.</p> <p>Appreciate verbally the print text such as stories, anecdotes, travelogue, biography advertisements along with drawing logical inferences.</p>
Reading	<p>Read familiar and unfamiliar text such as supplementary reader, story books, science fiction, biography with appropriate speed with critical comprehension.</p> <p>Consult dictionary, thesaurus, encyclopedia to find meaning of unfamiliar words, phrases and other information across curriculum.</p> <p>Read, analyze and infer logical details based on comprehension and reflect on the text material such as stories, articles, editorials, sports articles, advertisements, etc.</p>
Vocabulary	<p>Familiar with at least 1000 words in active vocabulary and able to use in day to day expression in sentences.</p>
Writing	<p>Write a paragraph, character sketch of a story/play, write ups using online and offline resources on a given topic/own experience, with appropriate diction, grammatical accuracy and with creative expression and extrapolation.</p> <p>Write descriptions, short stories, formal/ informal letters, script, poems, book review with creative expression.</p>

Table G-10: Specific Performance Level Descriptors for Language, Class VIII: Proficient

Competency	Specific Performance Level Descriptors
Listening and Responding (Oral and Written)	<p>Listen to news, announcements, comprehend and respond independently, listen to debates, discussions and involve actively in them.</p> <p>Conduct interviews with familiar groups, narrates incidents /descriptions giving details in sequential order.</p> <p>Narrate incidents; recite poems using proper pronunciation and voice modulation.</p> <p>Appreciate verbally the authentic text such as stories, anecdotes, advertisements and respond to them in their own words.</p>
Reading	<p>Read text with appropriate speed with analytical comprehension and reflection.</p> <p>Consult dictionary, Encyclopedia, thesaurus to find meaning of unfamiliar words, phrases and other information across curriculum.</p> <p>Read, locate central idea and infer logical conclusions based on comprehension and give critical appreciation.</p>
Vocabulary	Have rich active vocabulary and apply them in new situations.
Writing	<p>Write a paragraph, character sketch of a story/play using offline resources on a given topic/own experience with appropriate diction, grammatical accuracy</p> <p>Write short stories, formal/ informal letters, descriptions in a coherent manner.</p>

Table G-11: Specific Performance Level Descriptors for Language, Class VIII: Basic

Competency	Specific Performance Level Descriptors
Listening and Responding (Oral and Written)	<p>Listen to news and announcements, comprehend and respond with some external support.</p> <p>Conduct interviews with familiar groups with the peer support, participate in narrating activities with the peer group.</p> <p>Narrate incidents, recite poems using proper pronunciation and voice modulation with repeated practice.</p> <p>Respond verbally to the print text such as stories, anecdotes, advertisements with the peer support.</p>
Reading	<p>Read familiar text with less speed and literal comprehension with peer group support.</p> <p>Consult dictionary to find the meaning of unfamiliar words with the help of peer support.</p> <p>Read and locate central idea of the unfamiliar text.</p>
Vocabulary	Familiar with at least 700 words in active vocabulary but unable to use in day to day expression in sentences.
Writing	<p>Write a paragraph, character sketch of a story/play on a given topic with appropriate grammatical accuracy with peer group and teacher support.</p> <p>Write only descriptions, short stories, informal letters in a coherent manner.</p>

Table G-12: Specific Performance Level Descriptors for Language, Class VIII: Below Basic

Competency	Specific Performance Level Descriptors
Listening and Responding (Oral and Written)	<p>Listen to news and announcements but unable to comprehend and respond to those audio deliveries.</p> <p>Find difficult to conduct interviews with familiar groups even with the peer support, unable to narrate activities with the peer group support.</p> <p>Unable to narrate incidents, recite poems even with repeated practice.</p> <p>Unable to respond verbally to the print text even with the teacher / peer support.</p>
Reading	<p>Unable to read familiar text even with less speed and literal comprehension even with peer group support.</p> <p>Unable to consult dictionary to find the meaning of unfamiliar words even with the help of teacher support.</p> <p>Unable to read and locate central idea of the unfamiliar text.</p>
Vocabulary	<p>Unable to be familiar with at least 700 words in active vocabulary and use in day to day expression in sentences.</p>
Writing	<p>Unable to write a paragraph, character sketch of a story/play on a given topic.</p> <p>Unable to write descriptions, short stories and informal letters.</p>

Specific Performance Level Descriptors for Mathematics, Class III: Advanced, Proficient, Basic and Below Basic

Table G-13: Specific Performance Level Descriptors for Mathematics, Class III: Advanced

Competency	Specific Performance Level Descriptors
Conceptual Understanding and Procedural Knowledge	<p>Can expand & write beyond three digit numbers in expanded form.</p> <p>Can read & write Numbers beyond three digit.</p> <p>Can find before, and after numbers, in addition to missing numbers between two numbers beyond three digit.</p> <p>Can construct the multiplication tables 2 to 10.</p> <p>Division by algorithm.</p> <p>Identifying the chronological order of days/dates in a week/month.</p>
Mathematical Visualization and Communication	<p>Arrange, analyze and group the data in particular order to draw conclusion.</p> <p>Can use $<$, $>$ & $=$ to compare numbers.</p>
Mathematical Reasoning	<p>Can represent the data in the pictorial form.</p> <p>Identifying the magic square ... in the Calendar.</p>
Problem Solving	<p>Can solve complex problems related to all four fundamental operations such as addition, subtraction, Multiplication and Division correctly.</p> <p>Can solve problems related to additions vertically & horizontally for any number of digits.</p>
Application	<p>Can apply 4 fundamental operations on three digit in their daily life situations.</p> <p>Analyze & arrange the data to draw conclusion.</p> <p>Identifying the magic square ... in the Calendar.</p> <p>Sequences the events chronologically.</p>

Table G-14: Specific Performance Level Descriptors for Mathematics, Class III: Proficient

Competency	Specific Performance Level Descriptors
Conceptual Understanding and Procedural Knowledge	<p>Can expand three digit number in the expanded form.</p> <p>Can explain place value & face value of a digit in the given number.</p> <p>Can read & write directly three digit number.</p> <p>Can find before, and after numbers, in addition to missing numbers between two numbers up to three digit.</p> <p>Can multiply two digit by single digit.</p> <p>Division by repeated subtraction.</p> <p>Duration of days & time concerned.</p>
Mathematical Visualization and Communication	<p>Can record data using tally marks and can tabulate the data.</p> <p>Identify the smaller and greater number up to three digit numbers.</p> <p>Identify and write in correct form of date, month & year.</p>
Mathematical Reasoning	<p>Interpret the data.</p> <p>Identifying the magical relations in numbers in a calendar.</p>
Problem Solving	<p>Can solve problems related to four fundamental operations to their Grade.</p> <p>Can solve problems related to additions vertically & horizontally.</p>
Application	<p>Can apply Addition, subtraction & multiplication on three digit in their daily life situations.</p> <p>Arrange the collected data.</p> <p>Identifying the magical relations in numbers in a calendar.</p> <p>Sequences the events chronologically.</p>

Table G-15: Specific Performance Level Descriptors for Mathematics, Class III: Basic

Competency	Specific Performance Level Descriptors
Conceptual Understanding and Procedural Knowledge	<p>Can read & write 3 digit numbers by counting objects in hundreds, tens & ones.</p> <p>Can round the given numbers in 10s and 100s.</p> <p>Grouping pictures to get number.</p> <p>Can find before and after numbers up to three digit.</p> <p>Can construct the multiplication tables 2 to 10 by repeated addition.</p> <p>Division by grouping pictures.</p> <p>Reads a calendar to find a particular day and date.</p>
Mathematical Visualization and Communication	<p>Collection of the data for tabulating such using tally marks.</p> <p>Identify the smaller and greater number up to two digit numbers.</p>
Mathematical Reasoning	<p>Collecting tally marks (By Grouping).</p> <p>Reads a calendar to find a particular day/date.</p>
Problem Solving	<p>Can solve problems related to fundamental operations such as +, - and some to extent \times & \div to two digit numbers.</p> <p>Can solve problems related to additions vertically & horizontally of two-digit numbers.</p> <p>Can solve addition, subtraction problems in different situations presented through the pictures and stories.</p> <p>Can solve addition, subtraction problems in different situations presented through the pictures and stories.</p>
Application	<p>Can apply addition & subtraction on two digit in their daily life situations.</p> <p>Record the data in tabular form.</p> <p>Reads a calendar to find a particular day/date.</p>

Table G-16: Specific Performance Level Descriptors for Mathematics, Class III: Below Basic

Competency	Specific Performance Level Descriptors
Conceptual Understanding and Procedural Knowledge	<p>Unable to read & write 3 digit numbers by counting objects in hundreds, tens & ones.</p> <p>Unable to round the given numbers in 10s and 100s.</p> <p>Unable to find before and after numbers up to three digit.</p> <p>Unable to construct the multiplication tables 2 to 10 by repeated addition.</p> <p>Unable to read calendar to find a particular day and date.</p>
Mathematical Visualization and Communication	<p>Unable to collect the data for tabulating such using tally marks.</p> <p>Unable to identify the smaller and greater number up to two digit numbers.</p>
Mathematical Reasoning	<p>Unable to collect tally marks (By Grouping).</p> <p>Unable to read a calendar to find a particular day/date.</p>
Problem Solving	<p>Unable to solve problems related to fundamental operations such as +, - and some to extent \times & \div to two digit numbers.</p> <p>Unable to solve problems related to additions vertically & horizontally of two-digit numbers.</p> <p>Unable to solve addition, subtraction problems in different situations presented through the pictures and stories.</p>
Application	<p>Unable to find time from clock.</p>

Specific Performance Level Descriptors for Mathematics, Class V: Advanced, Proficient, Basic and Below Basic

Table G-17: Specific Performance Level Descriptors for Mathematics, Class V: Advanced

Competency	Specific Performance Level Descriptors
Conceptual Understanding and Procedural Knowledge	<p>Fractions and Decimal fractions: Approximation of the area of irregular geometrical shapes using grid paper by counting squares and their fraction part.</p> <p>Draws and traces the acute, right and obtuse angles. Shapes: Makes cube, cuboids, cylinder, and cone using nets.</p> <p>Estimates the length, weights, and volume (capacity) and verifies using standard units.</p> <p>Make conclusions and make predictions based on the trends of the data.</p> <p>Solves word problems related to four fundamental operations.</p>
Mathematical Visualization and Communication	<p>Estimates the results by performing four operations using different strategies and verifies with standard algorithm. Generates triangular numbers and square numbers and makes an attempt to explore other number patterns.</p>
Mathematical Reasoning	<p>Explore the principles behind Square and triangular numbers.</p>
Problem Solving	<p>Generates the different numbers from the given digits (More than four digits) and makes series of numbers; then arranges in ascending and descending order.</p> <p>Can use different operations, depend upon the context and solves the problems in multiple ways.</p>
Application	<p>Fractions and Decimal fractions: compares and then Quantifies the things around him using the concept of fraction towards accuracy.</p> <p>Angles and Shapes: Observes the different shapes in the immediate surroundings and explores the different angles hidden in them.</p>

Table G-18: Specific Performance Level Descriptors for Mathematics, Class V: Proficient

Competency	Specific Performance Level Descriptors
Conceptual Understanding and Procedural Knowledge	<p>Reads and writes numbers bigger than four digit numbers. Compares the numbers by interchanging the digits.</p> <p>Identifies and generates equivalent fractions and represents in pictorial form.</p> <p>Studies the characteristics of different shapes like edges, angles, faces, vertices, its moment (rolling/static). Explores the shapes of 2-D having characteristics like rotation, reflection, symmetry characteristics such as alphabets, numerals, drawings and shapes.</p> <p>Estimates and verifies by measuring the length, weight, volume in non-standard units.</p> <p>Interprets the data and graphs and make conclusions.</p> <p>Performs addition and subtraction of more than 4-digit numbers. Multiplication and division of more than four digit numbers with at least 2-digit numbers. The above operations have to be done with reasonable speed and accuracy.</p>
Mathematical Visualization and Communication	<p>Draws and traces the acute, right and obtuse angles. Shapes: Makes cube, cuboids, cylinder, and cone using nets.</p>
Mathematical Reasoning	<p>Identifies triangular and square numbers.</p>
Problem Solving	<p>Uses the number more than four digits in census, banking transaction, economic statistics etc.</p> <p>Can identify the numbers and identify the different relations and select the apt operation to solve the problem.</p>
Application	<p>Fractions and Decimal fractions: Extends the idea of fractions in different contexts like lengths, area, volume, weights, currency.</p> <p>Decimal Fraction: Applies the concept of decimal fractions for conversions of different units of measures.</p> <p>Measurements: Applies four fundamental operations in solving problems involving length, mass, capacity, time intervals and money.</p>

Table G-19: Specific Performance Level Descriptors for Mathematics, Class V: Basic

Competency	Specific Performance Level Descriptors
Conceptual Understanding and Procedural Knowledge	<p>Reads and writes 4-digit numbers. Compares the numbers of four digits and arranges in ascending and descending order by using place value.</p> <p>Representation of equal parts from the whole into fraction form and vice-versa. Identifies equivalent fractions. Converts fractions into decimals and vice versa.</p> <p>Classifies angles into right angle, acute and obtuse angle. Shapes: Sorting and classifying similar shapes of 2-D and 3-D and naming them.</p> <p>Relates different commonly used larger and smaller non-standard and standard units of different measures (length, weight, volume) and their inter-conversion.</p> <p>Collects the data related to various daily life situations & classify in tabular form and represents the data in bar graphs.</p> <p>Performs addition and subtraction of 4-digit numbers (with/without carry forward and borrowing). Multiplication and division of 4-digit numbers with at least 2-digit numbers using standard algorithm.</p>
Mathematical Visualization and Communication	Draws right and obtuse angles and makes cubes, cuboids, cylinder and cone using nets.
Mathematical Reasoning	Understand triangular and square numbers
Problem Solving	Can identify the numbers, but fail to identify the different relations and cannot select the apt operation to solve the problem.

