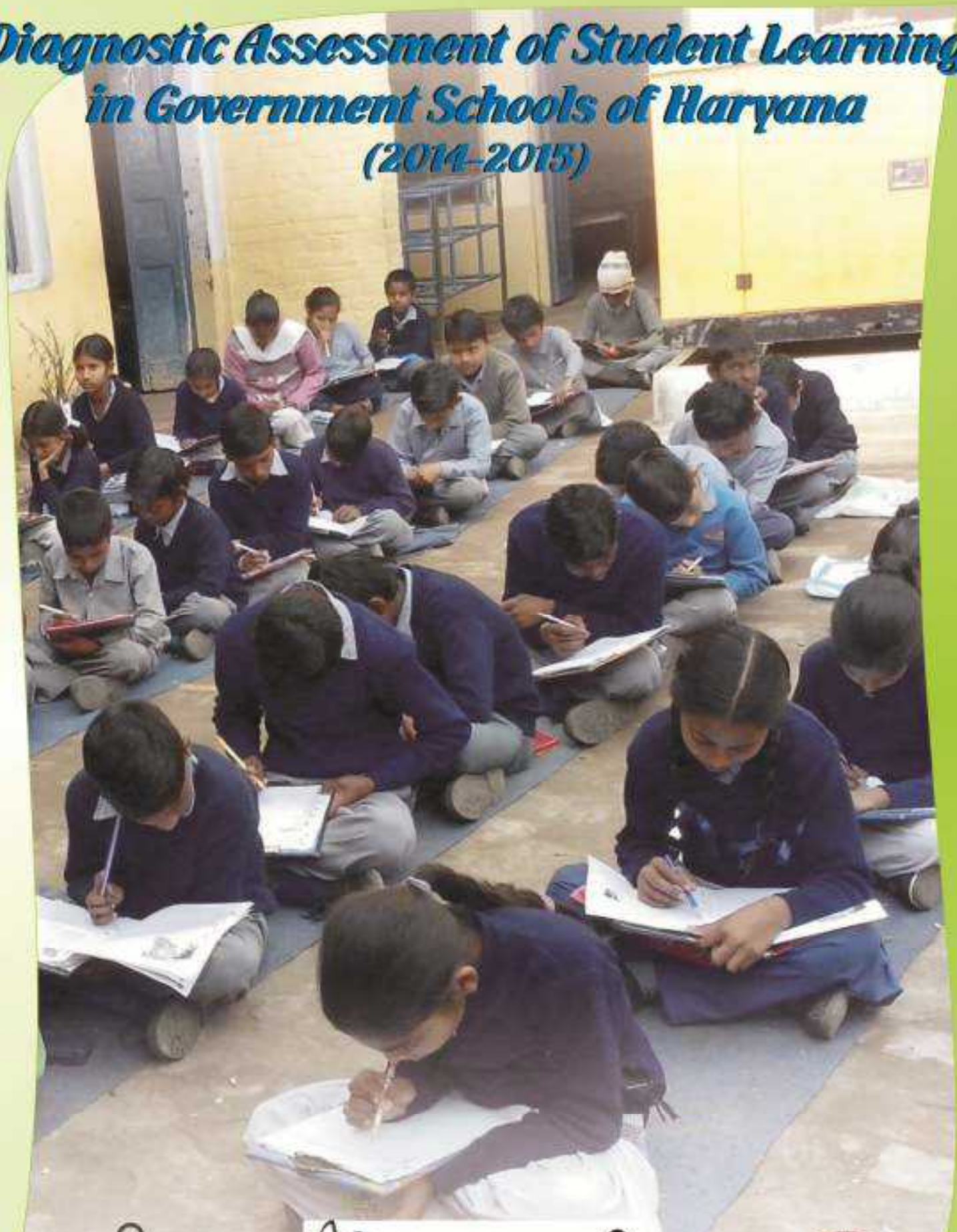
Diagnostic Assessment of Student Learning in Government Schools of Haryana (2014-2015)



educational initiatives

शिक्षा का अधिकार

सर्व शिक्षा अभियान
सब पढ़ें सब बढ़ें

ACKNOWLEDGEMENTS

We would like to thank the officials of Education Department, Govt. of Haryana, HSSPP and State Council for Education Research and Training (SCERT). The study would not have been possible without the kind support and help of many individuals and the departments of Haryana Government. We are highly indebted to them for their guidance and constant support for successful roll out of Diagnostic Assessments.

Special gratitude is due to Dr. T C Gupta, IAS, Principal Secretary – Education, Government of Haryana, and Sri. Alok Verma , IFS, State Project Director, HSSPP, Mrs Snehlata, Director SCERT and all the DPEO, EFE Coordinators, Principals and Teachers for their kind co-operation and the great support which helped us to roll out the assessments. We would also like to thank Dr. Surina Rajan, IAS for initiating this project and Boston Consulting Group for their continuous support throughout the project.

Last but not the least, we are also thankful to the students of Haryana that participated in this Diagnostic Assessments.

We sincerely hope that this illustrative study will be useful to the policy makers and schools.

MR. SRIDHAR RAJAGOPALAN
(Managing Director)
Educational Initiatives Pvt. Ltd.

PROJECT CORE TEAM

Government of Haryana

Mr. T.C Gupta, PSSE
Mr. Alok Verma, SPD
Mrs. Snehlata Ahlawat, Director SCERT
Mrs. Sushil Batra, Jt Director SCERT
Dr. Indrani Bhaduri, NCERT
Mr. Dilbag Malik, Consultant PMU
Ms. Mansi Narang, REAP
Ms. Nistha Lahoti, ARISE fellow
Ms. Manisha Kukreja, BCG
Mrs. Garima Batra , BCG

Educational Initiatives Pvt. Ltd.

Mr. Sridhar Rajagopalan, Managing Director
Mr. Pranav Kothari Vice-President Assessments
Mr. Deepak Agarwal, Project Manager
Mr. Rohit Mehta, Strategic Relationship Manager
Mr. Raghav Rohatgi, Project Manager
Ms. Archana Dwivedi, Research Fellow
Mr. Nishchal Shukla, Educational Fellow
Ms. Sidhya Balakrishnan, Jr.Research Associate
Ms. Gayatri Vaidya, Educational Specialist
Ms. Chitra Iyengar, Educational Specialist
Ms. Devika Mittal, Educational Specialist
Mr. Dhrumit Vyas, Executive - Field Operations
Mr. Kashi Nath Jha, Sr. Executive - Field Operations
Mr. Arpit Metaliya, Software Specialist
Ms. N.V.N.S.S. Durga, Graphic Designer
Mr. Ketan Beherawala, Asst Manager - Accounts
Mr. Shirish Patel, Logistics Executive

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

BACKGROUND AND OBJECTIVE

India's progress towards universal primary education has seen substantial success in access, with over 96% of Indian children enrolled in primary schools. This however, has not completely addressed issues of quality education in the classrooms. India's participation in PISA for 15 year olds in 2009 showed that 80% our students were below the basic level of reading proficiency needed to participate effectively and productively in life[1]. In order to evaluate and measure the impact of primary schooling systems and their progress towards improving learning levels, periodic assessments can be immensely valuable. Recognizing the above stated need to understand the progress towards its goals, a project focusing on measuring & continuously tracking learning outcomes of students in schools of Haryana for improving the quality of education has been conceptualized. This Diagnostic assessment will be conducted every year for 4 years. For the first two years, the assessment will be carried out independently by EI. The assessment will be conducted by SCERT from the third year onwards with the support of EI. With year-on-year assessments, learning progress can be accurately tracked, and periodic feedback can be provided to the state on the impact of its programs. The assessment aimed to provide nuanced insights into student learning levels by examining strengths and weaknesses in each subject, learning retention & improvements and gaps in each class and subject. These insights can direct teachers to retrospect and provide directed remedial action in the classrooms.

KEY FEATURES OF THE STUDY

Students of classes 3, 5 and 8 were covered in this assessment across all the 21 districts of Haryana. Around 3,000 students were sampled for each class from each district.

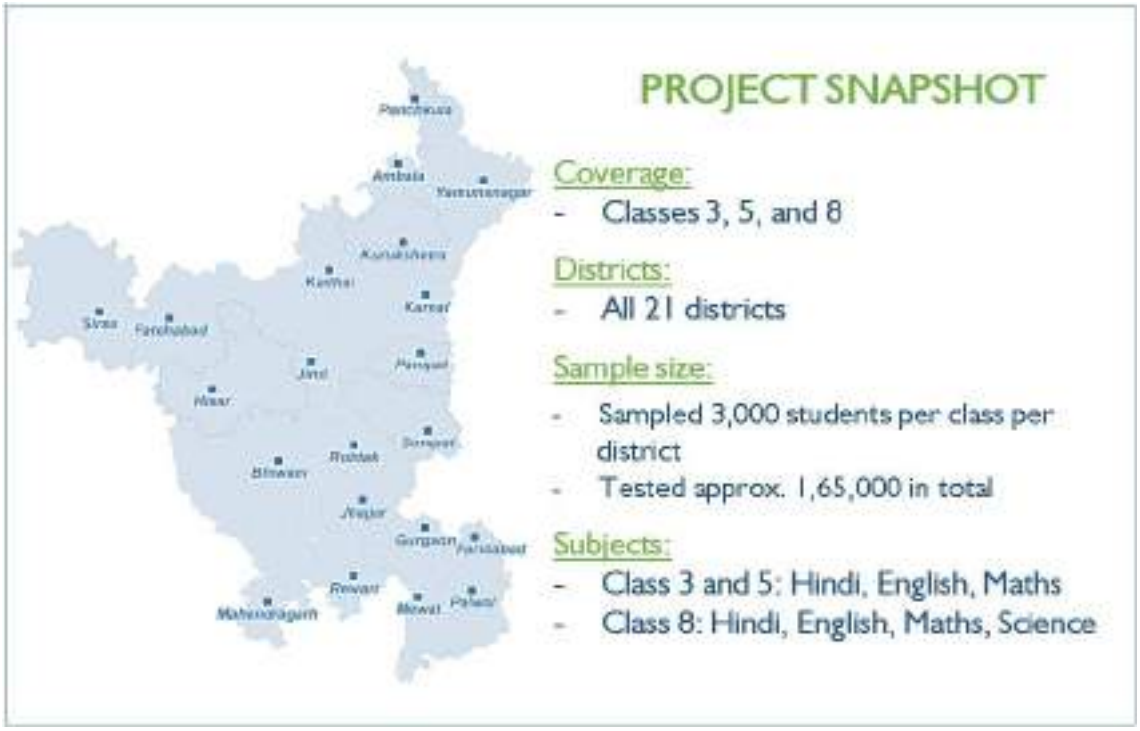


Figure 1: Project Snapshot

Schools were sampled using a stratified two-stage cluster sampling process, to incorporate differences in location and socioeconomic conditions, and ensure that the sample is representative of both the state and the districts. The test was conducted by trained **external field evaluators** recruited by EI, and **standardized test administration** was ensured in each school.