Table G-20: Specific Performance Level Descriptors for Mathematics, Class V: Below Basic

Competency	Specific Performance Level Descriptors
Conceptual Understanding and Procedural Knowledge	<p>Does not have the knowledge of place value.</p> <p>Does not have the number sense and not able to make equal parts.</p>
Mathematical Visualization and Communication	Unable to draws right and obtuse angles and makes cubes, cuboids, cylinder and cone using nets.
Mathematical Reasoning	Unable to understand triangular and square numbers
Problem Solving	Unable to number sense and make equal parts.
Application	Unable to applies the concept of decimal fractions for conversations of different units of measures and fundamental operations in solving problems involving length, mass, capacity, time, intervals and money.

Specific Performance Level Descriptors for Mathematics, Class VIII: Advanced, Proficient, Basic and Below Basic

Table G-21: Specific Performance Level Descriptors for Mathematics, Class VIII: Advanced

Competency	Specific Performance Level Descriptors
Conceptual Understanding and Procedural Knowledge	Applies properties of rational numbers in real life situations.
Mathematical Visualization and Communication	Use and able to justify the mathematical terms (simple & compound interest, profit loss, Percentage of students and proportions), geometrical shapes in communication and represents in the form of graphs and symbols.
Mathematical Reasoning	Applies multiple reasoning methods to solve complex problems based on algebra, geometry and mensuration.
Problem Solving	Able to solve equations reducible to linear forms. Able to solve complex real life problems. Able to solve difficult problems based on direct and indirect proportions related to real life situations.
Application	Able to find mean, median and mode of ungrouped data and understand its appropriateness. Able to solve word problems based on algebraic expressions. Able to perform and justify alternate solution, models, verification of algebraic expressions, derivation of formulas using different activities. They are able to correlate theoretical knowledge with activities.

Table G-22: Specific Performance Level Descriptors for Mathematics, Class VIII: Proficient

Competency	Specific Performance Level Descriptors
Conceptual Understanding and Procedural Knowledge	Derives properties of rational numbers.
Mathematical Visualization and Communication	Identifies and uses the mathematical terms (simple & compound interest, profit loss, Percentage of students and proportions), geometrical shapes in communication and represents in the form of graphs and symbols.
Mathematical Reasoning	Applies multiple reasoning methods to solve complex problems based on algebra, geometry and mensuration.
Problem Solving	Able to solve linear equations having variables on both sides. Able to solve word problems Able to solve easy problems based on direct proportions.
Application	Able to find mean, median and mode of ungrouped large data. Able to deal with all four operations (addition, subtraction, multiplication and division) on algebraic expressions. Able to understand and perform alternate solution, verification of algebraic expressions, derivation of formulas using activity methods and tools.

Table G-23: Specific Performance Level Descriptors for Mathematics, Class VIII: Basic

Competency	Specific Performance Level Descriptors
Conceptual Understanding and Procedural Knowledge	Understands basic operations on rational numbers.
Mathematical Visualization and Communication	Identifies the basic mathematical terms (profit, loss, Percentage of students and proportions), geometrical shapes in communication.
Mathematical Reasoning	Applies reasoning method to solve simple problems based on algebra, geometry and mensuration.
Problem Solving	Able to solve simple linear equations. Able to solve easy problems based on direct proportions.
Application	Able to find mean, median and mode of simple ungrouped data. Able to add and subtract simple algebraic expressions. Able to understand alternate solution and derivation of formulas using activity methods and tools.

Table G-24: Specific Performance Level Descriptors for Mathematics, Class VIII: Below Basic

Competency	Specific Performance Level Descriptors
Conceptual Understanding and Procedural Knowledge	Finds difficulty in understanding rational Numbers.
Mathematical Visualization and Communication	Finds difficulty in identifying basic mathematical terms.
Mathematical Reasoning	Not able to specify reason even for simple problems.
Problem Solving	Not able to solve simple linear equations.
Application	Faces difficulty in finding mean of very simple and small sized ungrouped data. Able to add and subtract simple algebraic expressions with the constant help of teacher. Not able to understand the equivalence between theory and activity. They fear to deal with tools.

Specific Performance Level Descriptors for Environmental Studies, Class III: Advanced, Proficient, Basic and Below Basic

Table G-25: Specific Performance Level Descriptors for Environmental Studies, Class III: Advanced

Competency	Specific Performance Level Descriptors
Identify, Recognize, distinguish, Classify (Symbols, diagrams, visuals etc.)	Identifies and describe parts of plants. Identify Claws and beaks of birds. Identifies complex relationship. Describe and identifies component of food. Differentiate types of family (Nuclear, large and joint). Need of food for different age-group/ web of life. Classify conservation/harvesting of water. Understand the process of simple purification eg. (boiling filtering).
Describe, Explain, Discuss.	Connect experiences of the child with the daily life/culture.
Relate process and phenomenon, establish cause and relationships.	Understand the process of sowing of crops according to season.
Demonstrate. Illustrate, Design, Simple experiments, perform investigations, Construct simple models, draw and label diagrams, flowcharts etc.	Conduct experiment on germination and record the process. Records the different features of plant animals seasons and occupation. Understand the measurement of water. Identify wet/ dry, hard/soft touch, primary and secondary colors.
Interpret information, graphs, charts etc, pose questions, express opinions, measures and calculates physical quantities.	Identify different type of houses according to different climate.
Analyze, evaluate draw conclusions, generalize, justify.	Comprehend analytically understand water cycle.
Find solutions to daily life problems, apply scientific concepts knowledge to daily life.	Draw and paste objects related to present and past.(Cloth, vessels, games played, communications. Distinguish between good and bad habits.
Respect for human dignity, rights, gender, human values, concern for life, including the environmental concerns.	Voices opinion on good and bad touch.

Table G-26: Specific Performance Level Descriptors for Environmental Studies, Class III: Proficient

Competency	Specific Performance Level Descriptors
Identify, Recognize, distinguish, Classify (Symbols, diagrams, visuals etc.)	Identifies the places and eating habits of animal, birds and human being. Differentiate the sound of birds and animals. Describe roles of family members, family influences and need for living together. Identifies types of food. Share the names of sources of water.
Describe, Explain, Discuss.	Express the names of sound and co-relation with animals and differentiate animals with their seizes and movements.
Relate process and phenomenon, establish cause and relationships.	Uses of plants, cycle of seasons, leaving habits of human being.
Demonstrate. Illustrate, Design, Simple experiments, perform investigations, Construct simple models, draw and label diagrams, flowcharts etc.	Classify the seeds and leaves, occupations, seasons, plants, animals etc. Measures the quantity of water and liquids with simple objects. Classify plants/ animals based on their feature. Collect the materials and record the observations.
Interpret information, graphs, charts etc, pose questions, express opinions, measures and calculates physical quantities.	Differentiate between home and house. Describe the parts of houses. Draw the picture of house.
Analyze, evaluate draw conclusions, generalize, justify.	Identify the reasons for scarcity of water. Draw a picture of seasons, food, plant and trees.
Find solutions to daily life problems, apply scientific concepts knowledge to daily life.	Differentiate between objects and activities of present and past. Cleanliness of its surrounding.
Respect for human dignity, rights, gender, human values, concern for life, including the environmental concerns.	Sensitize about protection of plants, birds, animals and human beings. Sensitize about good and bad touch. Respect for elderly, differently abled and diverse family.

Table G-27: Specific Performance Level Descriptors for Environmental Studies, Class III: Basic

Competency	Specific Performance Level Descriptors
Identify, Recognize, distinguish, Classify (Symbols, diagrams, visuals etc.)	Identify and describe part of plants. Identify claws and beak of birds. Child will observe and identify simple features of birds, plants and animals. Identify relationship with and among family members voices opinion on general food habits. Aware about need and uses of water. Aware about the size of vessels. Differentiate between plants-trees/birds-animals/ family and friends. Aware about personal hygiene. Aware about present activities, means of transportation etc.
Describe, Explain, Discuss.	Produce different sounds of animals/birds, size and movements. Express own ideas and share views in different ways about places visited/ objects.
Relate process and phenomenon, establish cause and relationships.	Knowledge of plants and types of seasons.
Demonstrate. Illustrate, Design, Simple experiments, perform investigations, Construct simple models, draw and label diagrams, flowcharts etc.	Collect the seeds, leaves etc. Collection of pictures of different occupations, seasons, plants, animals etc. Differentiate between plants, trees, birds, animals, families and friends. Identify dry/wet, hard/soft, touch primary and secondary colours.
Interpret information, graphs, charts etc, pose questions, express opinions, measures and calculates physical quantities.	Aware about family.
Analyze, evaluate draw conclusions, generalize, justify.	Aware about water and its uses, seasons, types of food, difference between plants and trees and different professions.
Find solutions to daily life problems, apply scientific concepts knowledge to daily life.	Understand the Sources of cooking food and cooking vessels. Aware about personal hygiene.
Respect for human dignity, rights, gender, human values, concern for life, including the environmental concerns.	Aware about living things and gender. Classify birds and animals on the basis of habitat and eating habits. Awareness on global warming, bio degradable or non-bio degradable.

Table G-28: Specific Performance Level Descriptors for Environmental Studies, Class III: Below Basic

Competency	Specific Performance Level Descriptors
Identify, Recognize, distinguish, Classify (Symbols, diagrams, visuals etc.)	<p>Unable to identify and describe part of plants.</p> <p>Unable to identify claws and beak of birds.</p> <p>Child will not able to observe and identify simple features of birds, plants and animals.</p> <p>Unable to identify relationship with and among family members voices opinion on general food habits.</p> <p>Not aware about need and uses of water.</p> <p>Not aware about the size of vessels.</p> <p>Unable to differentiate between plants-trees/birds-animals/ family and friends.</p> <p>Not aware about personal hygiene.</p> <p>Not aware about present activities, means of transportation etc.</p>
Describe, Explain, Discuss.	<p>Unable to Produce different sounds of animals/birds, size and movements.</p> <p>Unable to express own ideas and share views in different ways about placed visited/objects.</p>
Relate process and phenomenon, establish cause and relationships.	<p>No knowledge of plants and types of seasons.</p>
Demonstrate. Illustrate, Design, Simple experiments, perform investigations, Construct simple models, draw and label diagrams, flowcharts etc.	<p>Unable to collect the seeds, leaves etc.</p> <p>Unable to collect of pictures of different occupation, seasons, plants, animals etc.</p> <p>Unable to differentiate between plants, trees, birds, animals, families and friends.</p> <p>Unable to identify dry/wet, hard/soft, touch primary and secondary colours.</p>
Interpret information, graphs, charts etc, pose questions, express opinions, measures and calculates physical quantities.	<p>Not aware about family.</p>
Analyze, evaluate draw conclusions, generalize, justify.	<p>Not aware about water and its uses, seasons, types of food, difference between plant and trees and different professions.</p>
Find solutions to daily life problems, apply scientific concepts knowledge to daily life.	<p>Unable to understand the Sources of cooking food and cooking vessels.</p> <p>Aware about personal hygiene.</p>
Respect for human dignity, rights, gender, human values, concern for life, including the environmental concerns.	<p>Not aware about living things and gender.</p> <p>Unable to classify birds and animal on the basis of habitat and eating habits.</p> <p>No awareness on global warming, bio degradable or non-bio degradable.</p>

Specific Performance Level Descriptors for Environmental Studies, Class V: Advanced, Proficient, Basic and Below Basic

Table G-29: Specific Performance Level Descriptors for Environmental Studies, Class V: Advanced

Competency	Specific Performance Level Descriptors
Identify, Recognize, distinguish, Classify (Symbols, diagrams, visuals etc.)	<p>Identifies the similarities and differences- signs, directions, location of different places and applies its in daily life.</p> <p>Classifies and compares the objects, materials and living organisms as per their features and properties such as taste, size, shapes, color, traits and landforms.</p> <p>Explain as well as Correlates the concepts and logical information from various themes- types of terrain, climate, resources and cultural life.</p> <p>Compares and justifies the need and importance of saving natural resources- water, fuel, food.</p> <p>Establishes the relation between cause and effects- urbanization, population.</p> <p>Critically explains the interdependence between various organisms of environment animal, plants and humans.</p> <p>Identifies the similarities and differences- signs, directions, location of different places and applies its in daily life.</p> <p>Classifies and compares the objects, materials and living organisms as per their features and properties such as taste, size, shapes, color, traits and landforms.</p> <p>Sources of sound.</p>
Describe, Explain, Discuss.	<p>Observes and narrates various elements from immediate surroundings in details- germination, evaporation, floating, sinking.</p> <p>Is able to read pictures, collect information and narrate it.</p> <p>Understand various changes in environment in daily life.</p> <p>Records the experiences and information in the form of tables and diagrams.</p> <p>Explain as well as Correlates the concepts and logical information from various themes- types of terrain, climate, resources and cultural life.</p> <p>Compares and justifies the need and importance of saving natural resources- water, fuel, food.</p> <p>Establishes the relation between cause and effects- urbanization, population.</p> <p>Critically explains the interdependence between various organisms of environment animal, plants and humans.</p>
Relate process and phenomenon, establish cause and relationships.	<p>Makes an effort to find out the reasons- migration of families, different food habits.</p> <p>Scientific phenomenon- breathing process, spoilage of foods, germination of seeds.</p>
Demonstrate. Illustrate, Design, Simple experiments, perform investigations, Construct simple models, draw and label diagrams, flowcharts etc.	<p>Develop skills through the interaction with the natural and social environment- waste management, health & hygiene.</p> <p>Explore ways and means for environment cause.</p> <p>Performs experiments and make models, charts as instructed, can accurately label diagrams, charts.</p>

<p>Interpret information, graphs, charts etc, pose questions, express opinions, measures and calculates physical quantities.</p>	<p>Records the experiences and information in the form of tables, diagrams and graphs and interprets the results. Able to read map of India and Can locate places- states of India and tell directions.</p>
<p>Analyze, evaluate draw conclusions, generalize, justify.</p>	<p>Analyse and justify causes of situation/ events – Earthquake, need for conservation of resources. Make assumptions and inferences – distance, area, volume, weight length and time. Concerned about environmental issues. Sensitive towards the needs of saving resources like water and non-renewable sources of energy like petrol. Make assumptions and inferences – distance, area, volume, weight length and time.</p>
<p>Find solutions to daily life problems, apply scientific concepts knowledge to daily life.</p>	<p>Can lead a group if given responsibility. Share things. Understand dignity of labor. Works in team. Understands importance of social values. Is aware of the role and function of different institutions- Bank, Panchayat, Police station etc and applies information in daily life.</p>
<p>Respect for human dignity, rights, gender, human values, concern for life, including the environmental concerns.</p>	<p>Concerned about environmental issues. Sensitive towards the needs of saving resources like water and non-renewable sources of energy like petrol- health hygiene, managing waste, disaster/ emergency situation and Voices opinion on issues observed/ experienced.</p>

Table G-30: Specific Performance Level Descriptors for Environmental Studies, Class V: Proficient

Competency	Specific Performance Level Descriptors
Identify, Recognize, distinguish, Classify (Symbols, diagrams, visuals etc.)	Identify the similarities and differences- signs, directions, location of different places. Classifies Objects, materials and living organisms as per their features and properties such as taste, size, shapes, color, traits and landforms. Explains the interdependence between various organisms of environment animals, plants and humans.
Describe, Explain, Discuss.	Observe various elements from immediate surrounding- germination, evaporation, floating, sinking. Is able to read pictures and collect information. Has knowledge about the changes in environment. Records the experiences and information in the form of tables and diagrams to some extent. Explains the given concepts and information from various themes- terrain, climate, resources and cultural life. Understand the need and importance of natural resources- water, fuel, food. Has complete information about the phenomenon- urbanization. Explains the interdependence between various organisms of environment animals, plants and humans.
Relate process and phenomenon, establish cause and relationships.	Makes an effort to find out the reasons with the motivation of teacher- migration of families, different food habits. Understand the interaction between natural and social environment waste management, health and hygiene. Scientific phenomenon- breathing process, spoilage of foods, germination of seeds.
Demonstrate. Illustrate, Design, Simple experiments, perform investigations, Construct simple models, draw and label diagrams, flowcharts etc.	Performs simple experiments and make simple models, draw diagrams, charts label it, make posters.
Interpret information, graphs, charts etc, pose questions, express opinions, measures and calculates physical quantities.	Records the experiences and information in the form of tables and diagrams. Read maps – states of India.
Analyze, evaluate draw conclusions, generalize, justify.	Understands environmental issues .and needs of saving resources like water and non renewable resources of energy. Identify possible causes of situation/ events – Earthquake ,need for conservation of resources. Identify the spatial quantities and qualities – distance, area, volume, weight and time.
Find solutions to daily life problems, apply scientific concepts knowledge to daily life.	Can handle responsibility. Share things. Understand dignity of labor. Work in team. Understand importance of social values. Under stands the role and function in daily life- Bank, Panchayat, Police station etc.
Respect for human dignity, rights, gender, human values, concern for life, including the environmental concerns.	Suggest ways for environmental issues .and needs of saving resources like water and non renewable resources of energy, hygiene health, managing waste, disaster/ emergency situation.

Table G-31: Specific Performance Level Descriptors for Environmental Studies, Class V: Basic

Competency	Specific Performance Level Descriptors
Identify, Recognize, distinguish, Classify (Symbols, diagrams, visuals etc.)	Identifies the objects, materials organisms as per their features and properties such as taste, size, shapes, color, traits and landforms. Has knowledge but lacks observation. Has some knowledge about environmental changes.
Describe, Explain, Discuss.	Has information about the concepts and various themes- terrain, climates, natural resources and cultural life. Has knowledge about the natural resources. Has some information about the phenomenon.
Relate process and phenomenon, establish cause and relationships.	Less curious to find out the reasons of a scientific phenomenon. Is able to understand interdependence between various organisms of environment –animals and plants and humans.
Demonstrate. Illustrate, Design, Simple experiments, perform investigations, Construct simple models, draw and label diagrams, flowcharts etc.	Performs simple experiments, with the help of teacher. Draws diagrams but cannot label.
Interpret information, graphs, charts etc, pose questions, express opinions, measures and calculates physical quantities.	Makes an effort to record the experiences and information in the form of tables and diagrams. Read maps – states of India.
Analyze, evaluate draw conclusions, generalize, justify.	Understanding of environmental issues. Guesses the spatial quantities and qualities – distance, area, volume, weight and time.
Find solutions to daily life problems, apply scientific concepts knowledge to daily life.	Cannot apply the information about institutions in daily life.
Respect for human dignity, rights, gender, human values, concern for life, including the environmental concerns.	Understanding of environmental issues, health and hygiene, disaster situations human dignity, rights and gender- conservation of resources, festival of India, life in distant/ difficult areas like hot/ cold deserts.

Table G-32: Specific Performance Level Descriptors for Environmental Studies, Class V: Below Basic

Competency	Specific Performance Level Descriptors
Identify, Recognize, distinguish, Classify (Symbols, diagrams, visuals etc.)	Unable to identify the objects, materials organisms as per their features and properties such as taste, size, shapes, color, traits and landforms. Has knowledge but lacks observation. Has some knowledge about environmental changes.
Describe, Explain, Discuss.	Does not have information about the concepts and various themes- terrain, climates, natural resources and cultural life. Has no knowledge about the natural resources. Has no information about the phenomenon.
Relate process and phenomenon, establish cause and relationships.	Not curious to find out the reasons of a scientific phenomenon. Is unable to understand interdependence between various organisms of environment –animals and plants and humans.
Demonstrate. Illustrate, Design, Simple experiments, perform investigations, Construct simple models, draw and label diagrams, flowcharts etc.	Unable to perform simple experiments, with the help of teacher. Draws diagrams but cannot label.
Interpret information, graphs, charts etc, pose questions, express opinions, measures and calculates physical quantities.	Unable to record the experiences and information in the form of tables and diagrams. Read maps – states of India with effort.
Analyze, evaluate draw conclusions, generalize, justify.	No understanding of environmental issues. Not guesses the spatial quantities and qualities – distance, area, volume, weight and time.
Find solutions to daily life problems, apply scientific concepts knowledge to daily life.	Cannot apply the information about institutions in daily life.
Respect for human dignity, rights, gender, human values, concern for life, including the environmental concerns.	No understanding of environmental issues, health and hygiene, disaster situations human dignity, rights and gender- conservation of resources, festival of India, life in distant/ difficult areas like hot/ cold deserts.

Specific Performance Level Descriptors for Science, Class VIII: Advanced, Proficient, Basic and Below Basic

Table G-33: Specific Performance Level Descriptors for Science, Class VIII: Advanced

Competency	Specific Performance Level Descriptors
Identify, Recognize, distinguish, Classify (Symbols, diagrams, visuals etc.)	Use of microbes in Bio technology Phases of the moon, Constellations Modern agriculture practices (Green, White revolution) Metals and nonmetals – chemical properties and reactions. Structure of cell organelles, increase in surface area oviparous and viviparous reproduction in plants Electrolytic and metallic conductors Distinguish different types of sound. Produce different types of sound using the same source
Describe, Explain, Discuss	Understand virus, reproduction in microbes
Relate process and phenomenon, establish cause and relationships	Hormone secretion and role of Pituitary gland in other human system and their reactions. Refining/distillation and use of by products Effects of deforestation - global warming/ greenhouse effect Uses advantages and disadvantages of friction in day to day life Ionization / Oxidation, reduction and products of electrolysis
Demonstrate. Illustrate, Design, Simple experiments, perform investigations, construct simple models, draw and label diagrams, flowcharts etc.	Models given in text book Model to be made as per raw materials provided.
Interpret information, graphs, charts etc., pose questions, express opinions, measures and calculates physical quantities	Laws of reflection Observation and data collection Solving problems related to reflection and refraction Drawing and interpretation of graphs
Analyze, evaluate draw conclusions, generalize, justify	Understands formation of acid rain and effects
Find solutions to daily life problems, apply scientific concepts knowledge to daily life.	Uses of particular metals and nonmetals in our daily life, electroplating Knows what to grow endemic species Cloning Causes of heating effects/ making of wires/materials which causes heating effect
Respect for human dignity, rights, gender, human values, concern for life, including the environmental concerns	Afforestation Simple methods of conservation of flora and fauna

Table G-34: Specific Performance Level Descriptors for Science, Class VIII: Proficient