[1]http://research.acer.edu.au/cgi/viewcontent.cgi?article=1000&context=pisa

The test paper development process involved a comprehensive commenting and reviewing of each test item before finalization. **Each test paper was developed based on a blueprint** of the questions and competencies to be tested, which was based on the state curriculum. Approximately 60-150 unique items were developed, and **three different sets of test papers were developed for each class and subject** to allow for a large dataset of performance data for analysis. **Each test paper also had common questions** from EI's 6-state benchmarking study, 2013 and EI's diagnostic assessment for private schools, ASSET for **benchmarking of state performance** levels. **Some questions were also repeated from lower grade across classes** to understand if students have understood the lower grade concepts.

MAIN FINDINGS

The student performance across classes and subjects was examined for patterns at the state and district level. These have been summarized below.

I. Performance overview

- Learning levels across classes and subjects are not at grade appropriate level. Average performance at the state level across classes ranges between 51%-58% in Hindi, 34%-44% in Maths, 38%-47% in English and is 38% in Class 8 Science. Students struggle with intermediate and advanced competencies at respective grades and have performed lowest on questions which test understanding and application of concepts.

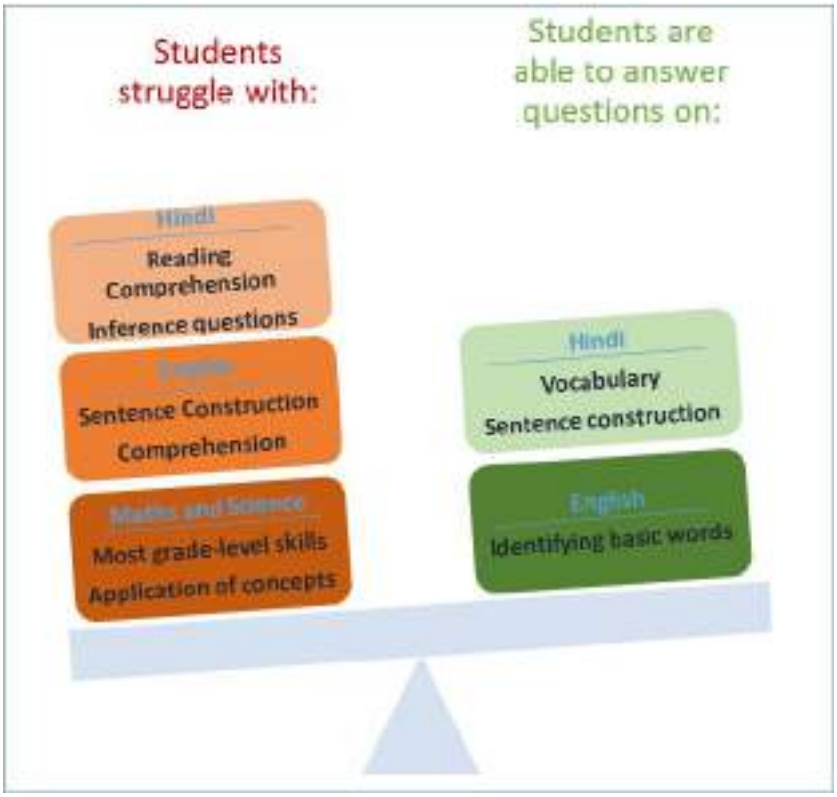


Figure 2: Strong and weak areas in different subjects

- Comparison with other states[2] showed that on common questions, performance levels of Haryana are higher than that of Karnataka, Gujarat, Bihar, MP and Uttarakhand in class 3 Maths and class 5 Hindi and Maths. An illustration of this trend is given for Class 5 Maths below[3].

[2] EI's Benchmarking study in 2012, tested government schools, affordable private schools and high fee private schools in 6 states. 2 districts in each state were tested in this study. The comparison given here is against this two-district average for each state.

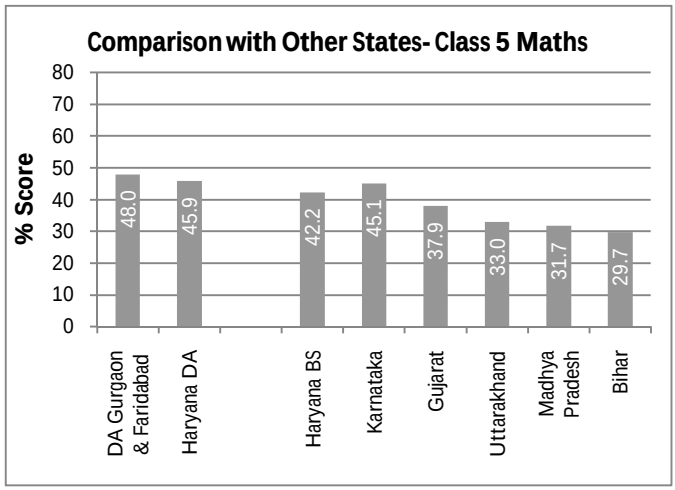


Figure 3: Comparison of Haryana with other states in Maths class 5

- Students in Haryana have performed 25 to 27 percentage points lower in Maths than private school students taking ASSET[4] on common questions across class 3, 5 and 8. In Class 8 Science, the difference in performance is 20 percentage points.

II. Specific insights into student learning

- Analysis shows that conceptual understanding and application of concepts is even lower. Students have performed significantly lower on questions which test understanding and application of concepts or ask students to draw inferences relative to questions which are procedural or recall based in nature.

- The data shows that the students of class 5 and class 8 have not even understood the concepts taught in class 3 and class 5 respectively. **Students of class 8 are able to answer only class 3 syllabus based questions in Hindi. In Maths, more than half of class 8 students are not able to answer even class 3 questions.**

- **Students harbour certain misconceptions, and make specific common errors** which indicate that there may be learning gaps in their understanding of the concepts. These include:

  - Measuring an object from zero irrespective of where the object is placed on the scale
  - Incorrect understanding of area and the difference between area and perimeter
  - Choosing an option which is directly referred to in a given passage without comprehending the question and the text
  - Incorrect usage of singular and plural forms of words
  - Interpreting that only glossy surfaces reflect light
  - Interpreting that there is no air in an inverted glass

- A large percentage of students have not attempted the free response questions which tested writing skills - (10% to 20% have skipped the questions where letter or word has to be written and 20% to 45% have skipped the questions where they have to write sentences). Moreover, the average performance of students in questions that tested knowledge of letters was around 65% while those in questions that

[3] Haryana DA: Daignostic assessment, Haryana (2015) | DA Gurgaon & Faridabad: Data of Gurgaon & Faridabad from Daignostic assessment, Haryana (2015) | Haryana BS: Data of Haryana from Benchmarking study

[4] Students were tested in their medium of instruction in both assessments. In ASSET, this was English, while in Haryana, the students were tested in the Hindi medium.

tested the writing skills was lower for both Hindi and English at 37% and 21% respectively. **Very few students were able to write a complete and a meaningful sentence without any error**. A majority of students attempting the question wrote incomplete sentences or sentences with inconsistencies in construction, grammatical usage, coherence and spellings. In English free-response questions, it is observed that **a strong influence of the mother tongue (Hindi) overrides the usage of English words.** This has led the student to think in Hindi and reproduce his/her thoughts in the same language.

Class 3 English

24 Write a sentence about the picture given below.

Answer: Uske Two Boy kana ka Raha Hai.

Sample Question: *The student has interpreted the picture correctly however has articulated the same using Hindi language. The student has transcribed the sentence in English. It reflects that the basic thought process of students seems to be in Hindi since they do are exposed to Hindi primarily and tend to think in native language.*

- Students learning levels have been analysed to understand what students know and are able to do in each grade at different ability (proficiency) level. The technique of 'Scale anchoring' has been used for this. Along with the learning benchmarks we have also provided distribution of students across these proficiency levels for all the districts. These tables and charts give us detailed idea of the current learning level of the students for each district.