Competency	Specific Performance Level Descriptors
Identify, Recognize, distinguish, Classify (Symbols, diagrams, visuals etc.)	Micro organisms (bacteria, Fungi, Protozoa, algae and virus as per use and harmfulness. Celestial objects Agriculture practices, Rabi, Kharif crops and natural and Chemical fertilizers. Metals and nonmetals – Physical and Chemical properties. Functions and structure of cell organelles. Embryonic development Materials of conductors and insulators Need for a medium for sound propagation
Describe, Explain, Discuss	Major groups of microbes and reproduction methods
Relate process and phenomenon, establish cause and relationships	Puberty, role of hormones and sex determination Uses of petroleum products obtained from distillation Conservation of forests, wild life. Biosphere reserves-its flora and fauna. Wild life sanctuaries, Deforestation, its causes. Effects of deforestation- (soil erosion, desertification) Causes and consequences of friction, Reduce and increase friction Can conduct activity on electrolysis
Demonstrate. Illustrate, Design, Simple experiments, perform investigations, construct simple models, draw and label diagrams, flowcharts etc.	Models to show force exerted by liquids and gases as per knowledge
Interpret information, graphs, charts etc., pose questions, express opinions, measures and calculates physical quantities	Measure angle of incidence and reflection/refractive index Growth of plants and animals Measure angle of incidence and reflection/refractive index Growth of plants and animals
Analyze, evaluate draw conclusions, generalize, justify	Understands global warming, greenhouse effect
Find solutions to daily life problems, apply scientific concepts knowledge to daily life.	Has knowledge of characteristics /uses of metals and non-metals Protects flora and Fauna Sexual reproduction in plants, pollination Use of conductor and nonconductors/ heating effects and Conductor/ insulators
Respect for human dignity, rights, gender, human values, concern for life, including the environmental concerns	Consequences of over extraction of coal and petroleum Protects flora and Fauna: save, reuse energy and water, reforestation

Table G-35: Specific Performance Level Descriptors for Science, Class VIII: Basic

Competency	Specific Performance Level Descriptors
Identify, Recognize, distinguish, Classify (Symbols, diagrams, visuals etc.)	Microbes as per structure Solar System Traditional agricultural methods Metals and nonmetals (Physical properties). Exhaustible and Inexhaustible natural resources Differences between plant and animal cells. Sexual and asexual reproduction Conduction/ bad conductor electricity Sources of sound
Describe, Explain, Discuss	Information of microbes Electrolysis of simple conducting solutions Laws of reflection Harmful effects of pollutants
Relate process and phenomenon, establish cause and relationships	Changes in Puberty Formation of Coal and Petroleum and refining of petroleum Deforestation and afforestation Effect of force Knowledge of Electrolysis and electroplating
Demonstrate. Illustrate, Design, Simple experiments, perform investigations, construct simple models, draw and label diagrams, flowcharts etc.	Models given in text book
Interpret information, graphs, charts etc., pose questions, express opinions, measures and calculates physical quantities	Solving problems related to reflection and refraction Drawing and interpretation of graphs Laws of reflection Observation and data collection
Analyze, evaluate draw conclusions, generalize, justify	Conservation of plants and animals Pollution of air and water
Find solutions to daily life problems, apply scientific concepts knowledge to daily life.	Knowledge of concept
Respect for human dignity, rights, gender, human values, concern for life, including the environmental concerns	Effects of over mining recycling of biodegradable materials (recycle paper) Afforestation Simple methods of conservation of flora and fauna

Table G-36: Specific Performance Level Descriptors for Science, Class VIII: Below Basic

Competency	Specific Performance Level Descriptors
Identify, Recognize, distinguish, Classify (Symbols, diagrams, visuals etc.)	Microbes (Fungi and Bacteria) as per structure Planets Traditional agricultural methods Metals and nonmetals (Physical properties). Plant and animal cells Definition of conductors and insulator Sources of sound
Describe, Explain, Discuss	Information of unicellular organisms
Relate process and phenomenon, establish cause and relationships	Definition of Puberty Formation of fossil fuels Deforestation and afforestation Concept of force Definition of Electrolysis
Demonstrate. Illustrate, Design, Simple experiments, perform investigations, construct simple models, draw and label diagrams, flowcharts etc.	Models given in specific chapters of text book
Interpret information, graphs, charts etc., pose questions, express opinions, measures and calculates physical quantities	Laws of reflection Data collection skills but lacks interpretation or graph plotting skills.
Analyze, evaluate draw conclusions, generalize, justify	Basic concept of Pollution
Find solutions to daily life problems, apply scientific concepts knowledge to daily life.	Lacks knowledge of use of metal and non-metals in daily life
Respect for human dignity, rights, gender, human values, concern for life, including the environmental concerns	Definition of Afforestation but lacks the knowledge of impact of afforestation on environment.

Specific Performance Level Descriptors for Social Science, Class VIII: Advanced, Proficient, Basic and Below Basic

Table G-37: Specific Performance Level Descriptors for Social Science, Class VIII: Advanced

Competency	Specific Performance Level Descriptors
Map Reading Skills (Identifies & Locates)	Identifies different location on Map of India as well as the capital of neighboring countries
Classification	Justifies judicious use of natural resources
Description	Describes different major crops and different agricultural practices in a country Describes the role of government in regulating economic activities Describe the role of government in providing public facilities such as water, sanitation, road, electricity etc. and recognise their availability
Relate processes and Establish cause & relationship	Relates process of election to parliament, state assembly and local level. Establish the cause of forest fire, landslide, industrial disasters and their risk reduction measures with relevant illustrations.
Draw Diagram	Makes graph using given data and interpret
Distinguish	Distinguishes the modern period from the medieval and ancient period using various historical sources with their relation to a particular period or kingdom
Explain	Explains various historical events and aspects of different periods with illustration
Analyze	Analyze emergence of democracy and function of government at all level with examples of other country Analyze emergence of democracy and functions of government Analyze the causes and consequences of marginalization faced by disadvantaged sections of one's own region
Interpret	Interprets various Social and Political issues related to caste, women, widow remarriage, child remarriage, social reforms and laws & policies of colonial administration towards these issues. Interprets social and political issues in one's own region with reference to the constitution of India
Problem solving	Knowledge about natural calamity, its causes and preventive measures
Application	Knowledge of fundamental rights & duties to find out about their violation, protection, and promotion in a given situation (example child rights) Process of making a law e.g. domestic violence act, RTE act, RTI Act. Applies how to file a F.I.R

Table G-38: Specific Performance Level Descriptors for Social Science, Class VIII: Proficient

Competency	Specific Performance Level Descriptors
Map Reading Skills (Identifies & Locates)	Identifies districts, states and country location without the help of teacher
Classification	Classifies the soils, industries and climate
Description	Describes major crops, types of farming and agricultural practices in the state Describes the role of government in regulating economic activities Describe the role of government in providing public facilities such as water, sanitation, road and electricity etc.
Relate processes and Establish cause & relationship	Relates process of election to the Lok Sabha and Rajya Sabha Establish the cause of forest fire, landslide, industrial disasters and their risk reduction measures.
Draw Diagram	Makes graph using given data
Distinguish	Distinguishes the modern period from the medieval and ancient period using various historical sources such as archaeological and literary
Explain	Explains important historical events and aspects of different periods
Analyze	Analyze emergence of democracy and functions of government Analyze the causes and consequences of marginalization faced by disadvantaged sections of one's own region
Interpret	Interprets few important Social and Political issues related to caste, women, widow remarriage, child remarriage, social reforms and laws & policies of colonial administration towards these issues. Interprets social and political issues in one's own region with reference to the constitution of India
Problem solving	Knowledge about natural calamity and its preventive measures
Application	Knowledge of fundamental rights & duties & raise concern on its violation (example child rights) Process of making a law e.g domestic violence act, RTE act, RTI Act.

Table G-39: Specific Performance Level Descriptors for Social Science, Class VIII: Basic

Competency	Specific Performance Level Descriptors
Map Reading Skills (Identifies & Locates)	Identifies own location with the help of teacher
Classification	Observes and identifies rocks, soils, industries, rivers, season and climate
Description	Describes major crops of surrounding areas Describes the role of government in economic activities Describe the role of government in providing basic public facilities
Relate processes and Establish cause & relationship	Relates process of election Establish cause of forest fire, land slide etc.
Draw Diagram	Reads data
Distinguish	Distinguishes the modern period from the medieval and ancient period
Explain	Explains some of the historical events
Analyse	Analyse democracy and government in simple way
Interpret	Interprets some of the Social and Political issues related to caste, women, widow remarriage, child remarriage, social reforms and laws & policies of colonial administration towards these issues.
Problem solving	Knowledge about natural calamity such as earthquake, flood, landslide, cyclone, tsunami etc
Application	Knowledge of fundamental rights and duties process of making a law

Table G-40: Specific Performance Level Descriptors for Social Science, Class VIII: Below Basic

Competency	Specific Performance Level Descriptors
Map Reading Skills (Identifies & Locates)	Unable to identify different location on map like state district etc.
Classification	Unable to observe and identify natural resources like rocks, soils, industries, rivers, season & climate change.
Description	Unable to describe major crops of surrounding areas and role of government in economic activities. Unable to describe role of government providing basic facilities.
Relate processes and Establish cause & relationship	Unable to relate process and establish cause and relationship.
Draw Diagram	Unable to draw diagram.
Distinguish	Unable to distinguish the modern period from the medieval and ancient period.
Explain	Unable to explain historical events.
Analyse	Analyse democracy and government not proper way.
Interpret	Interprets some of the social and political issues related to cast, women, widow remarriage, child marriage and unable to interpret social reforms and laws & policies of colonial administrator towards these issues.
Problem solving	Knowledge about natural calamity such as earthquake, flood, landslide, cyclone, tsunami etc.
Application	Some knowledge of fundamental rights and duties process of making law.

Appendix H

Field Tryout Results, Class III, V and VIII

Table H-1: Field Tryout Result for Class III, EVS

Item	Telugu		Tamil		English		Hindi		Bangla		Assameese	
	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**
Item:1	63.42	0.58	28.51	0.01	59.22	0.39	63.16	0.58	53.58	0.39	28.51	0.01
Item:2	66.67	0.64	77.85	0.25	84.36	0.31	57.89	0.60	71.69	0.45	57.89	0.25
Item:3	71.71	0.62	87.06	0.29	29.05	0.39	67.37	0.62	63.80	0.48	29.05	0.29
Item:4	52.79	0.36	72.15	0.14	74.30	0.41	52.11	0.71	62.84	0.40	52.11	0.14
Item:5	74.95	0.61	91.01	0.38	85.47	0.29	42.11	0.22	73.39	0.37	42.11	0.22
Item:6	57.37	0.53	85.28	0.45	39.13	0.34	52.11	0.49	58.47	0.45	39.13	0.34
Item:7	63.16	0.70	82.82	0.33	33.70	0.31	63.68	0.72	60.84	0.52	33.70	0.31
Item:8	57.89	0.60	79.14	0.44	23.91	0.35	63.68	0.52	56.16	0.48	23.91	0.35
Item:9	67.37	0.62	81.60	0.44	54.35	0.24	60.00	0.55	65.83	0.46	54.35	0.24
Item:10	52.11	0.71	71.17	0.44	68.48	0.36	45.79	0.50	59.38	0.50	45.79	0.36
Item:11	42.11	0.22	63.19	0.36	54.35	0.47	57.89	0.49	54.38	0.38	42.11	0.22
Item:12	52.11	0.49	59.51	0.42	59.78	0.26	43.16	0.56	53.64	0.43	43.16	0.26
Item:13	63.68	0.72	80.98	0.48	71.74	0.42	43.68	0.35	65.02	0.49	43.68	0.35
Item:14	63.68	0.52	58.90	0.33	70.65	0.28	66.32	0.57	64.89	0.43	58.90	0.28
Item:15	60.00	0.55	76.69	0.50	52.17	0.52	63.09	0.36	62.99	0.48	52.17	0.36
Item:16	45.79	0.50	81.21	0.63	34.48	0.26	89.26	0.64	62.69	0.50	34.48	0.26
Item:17	57.89	0.49	85.91	0.35	22.99	0.34	72.48	0.49	59.82	0.42	22.99	0.34
Item:18	43.16	0.56	70.47	0.49	56.32	0.34	77.18	0.43	61.78	0.45	43.16	0.34
Item:19	43.68	0.35	61.74	0.26	25.29	0.36	4.70	-0.14	33.85	0.21	4.70	-0.14
Item:20	66.32	0.57	88.59	0.60	82.76	0.33	75.00	0.30	78.17	0.45	66.32	0.30
Item:21	49.47	0.29	63.09	0.36	13.79	0.19	32.64	0.09	39.75	0.23	13.79	0.09
Item:22	66.84	0.63	89.26	0.64	55.17	0.42	84.72	0.47	74.00	0.54	55.17	0.42
Item:23	54.21	0.59	72.48	0.49	54.35	0.47	54.17	0.34	58.80	0.47	54.17	0.34
Item:24	46.84	0.56	77.18	0.43	59.78	0.26	79.86	0.36	65.92	0.40	46.84	0.26
Item:25	53.68	0.58	4.70	-0.14	9.20	-0.13	79.17	0.38	36.69	0.17	4.70	-0.14
Item:26	61.71	0.73	75.00	0.30	52.87	0.34	84.72	0.43	68.58	0.45	52.87	0.30
Item:27	32.00	0.29	32.64	0.09	68.97	0.22	88.19	0.46	55.45	0.26	32.00	0.09
Item:28	62.29	0.68	84.72	0.47	61.74	0.26	72.22	0.43	70.24	0.46	61.74	0.26
Item:29	52.00	0.44	54.17	0.34	88.59	0.60	77.08	0.33	67.96	0.43	52.00	0.33
Item:30	70.29	0.60	79.86	0.36	63.09	0.36	59.22	0.39	68.11	0.43	59.22	0.36
Item:31	55.43	0.69	79.17	0.38	89.26	0.64	84.36	0.31	77.05	0.50	55.43	0.31
Item:32	66.29	0.64	84.72	0.43	72.48	0.49	29.05	0.39	63.14	0.49	29.05	0.39
Item:33	66.29	0.62	88.19	0.46	77.18	0.43	74.30	0.41	76.49	0.48	66.29	0.41
Item:34	52.00	0.62	72.22	0.43	71.17	0.44	72.48	0.49	66.97	0.49	52.00	0.43
Item:35	52.00	0.54	77.08	0.33	79.14	0.44	77.18	0.43	71.35	0.43	52.00	0.33

* Facility

** Item-Rest Cor

Table H-2: Field Tryout Result for Class III, Language

Item	Telugu		Tamil		English		Hindi		Bangla		Assameese	
	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**
Item:1	77.48	0.52	93.86	0.34	94.86	0.34	77.48	0.52	85.92	0.43	77.48	0.34
Item:2	67.03	0.44	77.85	0.16	75.85	0.16	67.03	0.44	71.94	0.30	67.03	0.16
Item:3	69.01	0.57	76.75	0.10	76.75	0.10	69.01	0.57	72.88	0.33	69.01	0.10
Item:4	64.68	0.56	82.68	0.18	83.68	0.18	64.68	0.56	73.93	0.37	64.68	0.18
Item:5	69.37	0.62	85.75	0.35	85.75	0.35	69.37	0.62	77.56	0.48	69.37	0.35
Item:6	38.42	0.30	25.15	0.05	27.15	0.05	38.42	0.30	32.29	0.17	25.15	0.05
Item:7	54.74	0.46	79.14	0.53	80.14	0.53	54.74	0.46	67.19	0.50	54.74	0.46
Item:8	62.11	0.63	77.91	0.00	76.91	0.55	62.11	0.63	69.76	0.32	62.11	0.55
Item:9	57.37	0.44	68.71	0.20	57.37	0.44	57.37	0.44	60.20	0.38	57.37	0.20
Item:10	63.16	0.58	90.18	0.49	63.16	0.58	63.16	0.58	69.91	0.56	63.16	0.49
Item:11	67.37	0.66	94.48	0.33	67.37	0.66	67.37	0.66	74.15	0.58	67.37	0.33
Item:12	66.84	0.60	86.50	0.47	66.84	0.60	66.84	0.60	71.76	0.57	66.84	0.47
Item:13	56.32	0.54	71.78	0.57	56.32	0.54	56.32	0.54	60.18	0.55	56.32	0.54
Item:14	14.74	-0.13	2.45	-0.20	14.74	-0.13	14.74	-0.13	11.67	-0.15	2.45	-0.20
Item:15	64.74	0.58	4.29	-0.26	64.74	0.58	64.74	0.58	49.63	0.37	4.29	-0.26
Item:16	61.58	0.52	77.18	0.56	77.18	0.56	77.18	0.56	73.28	0.55	61.58	0.52
Item:17	40.00	0.49	22.15	-0.17	22.15	-0.17	22.15	-0.17	26.61	-0.01	22.15	-0.17
Item:18	55.79	0.47	55.03	0.39	55.03	0.39	55.03	0.39	55.22	0.41	55.03	0.39
Item:19	48.95	0.57	71.81	0.55	71.81	0.55	71.81	0.55	66.10	0.56	48.95	0.55
Item:20	54.21	0.51	44.97	-0.01	44.97	-0.01	44.97	-0.01	47.28	0.12	44.97	-0.01
Item:21	64.74	0.68	12.08	0.05	64.74	0.68	64.74	0.68	51.57	0.52	12.08	0.05
Item:22	61.58	0.66	6.04	-0.08	61.58	0.66	61.58	0.66	47.69	0.48	6.04	-0.08
Item:23	65.79	0.55	78.52	0.62	65.79	0.55	78.52	0.62	72.16	0.59	65.79	0.55
Item:24	54.74	0.61	75.17	0.48	54.74	0.61	75.17	0.48	64.95	0.54	54.74	0.48
Item:25	60.53	0.58	73.83	0.45	60.53	0.58	73.83	0.45	67.18	0.51	60.53	0.45
Item:26	58.86	0.54	89.58	0.40	58.86	0.54	89.58	0.40	74.22	0.47	58.86	0.40
Item:27	44.00	0.40	54.86	0.19	44.00	0.40	54.86	0.19	49.43	0.30	44.00	0.19
Item:28	55.43	0.48	86.11	0.50	55.43	0.48	86.11	0.50	70.77	0.49	55.43	0.48
Item:29	62.29	0.64	78.47	0.25	62.29	0.64	78.47	0.25	70.38	0.44	62.29	0.25
Item:30	61.14	0.57	84.03	0.49	61.14	0.57	84.03	0.49	72.59	0.53	61.14	0.49
Item:31	65.14	0.52	87.50	0.57	65.14	0.52	87.50	0.57	76.32	0.55	65.14	0.52
Item:32	37.71	0.26	50.69	0.25	37.71	0.26	50.69	0.25	44.20	0.26	37.71	0.25
Item:33	64.57	0.51	88.19	0.46	64.57	0.51	88.19	0.46	76.38	0.48	64.57	0.46
Item:34	57.14	0.69	20.14	0.15	57.14	0.69	20.14	0.15	38.64	0.42	20.14	0.15
Item:35	53.71	0.56	61.11	0.09	53.71	0.56	61.11	0.09	57.41	0.32	53.71	0.09

* Facility

** Item-Rest Cor

Table H-3: Field Tryout Result for Class III, Mathematics

Item	Telugu		Tamil		English		Hindi		Bangla		Assameese	
	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**
Item:1	71.53	0.58	91.45	0.38	71.53	0.58	73.62	0.49	77.03	0.51	71.53	0.38
Item:2	76.04	0.60	90.13	0.44	76.04	0.60	74.85	0.52	79.26	0.54	74.85	0.44
Item:3	69.91	0.63	90.13	0.33	69.91	0.63	50.31	0.24	70.06	0.46	50.31	0.24
Item:4	71.35	0.56	93.64	0.44	71.35	0.56	70.55	0.34	76.72	0.48	70.55	0.34
Item:5	69.19	0.52	92.32	0.43	69.19	0.52	86.50	0.41	79.30	0.47	69.19	0.41
Item:6	64.74	0.67	84.66	0.47	64.74	0.67	66.87	0.43	70.25	0.56	64.74	0.43
Item:7	67.37	0.51	87.73	0.54	67.37	0.51	73.01	0.33	73.87	0.47	67.37	0.33
Item:8	48.95	0.54	73.62	0.49	48.95	0.54	84.05	0.50	63.89	0.52	48.95	0.49
Item:9	50.53	0.60	74.85	0.52	50.53	0.60	77.18	0.39	63.27	0.53	50.53	0.39
Item:10	35.26	0.30	50.31	0.24	35.26	0.30	79.87	0.46	50.17	0.32	35.26	0.24
Item:11	52.11	0.46	70.55	0.34	52.11	0.46	75.84	0.29	62.65	0.38	52.11	0.29
Item:12	62.11	0.78	86.50	0.41	62.11	0.78	78.52	0.24	72.31	0.55	62.11	0.24
Item:13	40.00	0.53	66.87	0.43	40.00	0.53	50.34	0.23	49.30	0.43	40.00	0.23
Item:14	60.00	0.53	73.01	0.33	60.00	0.53	57.64	0.31	62.66	0.42	57.64	0.31
Item:15	54.74	0.63	84.05	0.50	54.74	0.63	72.92	0.51	66.61	0.57	54.74	0.50
Item:16	51.05	0.60	77.18	0.39	51.05	0.60	51.05	0.60	57.58	0.54	51.05	0.39
Item:17	56.32	0.60	79.87	0.46	56.32	0.60	56.32	0.60	62.20	0.56	56.32	0.46
Item:18	57.37	0.57	75.84	0.29	57.37	0.57	57.37	0.57	61.99	0.50	57.37	0.29
Item:19	50.00	0.62	87.25	0.54	87.25	0.54	50.00	0.62	68.62	0.58	50.00	0.54
Item:20	47.89	0.53	43.62	0.23	43.62	0.23	47.89	0.53	45.76	0.38	43.62	0.23
Item:21	57.37	0.59	85.23	0.61	85.23	0.61	57.37	0.59	71.30	0.60	57.37	0.59
Item:22	60.00	0.57	83.89	0.50	83.89	0.50	60.00	0.57	71.95	0.53	60.00	0.50
Item:23	61.58	0.60	86.58	0.58	86.58	0.58	61.58	0.60	74.08	0.59	61.58	0.58
Item:24	52.63	0.57	78.52	0.24	78.52	0.24	52.63	0.57	65.58	0.40	52.63	0.24
Item:25	48.42	0.56	50.34	0.23	50.34	0.23	48.42	0.56	49.38	0.40	48.42	0.23
Item:26	57.71	0.67	57.64	0.31	57.64	0.31	57.71	0.67	57.68	0.49	57.64	0.31
Item:27	42.29	0.44	72.92	0.51	72.92	0.51	42.29	0.44	57.60	0.47	42.29	0.44
Item:28	66.29	0.56	73.61	0.41	73.61	0.41	66.29	0.56	69.95	0.48	66.29	0.41
Item:29	58.86	0.55	84.03	0.46	84.03	0.46	58.86	0.55	71.44	0.51	58.86	0.46
Item:30	44.00	0.44	58.33	0.41	58.33	0.41	44.00	0.44	51.17	0.42	44.00	0.41
Item:31	33.71	0.34	59.72	0.30	59.72	0.30	33.71	0.34	46.72	0.32	33.71	0.30
Item:32	60.57	0.49	79.86	0.34	79.86	0.34	60.57	0.49	70.22	0.41	60.57	0.34
Item:33	59.43	0.60	83.33	0.40	83.33	0.40	59.43	0.60	71.38	0.50	59.43	0.40
Item:34	39.43	0.37	3.47	-0.12	5.47	-0.16	39.43	0.37	21.95	0.12	3.47	-0.16
Item:35	61.14	0.51	84.72	0.27	84.72	0.27	61.14	0.51	72.93	0.39	61.14	0.27