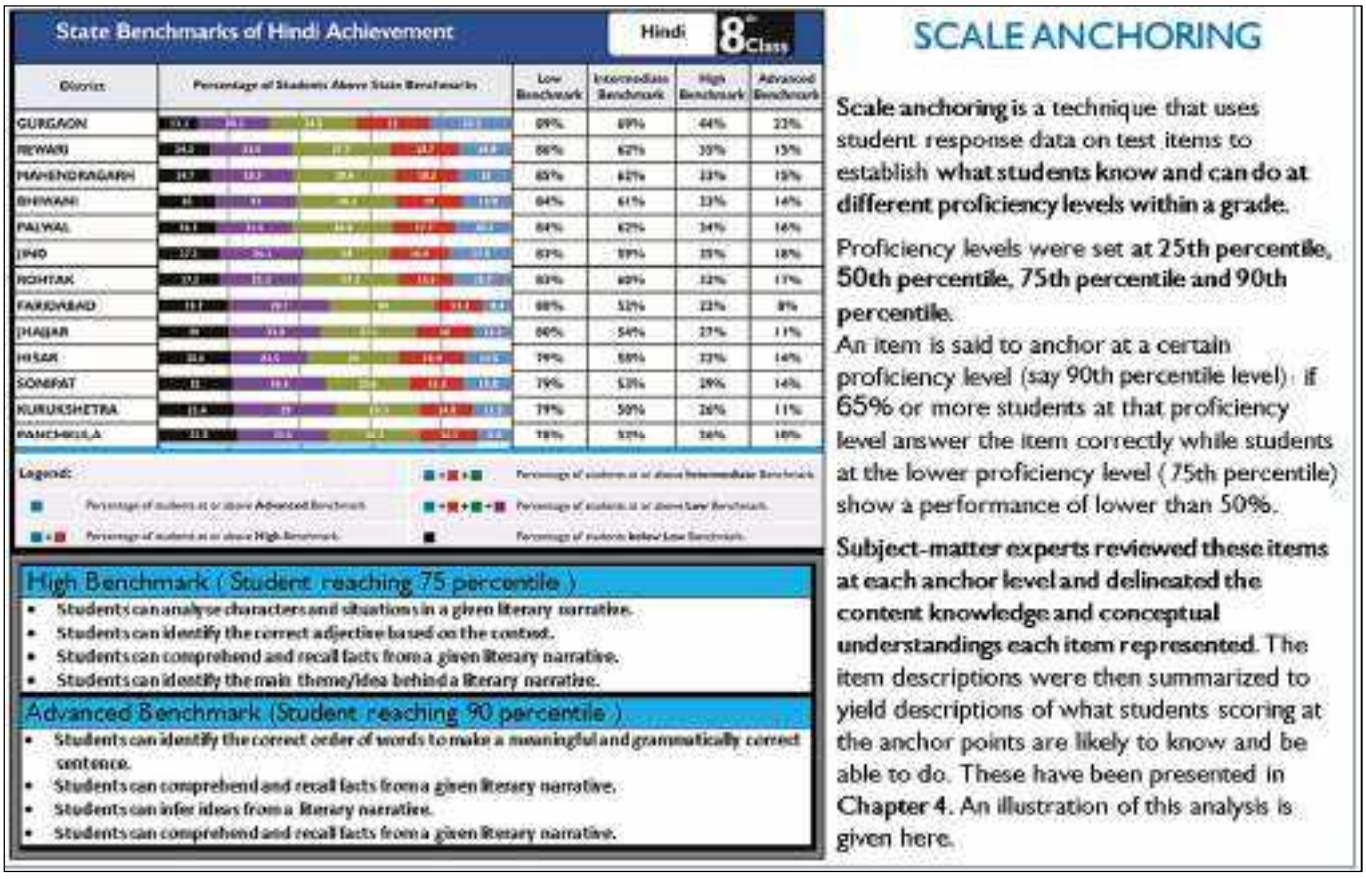


Figure 4: Scale anchoring snapshot – Student learning level benchmarks for 75th and 90th percentile for class 8 Hindi

III. Comparative Performance within the State

- Broadly, **Mahendragarh, Rewari, Gurgaon, Faridabad**, seem to show **higher performance levels** across classes while **Yamunanagar, Ambala, Panchkula and Kurukshetra seem to show lower performance levels**. The district-wise patterns for Class 5 are given here, and detailed in Chapter 3 for all classes and subjects.

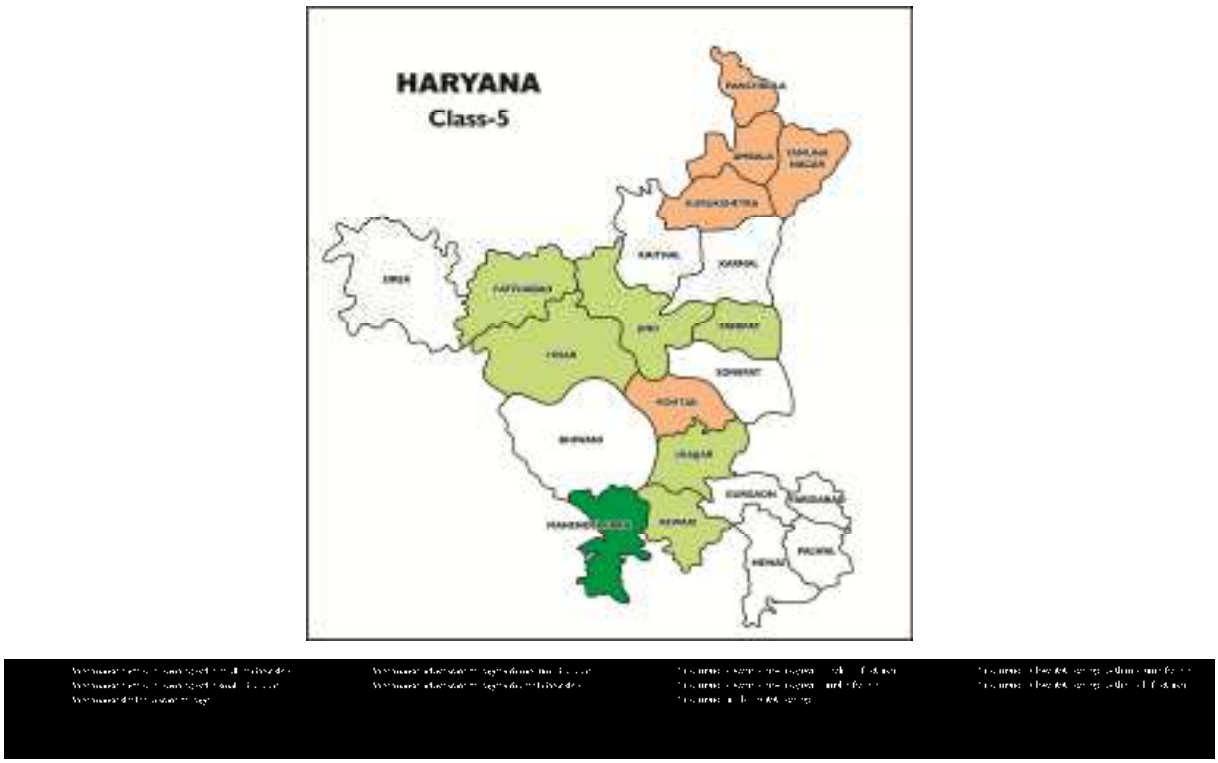


Figure 5: District performance comparison for class 5

- **In most classes and subjects, boys and girls perform at par at the state level,** with the exception of Class 8 Hindi, where girls perform meaningfully better than boys with a small difference. In Class 8, many districts also show that girls perform meaningfully better than boys.

- **There are no meaningful differences in the performance of rural and urban students in most classes and subjects.** Rural students perform meaningfully better than urban students only in Class 8 Maths and Science

- **Students of different social groups perform similar to the state average,** with the exception of SBC category students who perform meaningfully better than the state average in Hindi across classes.

DESIGN AND IMPLEMENTATION OF THE STUDY

1 DESIGN AND IMPLEMENTATION OF THE STUDY

1.1 NEED FOR THE STUDY

India's progress towards universal primary education has seen substantial success in access, with over 96% of Indian children enrolled in primary schools. This however, has not completely addressed issues of quality education in the classrooms. India's participation in PISA for 15 year olds in 2009 showed that 80% our students were below the basic level of reading proficiency needed to participate effectively and productively in life.[5]

The Government of Haryana has initiated many programs for enhancement of learning in the state. Recognizing the above stated need to understand the progress towards its goals, a project focusing on measuring & continuously tracking learning outcomes of students in schools of Haryana for improving the quality of education has been conceptualized.

The purpose of Diagnostic assessments is to conduct an in-depth qualitative diagnosis of the learning levels of a sample set students in Haryana, and to provide an absolute and relative picture of student learning and learning gaps in Haryana. These assessments require a very robust process for test design, development and analysis to provide diagnostic feedback capturing learning gaps and misconceptions, to understand whether students are learning with understanding or not, to evaluate their performance on specific skills e.g. reasoning skills, etc. and provide reports with recommendations that are meant for policy makers at the State level, as well as separately for districts and schools.

1.2 ABOUT THE STUDY

With the objective of providing actionable feedback towards improving learning levels in schools, the Government of Haryana, with Educational Initiatives Pvt. Ltd. (EI), conducted a Diagnostic Assessment in all 21 districts of Haryana in February - March 2015. The assessment was conducted for classes 3 and 5 in English, Hindi and Maths, and in Class 8 for Hindi, English, Maths and Science. These aim to answer the following questions:

- How well are students learning the different competencies?
- Are students learning grade appropriate competencies/skills?
- Is the learning superficial/ mechanical or is it deeper and conceptual?
- Is there any significant difference in performances across districts in the state?
- Is there any significant difference in performance across classes?
- What are the highlights of the question-wise analysis for the subjects in the selected classes?
- Are there any specific difficulty areas, learning gaps and misconceptions in the subjects in these classes?
- Is there any difference between the performance of boys and girls?
- Is there any difference between the performances of urban and rural?
- Is there any difference between the performances of social categories?

This Diagnostic assessment will be conducted every year for 4 years. For the first two years, the assessment will be carried out independently by EI. The assessment will be conducted by SCERT from the third year onwards. When this study is repeated in subsequent years, the following types of additional insights will be gained:

- Has student learning improved compared to the previous year? (e.g. in 2016 as compared to in 2015)
- Based on the feedback provided to the system, is improvement happening in particular learning areas?

[5] http://research.acer.edu.au/cgi/viewcontent.cgi?article=1000&context=pisa

It is important to recognise that well-designed benchmarking studies by themselves may not bring about the necessary systemic shifts for improvement, but will provide powerful data-driven insights into the existing learning gaps of students, which will enable stakeholders to initiate focussed action for improvement at the classroom, school, block and district levels.

1.3 SALIENT FEATURES OF THE STUDY

The diagnostic assessment was rigorously designed and developed to ensure that it can effectively capture student strengths and weaknesses. At the same time, the assessment also adopted a scientific sampling methodology to ensure that the findings and patterns emerging from the student responses is representative of the state. The key aspects of the assessment, including sampling of schools, test paper development and test conduction have been summarized below.

Coverage of classes and students: Classes 3, 5 and 8 were covered in the study across all the 21 districts of Haryana. In total approximately 3,000 students per class per district were sampled from approximately 3,850 schools. The number of students sampled from class 3, class 5 and class 8 were similar in each district – 3000 students from each class in each district.

Test paper development of three parallel test forms per class-subject: A large number of items were developed for each class-subject in order to exhaustively cover the syllabus in each class. Having a large number of items provided more information on each competency in each subject. In total, 243 unique items were developed for Hindi, 316 for Maths, 190 for English and 152 for Science across grades 3, 5 and 8. On an average, each class had 60-150 unique items in any subject. In order to limit the number of items that each student was tested on, 3 different sets of test papers were developed for each class and subject.

Anchoring of questions in the test to allow for comparison with government schools in other states and private schools: To compare the performance of students with Indian private school system, few questions in each subject were used from ASSET, EI's national diagnostic assessment for high-fee private schools, taken by over 3.5 lakh students every year. Additionally, to compare the performance of students with government schools in other states, questions were repeated from EI's Benchmarking study which was conducted across 6 states in India.

Paper Format, question types and length: The test papers for class 3 had questions which were read once in the beginning by the evaluators and then answered by students in the question paper. Student responses were then coded by the evaluators onto OMR sheets. In class 5 and 8, the questions had to be read and answered by students themselves. They were given a test paper containing all the questions and an OMR sheet to fill in the correct responses. Test papers contained mostly multiple choice questions except for class 3 papers (Hindi, English and Maths) which had free response items as described above.

Use of lower grade items in class 5 and class 8 test papers to measure improvement: Few questions from the class 3 and class 5 papers were also used in class 5 and class 8 respectively in each subject. This allows for an analysis of learning across grades to understand if students have retained or learnt these lower grade concepts when they move on to higher grades.

Comprehensive analysis using advanced statistical methods: Different types of analysis were carried out on the collected data to extract patterns in performances and to understand differences in learning levels across different groups. Advanced statistical methods were used to confirm patterns of learning, including Item Response Theory (IRT) and Scale Anchoring. Distractor analysis enabled identification of misconceptions and common errors. The data was studied across different units of analysis: schools, districts, competencies, gender, etc. Findings were validated for statistical significance and meaningfulness.

Use of external test administrators and standardised test procedures: The test administration was standardised by recruiting a special team of evaluators who were trained to cover all aspects of test administration, including reading out the question items, monitoring the time duration of the test as well as assigning appropriate codes for the answer responses given by students.

Student interview videos: Student interviews were conducted in around 22 schools across class 3, 5 and 8 for Hindi, Maths and English subjects in 4 districts – Gurgaon, Mewat, Rohtak and Bhiwani. Student interviews helps to understand how students think and understand any given concept and how they arrive at certain answers to the questions asked. These interviews were video recorded and learnings from these videos was shared in the form of short films – in total 12 videos were developed. Teachers and other stake holders can utilize these videos to understand how students think and incorporate the learnings in their lesson planning and modifying their teaching methodologies in classroom.

1.4 QUESTION PAPER DESIGN

A quality diagnostic assessment necessitates a rigorous test development process to ensure that the questions in the test meet the objectives of finding out student strengths and weaknesses. The process of test-development involved the following:

- The test items were developed after careful textbook analysis which included understanding in detail what is covered in the syllabus for each class.
- The question papers included different types of items that checked for understanding of concepts, application of concepts and also recall of facts and procedures.
- The tests used Multiple Choice Questions (MCQs) and Free Response Questions (FRQs).
- A few questions were repeated across classes to study learning across class levels.
- Three forms were made for each class- subject and a minimum of 12 questions were repeated across forms for equating purpose which allows to compare the scores across different test forms.

These are discussed in detail below.

1.4.1 Multiple test forms

In order to gather information on a large set of questions for each class-subject, we used 3 forms for each test paper, with different sets of items. The advantage of this was that while one student may attempt only around 30-60 items, but at a class level we collected information for larger pool of items. A total of 30 test papers were developed for this study:

- Test papers for classes 3, 5 and 8
- Hindi, Maths and English papers for classes 3 and 5
- Hindi, Maths, English and Science papers for class 8
- 3 different forms for each subject for each class

1.4.2 Process of test development

There were 2 main stages in the development of each test paper. These are detailed below.

Stage 1: Designing the blueprint and curriculum analyses - This involved building the framework of the test and doing the groundwork before starting the test assembly. It included defining the blueprint and analysis of the curriculum to define the key ideas to be tested in each class and subject.

Stage 2: Development of Papers - This stage consisted of the development of test items and paper assembly. The first step towards development of the papers was to list down the competencies that had to be tested. Based on these competencies, the test items were selected, taking care of the blueprint. In the pilot papers, 10% extra questions were entered. Post the analysis of data from the pilot testing, some items were removed from the test paper and the final papers for the diagnostic test were assembled.

1.4.3 Question paper blueprint

A question paper blueprint was designed to meet the objective of the study – to measure the performance of students on maximum test items and get meaningful insights for analysis. The question papers contained items of varying difficulty in appropriate numbers including few easy and few difficult questions in each grade so that performance of students across abilities could be tested reliably.

The blueprint ensured that all competencies listed were covered with the right combination of questions- straightforward versus non straightforward questions, questions from national benchmarking studies and MCQ's versus FRQ's.

1.4.4 Test paper length

The duration of paper was such that every student can attempt all the questions. The number of questions in the paper and test duration for each class is given below.

Table 1: Length of test for each class and subject

Class	Subject	No of Questions	Duration (min)
Class 3	Hindi	28	75
	English	24	75
	Maths	30	75
Class 5	Hindi	35	75
	English	30	75
	Maths	40	75
Class 8	Hindi	45	90
	English	35	90
	Maths	60	90
	Science	60	90

1.4.5 Competencies tested

The questions not only tested the ability to recall information or use formulae or procedures but also checked if the students have understood and internalized the concepts taught to them. The tests were competency-based which means that test paper of each subject included specific competencies appropriate to that grade and each competency had a minimum of 3 questions to attain the competency balance. The list of competencies which were tested in each paper is given in the Appendix C.

1.4.6 Question types

The tests included both multiple choice items and free response item types. Free Response items required students to give a numerical response, write a word, a short sentence etc. Scoring free response items objectively required a well-defined scoring rubric and intense training to evaluators.

Apart from the competency balance, the tests were also designed to include 'straightforward' questions and 'non-straightforward' items. A straightforward item was one which had a 'form' as it appeared in the textbook. A 'non-straightforward' item tests the same concepts and their application in an unfamiliar format, and provides information on whether children are able to perform only textbook type problems or whether they are able to apply the essential skills and competencies and use their understanding to give answers.

Straightforward

हल करें।

6859
+ 2130
_____

_____

A 4729
B 4720
C 8989
D 8980

Non-Straightforward

189 + 53 और _____ बराबर हैं।

A 188 + 52
B 190 + 52
C 190 + 54
D 188 + 55

1.4.6.1 Questions repeated across paper sets (Anchor items)

For each class-subject, a minimum of 12 items were repeated across the 3 forms. These items served as anchor items to allow equating to link the scores on different test forms. Anchor items were distributed across the skills and had a composite difficulty level comparable to the difficulty level of test papers as a whole.

1.4.6.2 Question repeated across classes

We have used common items across class 3, 5 and 8 in order to understand and compare performance across classes. In such scenarios, while items from lower classes were included in the tests, items from higher classes could not be included due to validity issues. So for each of the classes 5 & 8, few items were repeated from lower classes. The performance on these items was used to understand the natural progression of learning and if students have learned lower grade concepts or not.

1.5 SAMPLING

The assessments targeted to cover 3000 students of each class (3, 5 and 8) in each of the 21 districts of Haryana. The sampling methodology adopted was a stratified two-stage cluster sampling, which ensured a proportional distribution of students from urban and rural areas, gender, different school types (primary, upper primary with secondary etc.) from government schools in Haryana

1.5.1 Sampling data

Sampling was done based on the enrolment data provided by Government of Haryana. Only government schools from each district were taken for sampling of students from class 3, class 5 and class 8.

1.5.2 The Sampling Procedure

A Two Stage Stratified Cluster Sampling method was adopted for sampling.