* Facility

** Item-Rest Cor

Table H-4: Field Tryout Result for Class V, EVS

Item	Telugu		Tamil		English		Hindi		Bangla		Assameese	
	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**
Item:1	67.44	0.53	85.11	0.28	83.86	0.27	65.69	0.48	75.52	0.39	65.69	0.27
Item:2	67.44	0.52	85.11	0.22	83.86	0.21	65.69	0.47	75.52	0.35	65.69	0.21
Item:3	43.64	0.28	42.34	-0.05	41.09	-0.06	41.89	0.23	42.24	0.10	41.09	-0.06
Item:4	59.17	0.32	75.74	0.28	74.49	0.27	57.42	0.27	66.71	0.28	57.42	0.27
Item:5	72.56	0.51	75.74	0.43	74.49	0.42	70.81	0.46	73.40	0.46	70.81	0.42
Item:6	57.84	0.45	63.19	0.40	61.94	0.39	56.09	0.40	59.77	0.41	56.09	0.39
Item:7	52.94	0.38	81.60	0.49	80.35	0.48	51.19	0.33	66.52	0.42	51.19	0.33
Item:8	61.27	0.66	88.96	0.51	87.71	0.50	59.52	0.61	74.37	0.57	59.52	0.50
Item:9	61.27	0.67	77.91	0.39	76.66	0.38	59.52	0.62	68.84	0.52	59.52	0.38
Item:10	86.27	0.40	90.80	0.20	89.55	0.19	84.52	0.35	87.79	0.29	84.52	0.19
Item:11	47.06	0.32	77.91	0.43	76.66	0.42	45.31	0.27	61.74	0.36	45.31	0.27
Item:12	62.25	0.58	89.57	0.38	88.32	0.37	60.50	0.53	75.16	0.47	60.50	0.37
Item:13	62.75	0.47	75.46	0.18	74.21	0.17	61.00	0.42	68.35	0.31	61.00	0.17
Item:14	60.29	0.44	57.06	0.22	55.81	0.21	58.54	0.39	57.92	0.32	55.81	0.21
Item:15	8.82	-0.19	7.98	-0.14	6.73	-0.15	7.07	-0.24	7.65	-0.18	6.73	-0.24
Item:16	22.61	0.39	45.96	0.34	44.71	0.33	20.86	0.34	33.54	0.35	20.86	0.33
Item:17	53.77	0.42	70.81	0.13	69.56	0.12	52.02	0.37	61.54	0.26	52.02	0.12
Item:18	47.24	0.51	77.64	0.49	76.39	0.48	45.49	0.46	61.69	0.49	45.49	0.46
Item:19	42.71	0.41	56.52	0.30	55.27	0.29	40.96	0.36	48.87	0.34	40.96	0.29
Item:20	60.80	0.45	84.47	0.30	83.22	0.29	59.05	0.40	71.89	0.36	59.05	0.29
Item:21	79.90	0.45	80.12	0.14	78.87	0.13	78.15	0.40	79.26	0.28	78.15	0.13
Item:22	72.36	0.47	83.85	0.18	82.60	0.17	70.61	0.42	77.36	0.31	70.61	0.17
Item:23	49.75	0.53	68.94	0.26	67.69	0.25	48.00	0.48	58.60	0.38	48.00	0.25
Item:24	35.18	0.25	75.78	0.33	74.53	0.32	33.43	0.20	54.73	0.28	33.43	0.20
Item:25	55.78	0.35	78.88	0.37	77.63	0.36	54.03	0.30	66.58	0.35	54.03	0.30
Item:26	7.92	-0.15	34.93	0.10	33.68	0.09	6.17	-0.20	20.68	-0.04	6.17	-0.20
Item:27	56.93	0.48	67.12	0.36	65.87	0.35	55.18	0.43	61.28	0.41	55.18	0.35
Item:28	61.39	0.31	61.64	0.41	60.39	0.40	59.64	0.26	60.76	0.35	59.64	0.26
Item:29	53.96	0.55	56.85	0.35	55.60	0.34	52.21	0.50	54.65	0.43	52.21	0.34
Item:30	19.31	0.10	74.66	0.46	73.41	0.45	17.56	0.05	46.23	0.27	17.56	0.05
Item:31	52.97	0.31	73.29	0.17	72.04	0.16	51.22	0.26	62.38	0.23	51.22	0.16
Item:32	59.41	0.50	76.03	0.47	74.78	0.46	57.66	0.45	66.97	0.47	57.66	0.45
Item:33	59.41	0.37	57.53	0.20	56.28	0.19	57.66	0.32	57.72	0.27	56.28	0.19
Item:34	56.44	0.58	89.73	0.32	88.48	0.31	54.69	0.53	72.33	0.44	54.69	0.31
Item:35	78.22	0.46	85.62	0.33	84.37	0.32	76.47	0.41	81.17	0.38	76.47	0.32

* Facility

** Item-Rest Cor

Table H-5: Field Tryout Result for Class V, Language

Item	Telugu		Tamil		English		Hindi		Bangla		Assameese	
	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**
Item:1	50.41	0.18	58.09	0.01	56.84	0.13	48.66	0.12	53.50	0.11	48.66	0.01
Item:2	65.12	0.38	90.00	0.24	88.75	0.33	63.37	0.31	76.81	0.31	63.37	0.24
Item:3	49.92	0.39	83.40	0.21	82.15	0.34	48.17	0.33	65.91	0.32	48.17	0.21
Item:4	58.02	0.46	56.60	0.15	55.35	0.41	56.27	0.40	56.56	0.35	55.35	0.15
Item:5	23.14	-0.08	5.74	-0.29	4.49	-0.13	21.39	-0.15	13.69	-0.16	4.49	-0.29
Item:6	13.73	-0.18	25.15	0.13	23.90	-0.23	11.98	-0.24	18.69	-0.13	11.98	-0.24
Item:7	66.67	0.54	88.34	0.19	87.09	0.49	64.92	0.47	76.76	0.42	64.92	0.19
Item:8	57.84	0.47	44.79	0.13	43.54	0.42	56.09	0.40	50.56	0.36	43.54	0.13
Item:9	62.75	0.51	78.53	0.35	77.28	0.46	61.00	0.44	69.89	0.44	61.00	0.35
Item:10	57.35	0.52	66.26	0.50	65.01	0.47	55.60	0.46	61.06	0.49	55.60	0.46
Item:11	54.90	0.52	72.39	0.33	71.14	0.47	53.15	0.45	62.90	0.44	53.15	0.33
Item:12	61.76	0.42	79.14	0.41	77.89	0.37	60.01	0.35	69.70	0.39	60.01	0.35
Item:13	65.69	0.40	90.80	0.51	89.55	0.35	63.94	0.34	77.49	0.40	63.94	0.34
Item:14	56.86	0.43	44.79	0.09	43.54	0.38	55.11	0.37	50.07	0.32	43.54	0.09
Item:15	57.84	0.36	85.28	0.35	84.03	0.31	56.09	0.30	70.81	0.33	56.09	0.30
Item:16	67.84	0.55	55.28	0.31	54.03	0.50	66.09	0.48	60.81	0.46	54.03	0.31
Item:17	67.34	0.54	75.16	0.50	73.91	0.49	65.59	0.48	70.50	0.50	65.59	0.48
Item:18	68.84	0.43	77.02	0.41	75.77	0.38	67.09	0.37	72.18	0.40	67.09	0.37
Item:19	50.75	0.57	81.37	0.47	80.12	0.52	49.00	0.51	65.31	0.52	49.00	0.47
Item:20	69.85	0.54	75.16	0.50	73.91	0.49	68.10	0.47	71.75	0.50	68.10	0.47
Item:21	47.74	0.44	54.04	0.06	52.79	0.39	45.99	0.37	50.14	0.31	45.99	0.06
Item:22	47.74	0.55	55.28	-0.01	54.03	0.50	45.99	0.48	50.76	0.38	45.99	-0.01
Item:23	51.76	0.54	42.86	0.46	41.61	0.49	50.01	0.47	46.56	0.49	41.61	0.46
Item:24	51.26	0.42	47.83	0.26	46.58	0.37	49.51	0.35	48.79	0.35	46.58	0.26
Item:25	24.12	0.22	59.63	0.38	58.38	0.17	22.37	0.16	41.12	0.23	22.37	0.16
Item:26	69.80	0.43	67.12	0.26	65.87	0.38	68.05	0.36	67.71	0.36	65.87	0.26
Item:27	38.61	0.30	45.21	0.27	43.96	0.25	36.86	0.23	41.16	0.26	36.86	0.23
Item:28	12.38	-0.31	1.37	-0.16	0.12	-0.36	10.63	-0.38	6.12	-0.30	0.12	-0.38
Item:29	65.84	0.44	39.04	0.16	37.79	0.39	64.09	0.37	51.69	0.34	37.79	0.16
Item:30	58.42	0.32	71.23	0.13	69.98	0.27	56.67	0.25	64.07	0.24	56.67	0.13
Item:31	64.85	0.57	56.85	0.37	55.60	0.52	63.10	0.51	60.10	0.49	55.60	0.37
Item:32	56.44	0.39	56.85	-0.03	55.60	0.34	54.69	0.33	55.89	0.26	54.69	-0.03
Item:33	66.34	0.58	85.62	0.30	84.37	0.53	64.59	0.51	75.23	0.48	64.59	0.30
Item:34	31.19	0.05	64.38	0.14	63.13	0.44	29.44	-0.01	47.04	0.05	29.44	-0.01
Item:35	62.38	0.33	70.55	0.40	69.30	0.28	60.63	0.26	65.71	0.32	60.63	0.26

* Facility

** Item-Rest Cor

Table H-6: Field Tryout Result for Class V, Mathematics

Item	Telugu		Tamil		English		Hindi		Bangla		Assameese	
	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**
Item:1	67.11	0.45	69.11	0.40	66.11	0.45	67.86	0.38	67.54	0.42	66.11	0.38
Item:2	75.70	0.42	77.70	0.37	74.70	0.42	76.45	0.35	76.14	0.39	74.70	0.35
Item:3	34.05	0.26	36.05	0.21	33.05	0.26	34.80	0.19	34.49	0.23	33.05	0.19
Item:4	44.13	0.35	46.13	0.30	43.13	0.35	44.88	0.28	44.57	0.32	43.13	0.28
Item:5	52.40	0.38	54.40	0.33	51.40	0.38	53.15	0.31	52.83	0.35	51.40	0.31
Item:6	39.71	0.46	41.71	0.41	38.71	0.46	40.46	0.39	40.14	0.43	38.71	0.39
Item:7	38.19	0.17	40.19	0.12	37.19	0.17	38.94	0.10	38.63	0.14	37.19	0.10
Item:8	66.33	0.34	68.33	0.29	65.33	0.34	67.08	0.27	66.77	0.31	65.33	0.27
Item:9	66.83	0.37	68.83	0.32	65.83	0.37	67.58	0.30	67.27	0.34	65.83	0.30
Item:10	43.22	0.37	45.22	0.32	42.22	0.37	43.97	0.30	43.65	0.34	42.22	0.30
Item:11	46.73	0.34	48.73	0.29	45.73	0.34	47.48	0.27	47.17	0.31	45.73	0.27
Item:12	77.89	0.47	79.89	0.42	76.89	0.47	78.64	0.40	78.33	0.44	76.89	0.40
Item:13	39.70	0.23	41.70	0.18	38.70	0.23	40.45	0.16	40.14	0.20	38.70	0.16
Item:14	37.69	0.17	39.69	0.12	36.69	0.17	38.44	0.10	38.13	0.14	36.69	0.10
Item:15	45.23	0.27	47.23	0.22	44.23	0.27	45.98	0.20	45.66	0.24	44.23	0.20
Item:16	50.75	0.29	52.75	0.24	49.75	0.29	51.50	0.22	51.19	0.26	49.75	0.22
Item:17	16.67	0.01	18.67	-0.04	15.67	0.01	17.42	-0.06	17.10	-0.02	15.67	-0.06
Item:18	52.94	0.59	54.94	0.54	51.69	0.59	53.69	0.52	53.32	0.56	51.69	0.52
Item:19	62.75	0.48	64.75	0.43	61.50	0.48	63.50	0.41	63.12	0.45	61.50	0.41
Item:20	12.25	-0.04	14.25	-0.09	11.00	-0.04	13.00	-0.11	12.63	-0.07	11.00	-0.11
Item:21	67.16	0.38	69.16	0.33	65.91	0.38	67.91	0.31	67.53	0.35	65.91	0.31
Item:22	36.76	0.40	38.76	0.35	35.51	0.40	37.51	0.33	37.14	0.37	35.51	0.33
Item:23	39.22	0.47	41.22	0.42	37.97	0.47	39.97	0.40	39.59	0.44	37.97	0.40
Item:24	51.96	0.47	53.96	0.42	50.71	0.47	52.71	0.40	52.34	0.44	50.71	0.40
Item:25	50.00	0.51	52.00	0.46	48.75	0.51	50.75	0.44	50.38	0.48	48.75	0.44
Item:26	82.18	0.47	84.18	0.42	80.93	0.47	82.93	0.40	82.55	0.44	80.93	0.40
Item:27	31.19	0.40	33.19	0.35	29.94	0.40	31.94	0.33	31.56	0.37	29.94	0.33
Item:28	51.98	0.57	53.98	0.52	50.73	0.57	52.73	0.50	52.36	0.54	50.73	0.50
Item:29	60.40	0.42	62.40	0.37	59.15	0.42	61.15	0.35	60.77	0.39	59.15	0.35
Item:30	68.32	0.38	70.32	0.33	67.07	0.38	69.07	0.31	68.69	0.35	67.07	0.31
Item:31	64.36	0.35	66.36	0.30	63.11	0.35	65.11	0.28	64.73	0.32	63.11	0.28
Item:32	41.58	0.43	43.58	0.38	40.33	0.43	42.33	0.36	41.96	0.40	40.33	0.36
Item:33	69.31	0.40	71.31	0.35	68.06	0.40	70.06	0.33	69.68	0.37	68.06	0.33
Item:34	45.54	0.45	47.54	0.40	44.29	0.45	46.29	0.38	45.92	0.42	44.29	0.38
Item:35	37.13	0.44	39.13	0.39	35.88	0.44	37.88	0.37	37.50	0.41	35.88	0.37