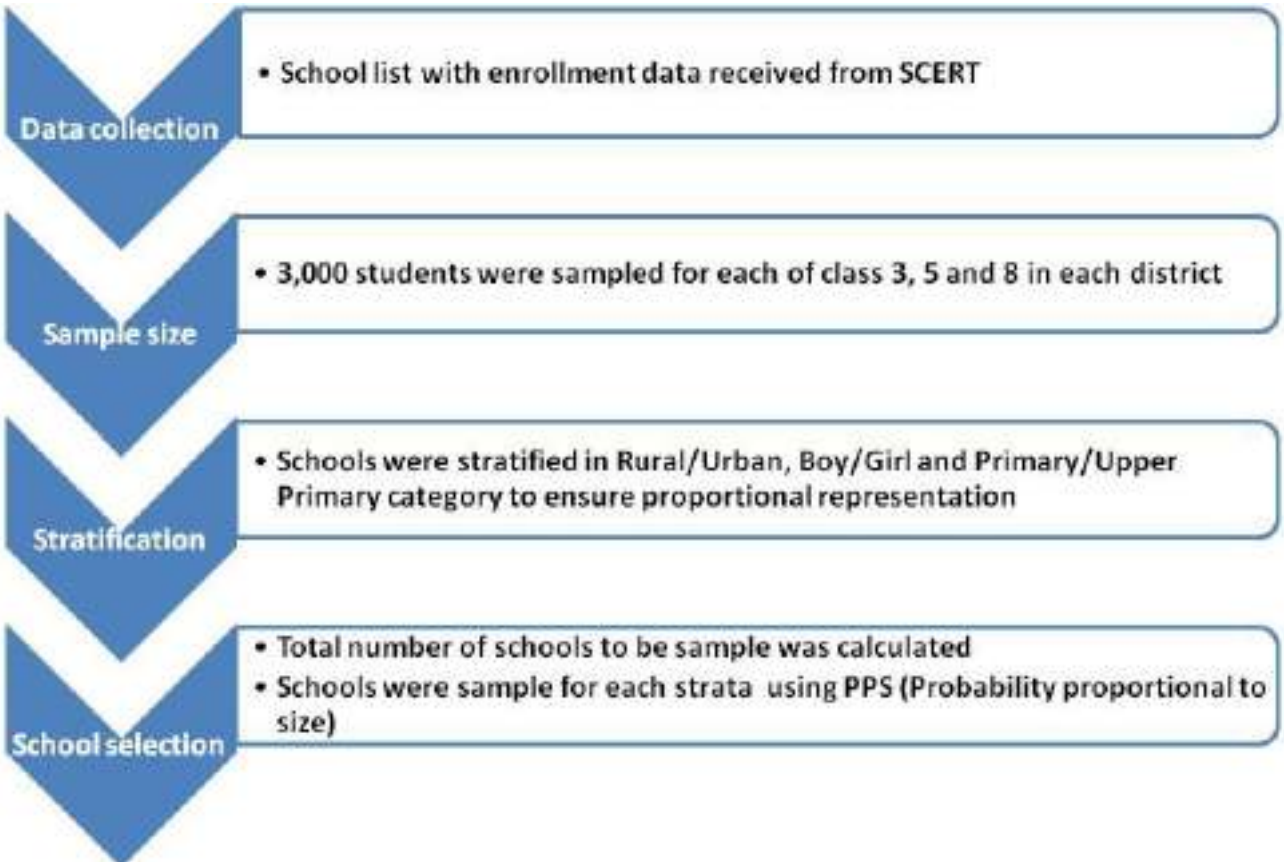


Figure 6: Sampling methodology

The first level of Stratification was classifying schools into Rural and Urban Schools. The next level of stratification involved splitting the Rural and Urban schools, into girls, boys and co-education schools. The third level of stratification involved splitting schools obtained from the initial steps into schools with only primary classes and schools with only upper primary classes and so on.

Post stratification total enrolment in the classes 3, 5 and 8 was calculated for each stratum. The number of students to be sampled into the final sample from each stratum should be proportional to the total enrolment calculated above. Once the number of students for each strata was been decided, sample size was increased by a specific percentage (10% in this case) to compensate for losses due to absenteeism, overstatement of enrolment figures etc.

The next phase of the sampling procedure involved calculating number of schools to be sampled and selecting schools from each stratum. This phase is the Stage – 1 of the Clustering phase. In this context each school can be treated as a cluster. Following this a minimum cluster size was decided based on the typical enrolment per class section in Govt. Schools. The Minimum Cluster Size in this context was the class section strength of a typical government school. The method used to select schools from each stratum is called Probability Proportional to Size (PPS). PPS is a sampling technique in which probability that a sampling unit will be selected in the sample is proportional to some known variable (for e.g. in a population survey, the population size of the sampling unit, in this case, sampling unit is the school-class). PPS is used when the populations of the sampling units vary. PPS algorithm makes the probability of each student from the population getting into the sample equal irrespective of the size of class. If class size in a school is very high, then the chance of each student getting into the final sample is much lower than for a student in a school with a smaller class size. PPS compensates for this bias by increasing the probability of selection of schools with higher class sizes into the final sample. During this we also ensured that the schools are selected from all the blocks in a district.

The PPS algorithm outlined above was used for each stratum separately. While selecting schools, in order to avail the opportunity to compare performance across the classes and to avoid complication of logistics, same schools will be used for testing different classes where possible. Since we are doing the PPS based on average enrolment per class, the schools selected can actually be used for testing all the classes of interest to us from the available classes at the school.

After the selection of schools one intact class section was randomly selected from each sampled school in each stratum. This phase is Stage – 2 of the Clustering phase. While selecting students in a class at a school, two sections were not merged unless the section strength was really low (15 and below). If there were more than one section for a class in a school, then the section which had enrolment closest to or more than 45 students was selected. If a class section size was more than 50 students, then 45 students were selected randomly in that class section.

1.6 TEST CONDUCTION

Test was administered by external evaluators in all the schools. The test administration was standardised by recruiting a team of evaluators who were trained rigorously before the field work to cover all aspects of test administration, including reading out the question items, monitoring the time duration of the test as well as assigning appropriate codes for the answer responses given by students. The process of test conduction in schools, OMR Scanning and report writing was completely managed by Educational Initiatives.

1.7 A NOTE ON LIKELIHOOD OF ASSISTANCE OR COPYING

As part of our analysis procedures, we checked the assessment data of each school to check for cases where there is high probability of assistance by teacher or copying among students. We did find some extent of such cases. Such instances are not unusual in large scale assessments, and through continued emphasis on the low stakes nature of the assessment, and also pointing out that we are able to detect cases of assistance, we should be able to discourage and minimize further occurrence in future years. This does not have an implication for the nature of the main findings since this data has been removed from analysis - however it is to be kept in mind that all scores all likely to be overstated to some extent.

MAIN FINDINGS

2 MAIN FINDINGS

The student performance across classes and subjects was examined through various lenses to highlight nuanced patterns in learning levels both at the state level and within the states. The findings presented in this section summarize the key findings from the study. These are discussed under three heads. First, state-wide performance of Haryana has been examined against performance levels of other states, and against other assessments on common questions to understand the relative learning levels of the state. Second, state-wide performance levels of each class and subject are examined against subject competencies and concepts to understand the strong and weak areas among the students. Third, the state-wide performance across classes and subjects has been disaggregated to understand variations within the state across districts, regions, gender and social categories of students. Findings from each of these areas will be elaborated below.

2.1 PERFORMANCE OVERVIEW

The assessment covered Classes 3, 5 and 8 in Hindi, Maths, English and Science (class 8 only) across all the districts in Haryana. Approximately 45,000 to 55,000 students were tested in each class in all the subjects. The overall performances are highlighted below:

Table 2: Performance Summary

Class	Subject	Number of students	Average	Standard Deviation	SE
3	English	43,358	46.8%	20.1	0.10
	Maths	45,411	44.2%	21.3	0.10
	Hindi	46,683	57.9%	24.1	0.11
5	English	46,427	38.3%	19.7	0.09
	Maths	53,327	38.2%	18.9	0.08
	Hindi	51,477	51.9%	23.4	0.10
8	English	48,568	46.8%	16.0	0.07
	Maths	54,890	34.1%	15.4	0.07
	Hindi	53,278	57.9%	19.1	0.08
	Science	54,160	38.0%	13.1	0.06

2.2 HARYANA PERFORMANCE AGAINST OTHER STATES AND PRIVATE SCHOOLS

The performance on common questions was compared with performance of government schools across 6 states. Performance levels were also compared against private schools who take EI's diagnostic assessment ASSET. This enables an interpretation of the state's learning levels. The key findings are summarized below.

STATE PERFORMANCE AGAINST PRIVATE SCHOOLS AND OTHER STATES

- Comparison with other states showed that performance levels of Haryana are on the higher side than that of Karnataka, Gujarat, Bihar, MP and Uttarakhand in class 3 Maths and class 5 Maths and Hindi.
- Haryana students have performed 20 to 27% percentage point lower than their counterparts in private schools in Maths and Science.

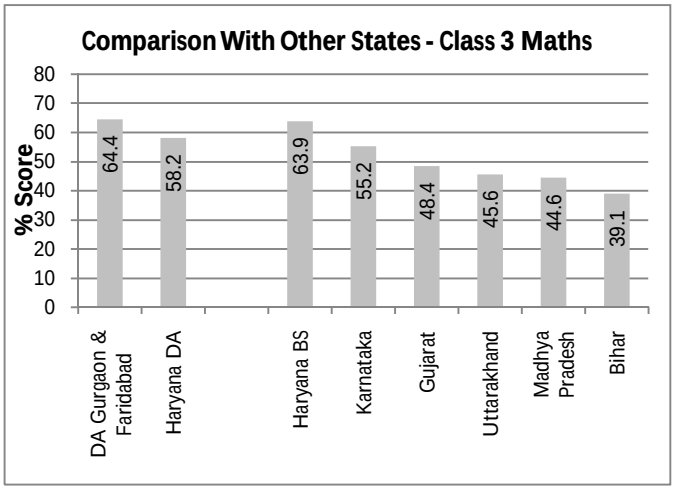
2.2.1 Comparison with Other States

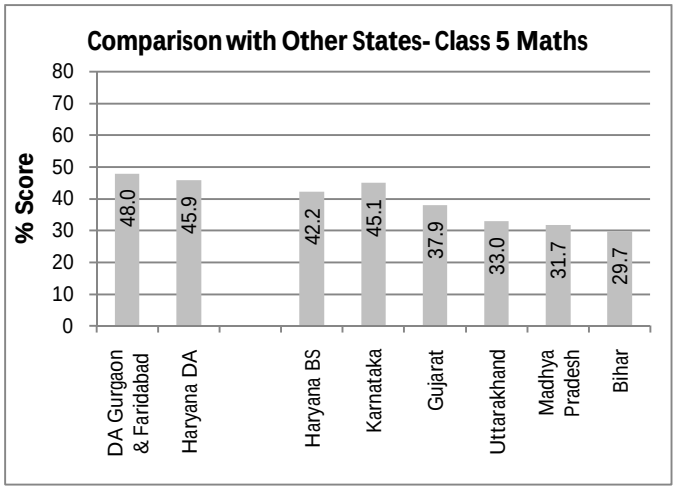
Few questions were taken from the benchmarking study[6] carried out by Educational Initiatives in different school systems (Government, High fee private schools and Affordable private schools) across 6 states in 2013. Haryana (only 2 districts) was also one of the states which participated in the study. The benchmarking study was conducted from classes 3 to 7. Analysis has been carried out to compare the performance of Haryana students with other states students. The performance of Haryana students on the questions which were used from the benchmarking study was compared to that of the students from Karnataka, Gujarat, Bihar, MP and Uttarakhand. Only government school data has been used to compare the performance.