* Facility

** Item-Rest Cor

Table H-7: Field Tryout Result for Class VIII, Language

Item	Telugu		Tamil		English		Hindi		Bangla		Assameese	
	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**
Item:1	80.10	0.32	72.32	0.36	66.7	0.35	81.97	0.33	75.27	0.34	66.67	0.32
Item:2	51.31	0.34	35.71	0.46	68.0	0.08	39.34	0.08	48.60	0.24	35.71	0.08
Item:3	77.49	0.46	59.82	0.46	64.3	0.37	63.61	0.40	66.31	0.42	59.82	0.37
Item:4	60.21	0.29	60.71	0.24	46.5	0.21	46.89	0.24	53.57	0.25	46.46	0.21
Item:5	38.74	0.41	28.57	0.34	42.1	0.24	40.33	0.38	37.43	0.34	28.57	0.24
Item:6	44.50	0.14	16.96	0.04	36.0	0.16	54.10	0.05	37.90	0.10	16.96	0.04
Item:7	79.06	0.40	73.21	0.39	73.4	0.45	73.44	0.51	74.78	0.44	73.21	0.39
Item:8	27.75	0.09	33.04	0.57	34.0	0.51	51.80	0.54	36.65	0.43	27.75	0.09
Item:9	48.69	0.05	56.25	0.59	44.1	0.34	63.28	0.33	53.08	0.33	44.11	0.05
Item:10	6.81	-0.17	16.07	-0.17	14.8	-0.14	15.08	-0.01	13.19	-0.12	6.81	-0.17
Item:11	68.19	0.33	50.79	0.33	62.6	0.45	66.70	0.38	62.06	0.37	50.79	0.33
Item:12	49.33	0.38	50.79	0.38	40.7	0.31	37.42	0.27	44.55	0.34	37.42	0.27
Item:13	62.10	0.22	63.09	0.35	59.1	0.46	58.46	0.43	60.68	0.37	58.46	0.22
Item:14	71.05	0.32	78.86	0.37	59.3	0.48	70.27	0.39	69.88	0.39	59.33	0.32
Item:15	51.62	0.19	42.90	0.11	43.0	0.21	26.28	0.23	40.96	0.19	26.28	0.11
Item:16	75.97	0.39	85.00	0.20	80.3	0.42	77.56	0.37	79.71	0.35	75.97	0.20
Item:17	47.40	0.25	27.00	0.25	46.9	0.37	45.87	0.43	41.78	0.33	27.00	0.25
Item:18	68.83	0.32	54.00	0.33	60.6	0.28	64.69	0.37	62.04	0.33	54.00	0.28
Item:19	53.25	0.46	55.00	0.56	64.2	0.42	37.62	0.17	52.51	0.40	37.62	0.17
Item:20	62.99	0.56	52.00	0.37	59.8	0.44	56.77	0.44	57.90	0.45	52.00	0.37
Item:21	51.95	0.46	59.00	0.38	33.5	0.26	49.50	0.38	48.48	0.37	33.46	0.26
Item:22	35.71	0.11	52.00	0.39	15.7	-0.17	34.32	0.25	34.45	0.15	15.75	-0.17
Item:23	29.87	0.17	40.00	0.46	26.8	-0.06	20.46	0.20	29.28	0.19	20.46	-0.06
Item:24	74.03	0.42	84.00	0.37	68.9	0.37	26.40	-0.01	63.33	0.29	26.40	-0.01
Item:25	29.87	0.05	37.00	0.02	37.0	0.14	52.81	0.32	39.17	0.13	29.87	0.02
Item:26	92.22	0.47	92.38	0.26	84.2	0.41	81.38	0.41	87.54	0.39	81.38	0.26
Item:27	60.00	0.41	45.71	0.34	42.3	0.43	44.14	0.29	48.04	0.37	42.29	0.29
Item:28	19.44	0.02	34.29	0.19	42.3	0.40	55.52	0.51	37.88	0.27	19.44	0.02
Item:29	57.78	0.33	60.95	0.33	64.0	0.35	52.76	0.36	58.88	0.34	52.76	0.33
Item:30	42.78	0.42	50.48	0.43	32.4	0.51	38.28	0.37	40.99	0.43	32.41	0.37
Item:31	81.11	0.41	78.10	0.30	62.8	0.47	58.62	0.47	70.17	0.41	58.62	0.30
Item:32	41.67	0.48	27.62	0.23	34.0	0.21	40.34	0.32	35.91	0.31	27.62	0.21
Item:33	70.00	0.47	80.00	0.37	39.5	0.20	67.93	0.47	64.36	0.38	39.53	0.20
Item:34	91.67	0.45	89.52	0.29	64.4	0.47	74.14	0.49	79.94	0.43	64.43	0.29
Item:35	81.11	0.36	62.86	0.19	64.0	0.33	72.41	0.42	70.10	0.33	62.86	0.19

* Facility

** Item-Rest Cor

Table H-8: Field Tryout Result for Class VIII, Mathematics

Item	Telugu		Tamil		English		Hindi		Bangla		Assameese	
	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**
Item:1	8.95	-0.12	1.89	-0.03	13.06	-0.19	13.70	-0.09	9.40	-0.11	1.89	-0.19
Item:2	76.38	0.35	78.55	0.50	63.93	0.31	52.45	0.31	67.83	0.37	52.45	0.31
Item:3	51.81	0.39	68.77	0.53	42.54	0.50	23.16	0.16	46.57	0.39	23.16	0.16
Item:4	76.95	0.33	90.85	0.14	65.67	0.38	58.69	0.35	73.04	0.30	58.69	0.14
Item:5	52.57	0.33	65.30	0.38	35.20	0.48	30.73	0.25	45.95	0.36	30.73	0.25
Item:6	14.14	0.20	36.61	-0.21	27.61	-0.10	23.61	0.20	25.49	0.02	14.14	-0.21
Item:7	20.94	-0.18	54.46	0.18	42.09	0.49	26.23	0.04	35.93	0.13	20.94	-0.18
Item:8	42.93	0.43	44.64	0.26	37.71	0.49	21.31	0.32	36.65	0.38	21.31	0.26
Item:9	50.26	0.46	64.29	0.66	41.08	0.60	17.05	0.21	43.17	0.48	17.05	0.21
Item:10	22.51	0.19	63.39	0.66	39.73	0.45	29.51	0.22	38.79	0.38	22.51	0.19
Item:11	37.70	0.41	70.54	0.75	51.85	0.57	35.74	0.38	48.96	0.53	35.74	0.38
Item:12	49.21	0.48	76.79	0.61	51.52	0.53	28.85	0.32	51.59	0.49	28.85	0.32
Item:13	30.89	0.22	50.89	-0.32	45.79	0.55	35.41	0.32	40.75	0.19	30.89	-0.32
Item:14	52.36	0.40	65.18	0.50	56.57	0.47	48.20	0.45	55.57	0.45	48.20	0.40
Item:15	70.68	0.31	82.14	-0.11	75.76	0.44	60.66	0.45	72.31	0.27	60.66	-0.11
Item:16	31.17	0.15	70.00	0.21	37.80	0.34	33.00	0.15	42.99	0.21	31.17	0.15
Item:17	33.77	0.52	8.00	0.04	16.54	0.09	9.90	0.10	17.05	0.19	8.00	0.04
Item:18	31.17	-0.28	22.00	0.30	33.07	-0.01	33.00	0.08	29.81	0.02	22.00	-0.28
Item:19	16.23	-0.14	41.00	-0.04	23.62	0.31	29.04	0.19	27.47	0.08	16.23	-0.14
Item:20	24.03	0.03	5.00	-0.04	32.28	0.31	18.48	-0.10	19.95	0.05	5.00	-0.10
Item:21	29.87	0.37	59.00	0.38	25.20	0.46	16.17	0.27	32.56	0.37	16.17	0.27
Item:22	29.87	0.38	64.00	0.42	19.29	0.18	16.17	0.10	32.33	0.27	16.17	0.10
Item:23	37.66	0.41	71.00	0.07	39.76	0.39	38.61	0.19	46.76	0.26	37.66	0.07
Item:24	31.82	0.24	55.00	0.62	31.50	0.19	20.46	0.15	34.69	0.30	20.46	0.15
Item:25	30.52	0.24	4.00	-0.11	27.56	0.30	21.12	0.20	20.80	0.16	4.00	-0.11
Item:26	37.22	0.25	20.95	-0.25	24.11	-0.10	23.10	0.08	26.35	-0.01	20.95	-0.25
Item:27	16.67	0.35	8.57	-0.08	24.11	-0.09	24.83	0.29	18.54	0.12	8.57	-0.09
Item:28	55.56	0.33	40.00	0.15	28.85	0.08	38.28	0.08	40.67	0.16	28.85	0.08
Item:29	19.44	0.04	1.90	-0.11	37.55	0.27	24.48	0.02	20.85	0.06	1.90	-0.11
Item:30	21.11	0.06	56.19	0.46	32.81	0.23	27.24	0.18	34.34	0.23	21.11	0.06
Item:31	28.89	0.26	32.38	0.23	34.39	0.58	14.14	0.29	27.45	0.34	14.14	0.23
Item:32	45.56	0.06	87.62	0.38	50.59	0.50	32.76	0.30	54.13	0.31	32.76	0.06
Item:33	27.78	0.20	16.19	-0.35	34.78	0.41	18.97	0.14	24.43	0.10	16.19	-0.35
Item:34	33.33	0.27	58.10	0.26	23.72	0.47	15.52	0.19	32.67	0.30	15.52	0.19
Item:35	37.78	0.58	40.00	0.38	23.32	0.03	18.97	0.20	30.02	0.30	18.97	0.03

* Facility

** Item-Rest Cor

Table H-9: Field Tryout Result for Class VIII, Science

Item	Telugu		Tamil		English		Hindi		Bangla		Assameese	
	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**
Item:1	35.60	0.40	72.32	0.27	36.70	0.09	23.28	0.09	41.98	0.21	23.28	0.09
Item:2	14.66	-0.08	4.46	-0.09	13.13	-0.25	13.11	-0.04	11.34	-0.12	4.46	-0.25
Item:3	47.12	0.35	57.14	0.47	49.16	0.22	31.80	0.14	46.31	0.30	31.80	0.14
Item:4	43.98	0.31	63.39	0.11	37.37	0.11	42.30	0.23	46.76	0.19	37.37	0.11
Item:5	27.75	-0.09	20.54	-0.26	27.95	0.12	18.36	0.12	23.65	-0.03	18.36	-0.26
Item:6	32.46	0.28	43.75	0.36	41.75	0.26	23.61	0.07	35.39	0.24	23.61	0.07
Item:7	47.64	0.24	65.18	0.66	39.73	0.38	32.13	0.26	46.17	0.38	32.13	0.24
Item:8	15.18	-0.19	48.21	0.57	31.65	-0.03	26.89	0.15	30.48	0.13	15.18	-0.19
Item:9	16.75	-0.21	51.79	0.85	23.57	-0.05	30.16	0.15	30.57	0.18	16.75	-0.21
Item:10	34.03	-0.18	34.82	-0.06	48.15	0.28	35.08	0.05	38.02	0.03	34.03	-0.18
Item:11	33.33	0.21	51.42	0.39	41.04	0.28	42.09	0.22	41.97	0.28	33.33	0.21
Item:12	42.67	0.27	35.33	0.32	31.59	0.35	46.88	0.29	39.12	0.31	31.59	0.27
Item:13	56.57	0.45	66.25	0.64	48.63	0.32	58.57	0.36	57.51	0.44	48.63	0.32
Item:14	49.71	-0.03	39.12	0.19	46.52	0.23	31.63	0.17	41.74	0.14	31.63	-0.03
Item:15	53.52	0.40	56.15	0.37	46.77	0.38	46.44	0.31	50.72	0.37	46.44	0.31
Item:16	55.84	0.40	34.00	0.50	24.41	0.13	24.75	0.26	34.75	0.32	24.41	0.13
Item:17	47.40	0.40	60.00	0.74	47.24	0.11	49.50	0.27	51.04	0.38	47.24	0.11
Item:18	31.82	0.54	52.00	0.66	35.04	0.30	30.03	0.21	37.22	0.43	30.03	0.21
Item:19	43.51	0.58	52.00	0.81	42.91	0.15	30.69	0.21	42.28	0.44	30.69	0.15
Item:20	63.64	0.34	60.00	-0.22	52.76	0.29	56.77	0.38	58.29	0.20	52.76	-0.22
Item:21	26.62	-0.01	57.00	0.80	34.25	0.30	19.14	0.13	34.25	0.31	19.14	-0.01
Item:22	30.52	0.32	59.00	0.83	32.28	0.34	30.69	0.02	38.12	0.37	30.52	0.02
Item:23	37.01	0.33	67.00	0.70	42.13	0.34	29.37	0.17	43.88	0.39	29.37	0.17
Item:24	30.52	-0.03	30.00	-0.54	31.10	0.25	15.84	0.04	26.87	-0.07	15.84	-0.54
Item:25	68.18	0.29	86.00	0.10	56.30	0.45	73.27	0.48	70.94	0.33	56.30	0.10
Item:26	21.67	-0.21	36.19	-0.33	18.97	-0.11	29.31	0.09	26.53	-0.14	18.97	-0.33
Item:27	27.22	-0.01	54.29	-0.28	43.87	-0.03	35.52	0.33	40.22	0.03	27.22	-0.28
Item:28	55.00	0.39	36.19	0.25	28.85	0.09	12.41	0.05	33.11	0.19	12.41	0.05
Item:29	37.78	0.46	32.38	0.43	6.72	0.14	5.17	0.03	20.51	0.26	5.17	0.03
Item:30	28.89	0.45	59.05	0.55	26.09	0.35	16.21	0.04	32.56	0.35	16.21	0.04
Item:31	66.11	0.52	57.14	-0.25	38.34	0.31	41.72	0.30	50.83	0.22	38.34	-0.25
Item:32	86.67	0.34	86.67	0.33	66.80	0.29	78.97	0.37	79.77	0.33	66.80	0.29
Item:33	44.44	0.39	35.24	0.51	27.67	0.25	23.10	0.20	32.61	0.34	23.10	0.20
Item:34	45.56	0.50	68.57	0.22	49.01	0.37	41.72	0.35	51.22	0.36	41.72	0.22
Item:35	65.00	0.40	66.67	0.28	38.34	0.34	37.59	0.27	51.90	0.32	37.59	0.27

* Facility

** Item-Rest Cor

Table H-10: Field Tryout Result for Class VIII, Social Science

Item	Telugu		Tamil		English		Hindi		Bangla		Assameese	
	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**	F*	IRC**
Item:1	23.24	0.18	27.13	0.07	52.74	0.40	23.39	0.24	31.62	0.22	23.24	0.07
Item:2	42.10	0.19	67.51	0.34	61.07	0.31	62.36	0.41	58.26	0.31	42.10	0.19
Item:3	55.43	0.44	88.33	0.42	51.24	0.41	59.02	0.41	63.51	0.42	51.24	0.41
Item:4	46.10	0.29	86.75	0.41	41.54	0.50	34.30	0.33	52.17	0.39	34.30	0.29
Item:5	37.90	0.20	65.93	0.37	40.17	0.42	33.52	0.37	44.38	0.34	33.52	0.20
Item:6	25.65	0.43	87.50	0.45	44.11	0.57	38.69	0.41	48.99	0.47	25.65	0.41
Item:7	44.50	0.55	82.14	0.40	37.04	0.29	57.70	0.34	55.35	0.39	37.04	0.29
Item:8	36.13	0.61	78.57	0.37	30.98	0.03	36.39	0.31	45.52	0.33	30.98	0.03
Item:9	20.42	0.32	0.89	-0.24	26.94	0.05	19.02	0.18	16.82	0.08	0.89	-0.24
Item:10	23.56	0.29	26.79	0.28	37.37	0.23	33.11	0.49	30.21	0.32	23.56	0.23
Item:11	35.60	0.73	84.82	0.46	42.09	0.54	33.11	0.35	48.91	0.52	33.11	0.35
Item:12	13.09	0.12	38.39	0.23	49.16	0.18	29.84	0.18	32.62	0.18	13.09	0.12
Item:13	28.27	0.38	20.54	0.29	23.23	0.21	13.77	-0.07	21.45	0.20	13.77	-0.07
Item:14	50.79	0.63	85.71	0.33	44.78	0.40	46.23	0.41	56.88	0.44	44.78	0.33
Item:15	57.07	0.37	74.11	0.49	42.76	0.09	31.15	0.42	51.27	0.34	31.15	0.09
Item:16	16.88	-0.14	73.00	0.62	34.65	0.28	33.66	0.30	39.55	0.27	16.88	-0.14
Item:17	51.95	0.39	51.00	0.50	33.86	0.27	24.75	0.20	40.39	0.34	24.75	0.20
Item:18	30.52	0.11	53.00	0.35	28.74	0.17	29.04	0.06	35.33	0.17	28.74	0.06
Item:19	29.22	0.49	56.00	0.37	29.53	-0.07	38.94	0.16	38.42	0.24	29.22	-0.07
Item:20	12.34	-0.14	63.00	0.67	32.68	0.08	30.36	0.32	34.59	0.23	12.34	-0.14
Item:21	33.12	0.34	56.00	0.29	18.50	-0.07	15.84	-0.04	30.87	0.13	15.84	-0.07
Item:22	29.22	0.44	79.00	0.69	45.28	0.33	40.26	0.38	48.44	0.46	29.22	0.33
Item:23	35.06	-0.06	24.00	0.18	23.62	-0.02	19.80	0.11	25.62	0.05	19.80	-0.06
Item:24	31.82	0.41	72.00	0.75	37.01	0.36	25.74	0.39	41.64	0.48	25.74	0.36
Item:25	19.48	0.10	7.00	-0.39	15.75	0.02	21.45	0.14	15.92	-0.03	7.00	-0.39
Item:26	57.78	0.33	75.24	0.41	50.99	0.50	37.59	0.34	55.40	0.40	37.59	0.33
Item:27	48.89	0.31	58.10	0.25	28.06	-0.27	31.38	0.03	41.61	0.08	28.06	-0.27
Item:28	27.78	-0.01	52.38	0.33	21.74	0.08	16.21	0.02	29.53	0.10	16.21	-0.01
Item:29	23.89	-0.02	73.33	0.46	54.15	0.41	39.31	0.28	47.67	0.28	23.89	-0.02
Item:30	15.00	0.11	75.24	0.51	28.46	0.40	52.07	0.40	42.69	0.35	15.00	0.11
Item:31	52.78	0.30	84.76	0.61	49.41	0.42	45.17	0.29	58.03	0.40	45.17	0.29
Item:32	51.67	0.57	18.10	-0.49	13.83	0.16	20.00	0.22	25.90	0.12	13.83	-0.49
Item:33	35.00	0.09	24.76	-0.32	26.09	0.39	17.24	-0.05	25.77	0.03	17.24	-0.32
Item:34	27.22	0.07	71.43	0.61	42.29	0.59	52.41	0.52	48.34	0.45	27.22	0.07
Item:35	67.78	0.57	67.62	0.35	34.78	0.36	42.41	0.39	53.15	0.42	34.78	0.35

* Facility

** Item-Rest Cor

Appendix I

List of Workshops

Table I-1: List of Workshops for Item Development and Finalization

S. No.	Name of Workshops conducted for Elementary NAS 2017	Dates
1	Review of Tests Items	28 th - 29 th April 2017
2	Review & Finalization of Tests Classes III to V	2 nd - 4 th May 2017
3	Review & Finalization of Tests Classes VI to VIII	2 nd - 5 th May 2017
4	Sampling Workshop for NAS Classes III, V and VIII	28 th June - 7 th July 2017
5	Capacity Development of States on NAS	17 th - 18 th July 2017
6	Finalization of Test Items Classes III, V and VIII, 1 st Round	24 th - 25 th July 2017
7	Finalization of Test Items Classes III, V and VIII, 2 nd Round	28 th - 29 th July 2017
8	Finalization of Test Items Classes III, V and VIII, 3 rd Round	31 st July - 1 st August 2017
9	Meeting to Review Progress of NAS & Learning Outcome	2 nd August 2017
10	Finalization and Review of Class VIII test items, 4 th Round	10 th - 12 th August 2017
11	Review & Finalization of Operational Guideline	10 th - 12 th August 2017
12	Pilot Study of Class VIII Test Items	17 th August 2017
13	One on One Vetting of Translated Test Items with States/UTs	15 th September-13 th October 2017
14	Development of Material for Short Term Interventions Post NAS	10 th - 11 th November 2017

Table I-2: District Level Workshop Schedule

S. No.	States	Venue	Dates
1	Maharashtra, Chhattisgarh, Goa	Raipur	29 th - 30 th August 2017
2	Madhya Pradesh, Delhi	Bhopal	31 st August - 1 st September 2017
3	Assam, Tripura, Manipur, Sikkim	Guwahati	12 th - 13 th September 2017
4	Mizoram, Arunachal Pradesh, Meghalaya, Nagaland	Guwahati	14 th - 15 th September 2017
5	Punjab, Haryana and Chandigarh	Chandigarh	13 th - 14 th September 2017
6	Jammu and Kashmir, Himachal Pradesh and Uttarakhand	Chandigarh	15 th - 16 th September 2017
7	Odisha, West Bengal	Bhubaneswar	12 th - 13 th September 2017
8	Rajasthan, Gujarat, Daman and Diu, Dadra and Nagar Haweli	Gandhinagar	15 th - 16 th September 2017
9	Uttar Pradesh	Varanasi	18 th - 19 th September 2017
10	Bihar, Jharkhand	Patna	18 th - 19 th September 2017
11	Tamil Nadu, Kerala, Lakshadweep, A&N Islands, Puducherry	Bengaluru	19 th - 20 th September 2017
12	Andhra Pradesh, Telangana, Karnataka	Bengaluru	17 th - 18 th September 2017
12	Andhra Pradesh, Telangana, Karnataka	Bengaluru	17 th - 18 th September 2017

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Examinations

An examination is a formal test of an individual student's knowledge or proficiency in a subject on the curriculum. The results of examinations apply to individual students, enabling them to progress through school or apply for further education or employment. Taken together, examination results provide an overall snapshot of students' performance at the end of a school year or course of learning. Examination results do not indicate the reasons behind high or low achievement of students.

Achievement Surveys

Achievement Surveys provide a measure of learning across a representative sample of students. They allow classification of students at a specific grade level by their ability (what students know and can do) in different subjects on the curriculum. National Achievement Surveys provide a "Health Check" to the education system by analyzing achievement based on a range of background factors (school, home, teachers). They potentially enable policy makers and practitioners to address the challenges to enhance student learning.

NAS for Transforming School Education



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