Table 3: Number of common questions with Benchmarking study across the 3 test forms

Hindi Class 5	Maths Class 3	Maths Class 5
25	11	11

Comparison with other states showed that on common questions, performance levels of Haryana are higher than that of Karnataka, Gujarat, Bihar, MP and Uttarakhand in class 3 Maths and class 5 Maths and Hindi[7].





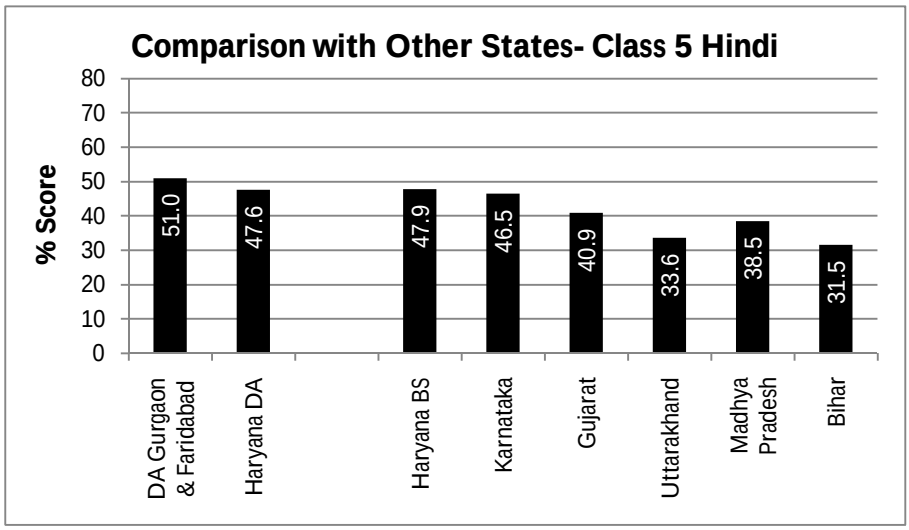


Figure 7: Comparison of Haryana with other states

[6] EI's Benchmarking study in 2012, tested government schools, affordable private schools and high fee private schools in 6 states. 2 districts in each state were tested in this study. The comparison given here is against this two-district average for each state.

[7] Haryana DA: Daignostic assessment, Haryana (2015) | DA Gurgaon & Faridabad: Data of Gurgaon & Faridabad from Daignostic assessment, Haryana (2015) | Haryana BS: Data of Haryana from Benchmarking study

2.2.2 Comparison with private schools

Performance of students was examined against students of Private schools who take ASSET[8], a diagnostic benchmarking national level test taken by private English medium schools across the country. This was done for the common questions in the Maths and Science papers. This showed that **Haryana students performed lower than their counterparts in private schools across all classes and subjects.**

Students in Haryana have performed 25 to 27 percentage points lower in Maths than private school students across class 3, 5 and 8. In Class 8 Science, the difference in performance is 20 percentage points.

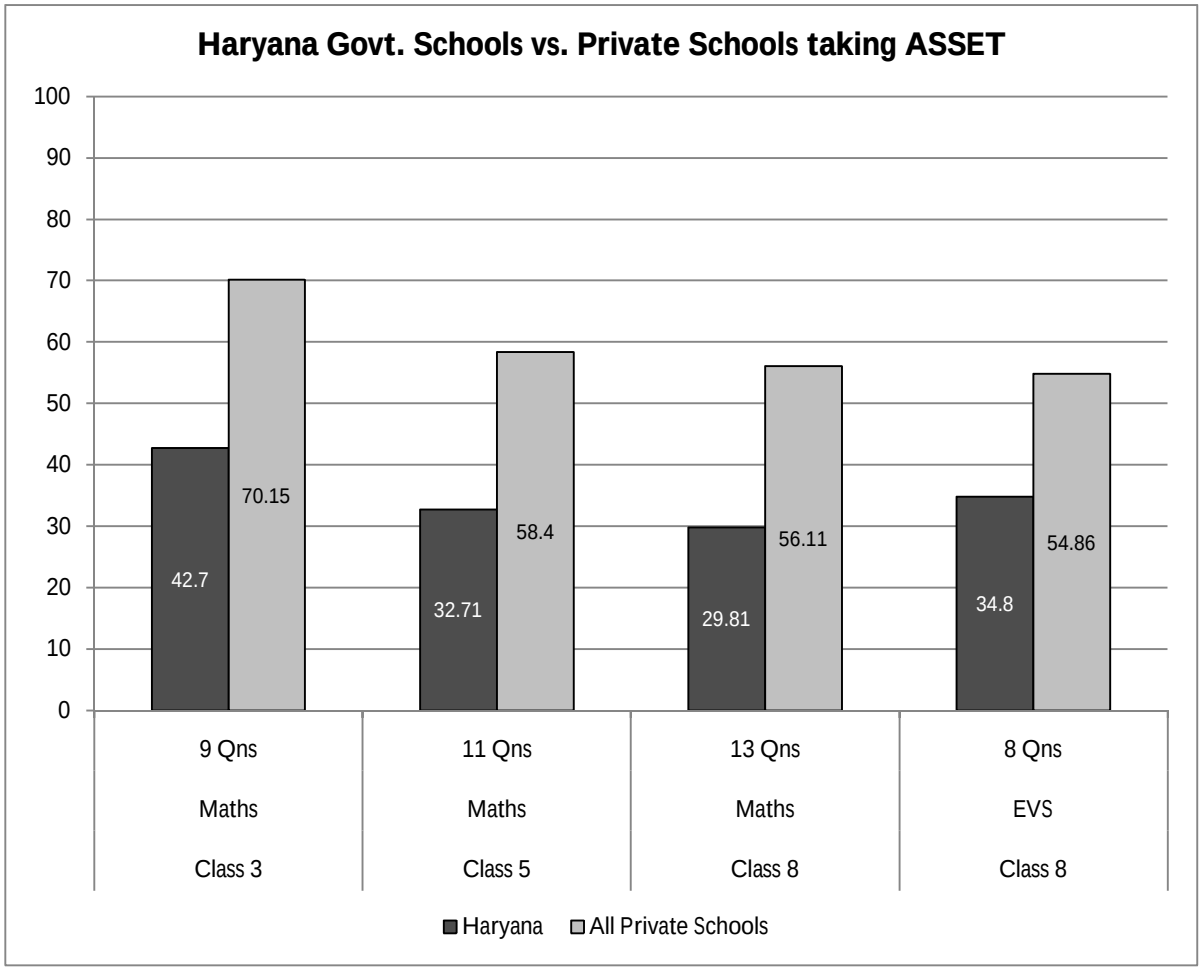


Figure 8: Comparison of Haryana government schools with private schools taking ASSET

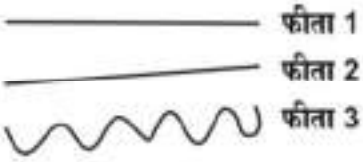
Question-wise analysis on common questions showed that Haryana students have performed lower on most of the questions asked across classes, however it has been noticed that in Class 3 Maths, Haryana students performed better on questions related to measurement.

The below example checks if students are able to estimate the length of the given ribbons and identify the one that is the longest. 62.9% of Haryana students could answer the question correctly as compared to 49.9% of Private school students.

[8] Students were tested in their medium of instruction in both assessments. In ASSET, this was English, while in Haryana, the students were tested in the Hindi medium.

Class 3, Maths

10 इनमें से कौन-सी फीता सबसे लम्बा है?



सही जवाब पर सही (√) का निशान लगाएँ।

अ फीता 1
ब फीता 2
स फीता 3
द सभी फीतों की लम्बाई समान है।

2.3 SPECIFIC INSIGHTS INTO STUDENT LEARNING

The state-wide performance across classes and subjects revealed key insights on the state of student learning at an overall level for classes and subjects. In this section, performance on specific questions in each paper has been examined to detect strengths and weaknesses in each subject. This includes highlighting the types of questions which see high and low performance, the improvement in performance across grades in each subject, and misconceptions or common errors that students make in each subject. These are immensely valuable for teachers and stakeholders to direct remedial action in the classrooms. These findings have been summarized here, and also detailed in Chapters 4. The key insights are summarized below:

PERFORMANCE ON LEARNING COMPETENCIES

- Learning levels across classes and subjects are not at grade appropriate levels. Also students have performed lower on questions which test understanding and application of concepts or ask students to draw inferences based on facts in case of Hindi and English.
- In Maths and Science, students have low performance in the straightforward items also so there is a need to focus on basic skills as well as deeper understanding across the subject.
- The data shows that the students of class 5 and class 8 have not mastered the concepts taught in class 3 and class 5 respectively. Students of class 8 are able to answer only class 3 syllabus based questions in Hindi. In Maths, more than half of class 8 students are not able to answer even class 3 questions. Though learning gains are seen across classes, the extent of improvement is not substantial.

2.3.1 Learning with Understanding

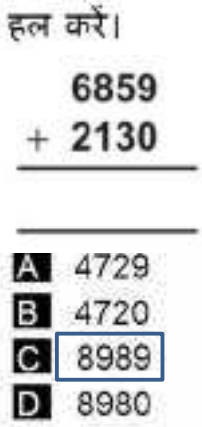
Analysis of performance on individual questions revealed that conceptual understanding and its application is low. Students have performed significantly lower on questions which test understanding and application of concepts or ask students to draw inferences based on facts in case of Hindi and English. The performances are given in the tables below. Though in Maths and Science it seems that the comparative difference is low but that may be due to the fact that students have low performance in the straightforward items also so there is a need to focus on basic skills and deeper understanding both in Maths and Science.

Table 4: Performance difference in straightforward and non-straightforward questions

Class	Subject	Straightforward questions		Non-straightforward Question	
		No. of Questions	Average	No. of Questions	Average
3	Maths	37	53.8%	27	42.2%
5	Maths	56	39.7%	40	36.2%
8	Maths	100	34.9%	56	31.9%
3	English	39	47.1%	9	38.3%
5	English	39	45.0%	27	37.9%
8	English	45	46.6%	31	36.7%
3	Hindi	38	58.6%	20	51.9%
5	Hindi	55	56.3%	22	43.2%
8	Hindi	78	60.2%	30	52.0%
8	Science	84	40.5%	68	35.4%

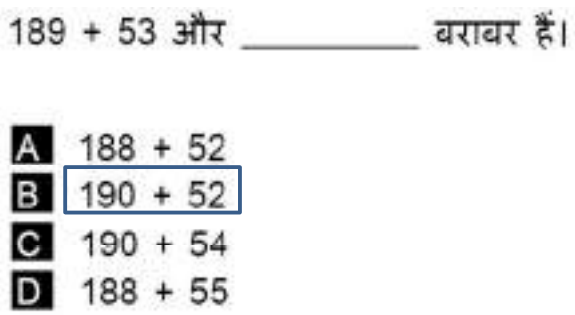
For example, below 2 examples from the Class 5 Maths test the same skill - Addition of numbers. But students have performed relatively better on the question which is procedural in comparison to the second question which is testing conceptual application of the same skill.

Straightforward



74.3% of students could correctly answer this question

Non-Straightforward



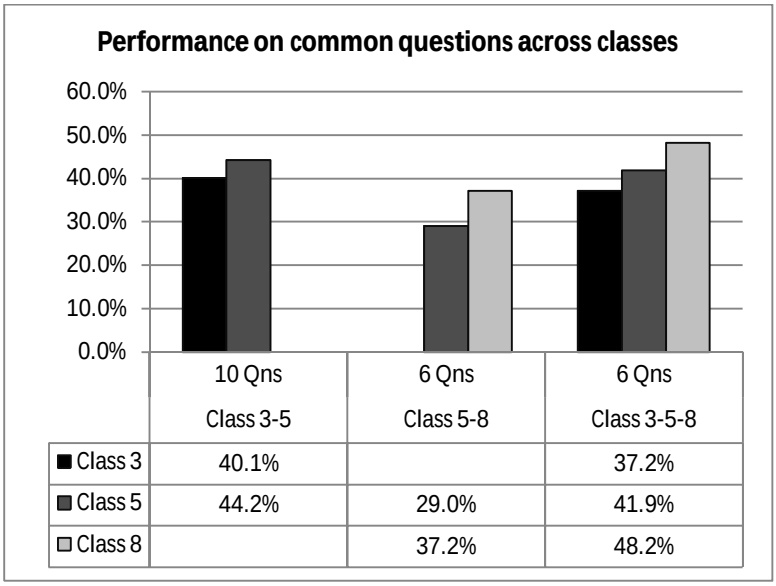
47.5% of students could correctly answer this question

2.3.2 Performance of lower grade questions

Few items of lower grade were repeated in higher grade test paper. The objective of repeating the items was twofold:

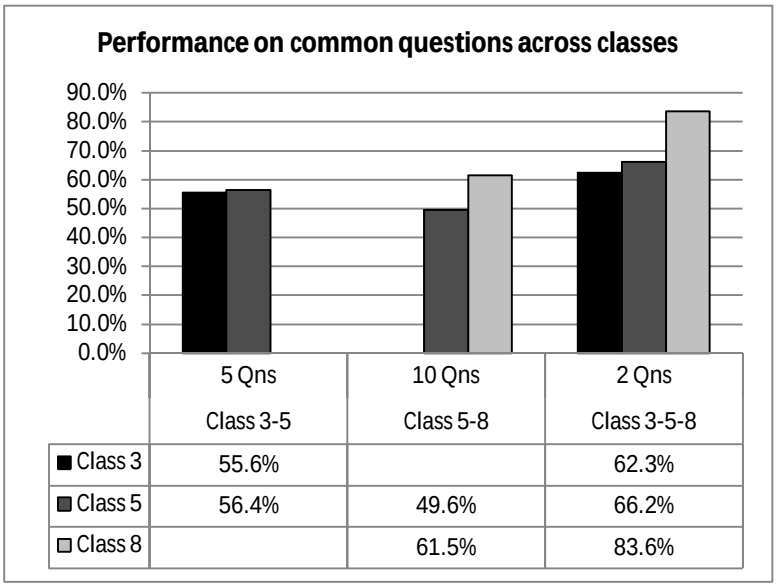
- To understand if students have understood and are able to retain the lower grade skills
- To understand if any improvement is happening on those skills when students move to higher grades and by how much.

The performance on these questions shows that though learning gains are seen across classes, the extent of improvement is not substantial. The data shows that the students of class 5 and class 8 have not understood the concepts taught in class 3 and class 5 respectively. Only in Hindi, class 8 students are able to answer class 3 level questions. In Maths, more than half of class 8 students are not able to answer even class 3 level questions.



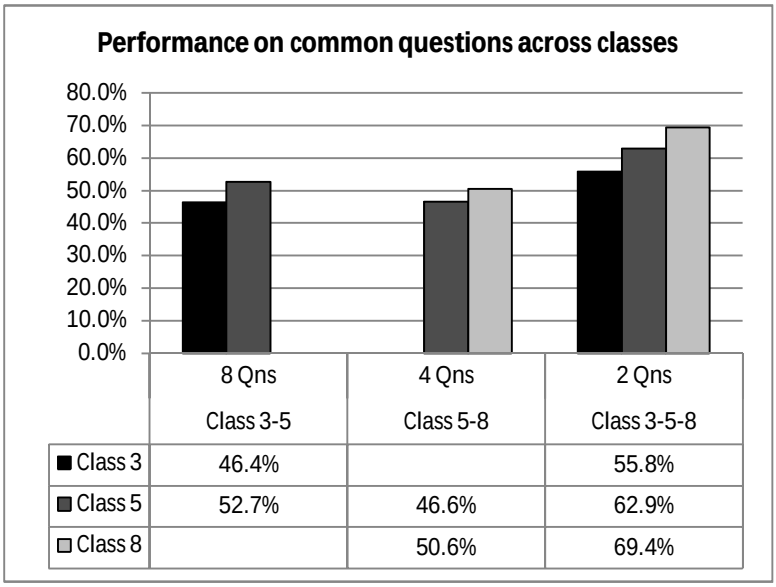
	10 Qns Class 3-5	6 Qns Class 5-8	6 Qns Class 3-5-8
Class 3	40.1%		37.2%
Class 5	44.2%	29.0%	41.9%
Class 8		37.2%	48.2%

Figure 9: Performance comparison on common questions across classes in Maths



	5 Qns Class 3-5	10 Qns Class 5-8	2 Qns Class 3-5-8
Class 3	55.6%		62.3%
Class 5	56.4%	49.6%	66.2%
Class 8		61.5%	83.6%

Figure 10: Performance comparison on common questions across classes in Hindi



	8 Qns Class 3-5	4 Qns Class 5-8	2 Qns Class 3-5-8
Class 3	46.4%		55.8%
Class 5	52.7%	46.6%	62.9%
Class 8		50.6%	69.4%

Figure 11: Performance comparison on common questions across classes in English

2.4 COMPARATIVE PERFORMANCE WITHIN THE STATE

While an understanding of subject level and question level patterns are critical to understand the learning levels and gaps across the state, it does not highlight the variations in learning levels based on region or socioeconomic profiles of the students. Within the state, performance levels can vary based on region, location, type of school, gender or social category. An understanding of these variations can direct remedial action for students who seem to be performing lower than their counterparts in the state. This can direct a focussed effort to improve learning levels in the highlighted regions or students.

To understand the variations across the state, the performance across 20 districts of Haryana[9], to highlight if any districts are performing substantially above or below the state average in each class and subject, were examined. Absolute ranks of districts are indicative, but misleading as they do not highlight how much the district levels vary from the state average, and if the difference is substantial enough to highlight the district as a higher performer. In order to ensure that only the districts which show substantial differences from the state average levels were highlighted, the difference of each district was checked for statistical significance. At the same time, a significant difference may not be easy to interpret, and can also highlight smaller differences in large scale studies. In order to define the differences in a measurable manner, an effect size of the difference was calculated and the difference from the state average defined as 'small', 'medium' or 'large' based on a criterion. (Appendix D) This ensured that district level differences were only highlighted if they were significant and meaningful, enabling examination of only those districts which showed such differences.

The key findings are summarized below:

COMPARATIVE PERFORMANCE WITHIN THE STATE

- Districts of Mahendragarh, Rewari, Gurgaon and Faridabad seem to show higher performance levels across classes while the districts of Yamunanagar, Ambala, Panchkula and Kurukshetra have performed lower.
- In most classes and subjects, boys and girls perform at par at the state level, with the exception of Class 8 Hindi, where girls perform meaningfully better than boys with a small difference. In Class 8, many districts also show this pattern where girls perform meaningfully better than boys.
- There are no meaningful differences in the performance of rural and urban students in most classes and subjects. Rural students perform meaningfully better than urban students only in Class 8 Maths and Science.
- Students of different social groups perform similar to the state average, with the exception of SBC category students who perform meaningfully better than the state average in Hindi across classes.

2.4.1 Performance across districts

District level patterns were highlighted for each class and subject tested. A strong correlation (0.85 and above) was observed in the district-wise performance levels across the subjects tested in each class. This means that a district which was a high performer in one subject in a given class also performed high in other subjects in that class. As a result, a 'composite performance index' was calculated for each district for each class, taking a simple average of its performance across the subjects in each class.

[9] Mewat was excluded from district comparison analysis as significant amount of cheating was detected across all the classes .

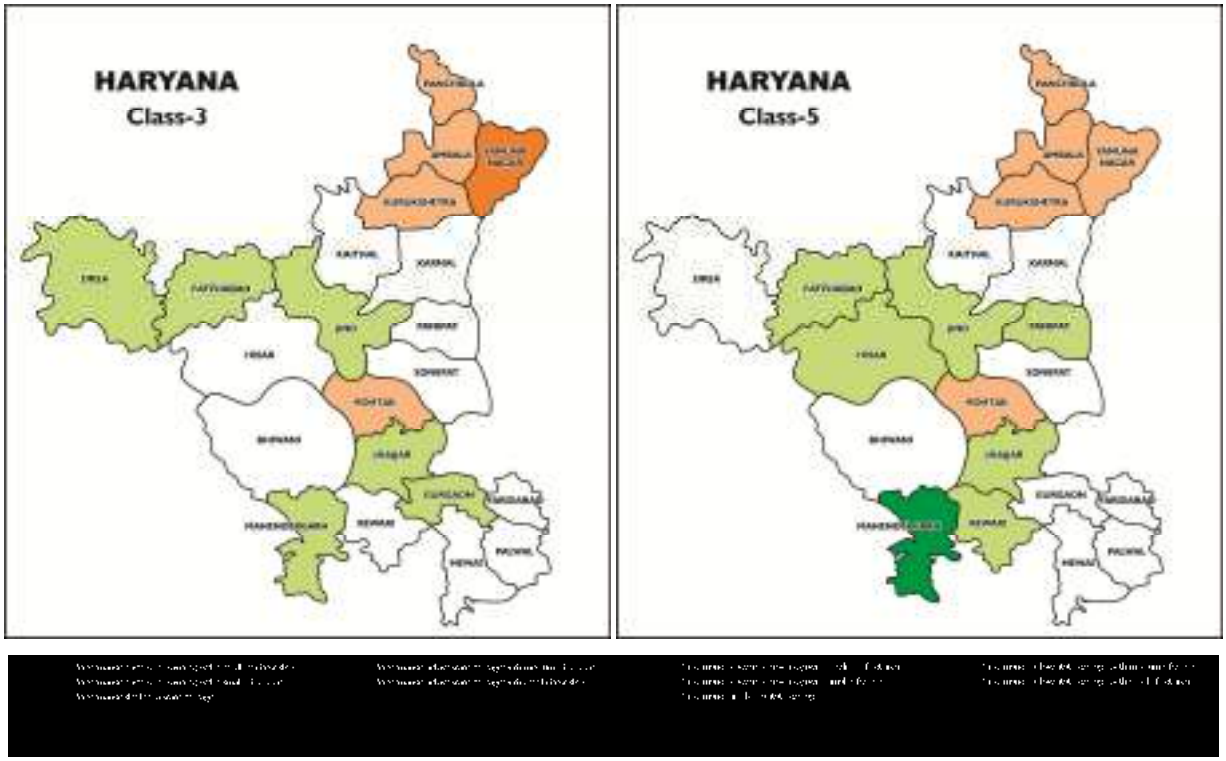


Figure 12: Performance comparison across districts in class 3 and class 5

- **In Class 3,**Mahendragarh, Jhajjar, Sirsa, Jind, Gurgaon and Faridabad perform meaningfully above state average with small differences. Yamunanagar shows the lowest performance levels with medium differences from the state average. Districts of Kurukshetra, Rohtak, Panchkula, and Ambala perform meaningfully below than state average with small differences.

- **In Class 5**,Mahendragarh performs above state average with medium differences. Districts of Rewari, Hisar, Fatehabad, Jind, Panipat and Jhajjar also perform above state average with small differences. As in Class 3, districts of Rohtak, Panchkula, Kurukshetra, Ambala and Yamunanagar perform below state average, with small differences.

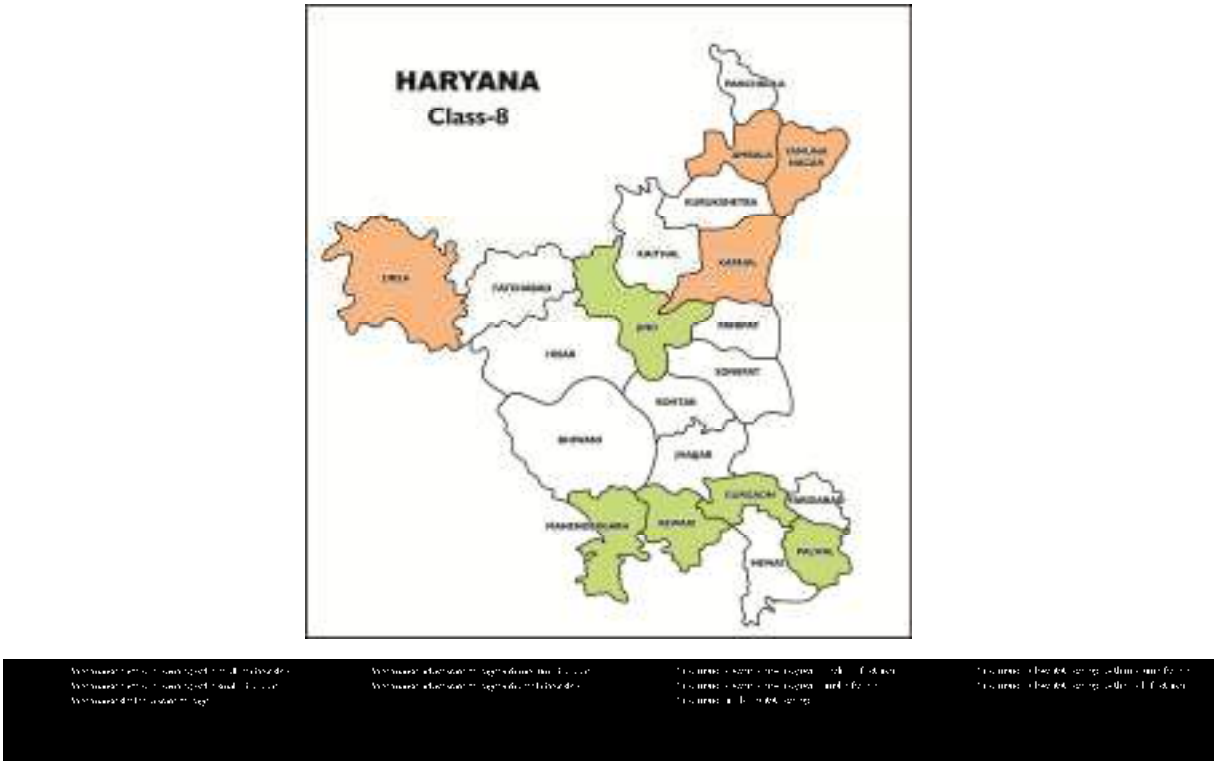


Figure 13: Performance comparison across districts in class 8

- **In Class 8,** Palwal, Mahendragarh, Jind, Rewari and Gurgaon perform above state average with small differences, while Sirsa, Ambala, Karnal and Yamunanagar perform below state average with small differences

It is also valuable to understand variations in district performance across classes and subjects, for district and state level stakeholders to understand a difference (if any) in a particular district's relative performance in each subject. The performance levels across districts in each class and subject is presented in Appendix A

2.4.2 Performance levels of boys and girls

To understand if there are any meaningful variations in the performance of boys and girls across the states and districts, their performance was compared against each other for each class and subject, and differences if any have been reported. It is observed that in most classes and subjects, boys and girls perform at par at the state level, with the exception of Class 8 Hindi, where girls perform meaningfully better than boys with a small difference. (Based on Cohen's D criterion)

Table 5: Performance comparison of boys and girls in Haryana

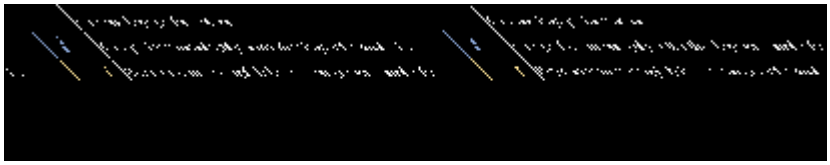
Class	Subject	Girls			Boys			Cohen's D	Effect Size
		N	Avg	SD	N	Avg	SD		
3	English	22,699	47.4%	20.1	20,479	46.2%	20.2	0.06	-
3	Maths	23,771	44.6%	21.3	21,440	43.9%	21.3	0.03	-
3	Hindi	24,424	59.2%	24.1	22,065	56.6%	23.9	0.11	-
5	English	23,965	39.1%	19.9	22,375	37.4%	19.5	0.09	-
5	Maths	27,871	38.7%	19.1	25,355	37.6%	18.8	0.06	-
5	Hindi	26,807	53.2%	23.5	24,566	50.7%	23.1	0.11	-
8	English	26,310	47.7%	16.1	22,195	45.9%	15.8	0.11	-
8	Maths	29,941	34.5%	15.6	24,907	33.5%	15.2	0.07	-
8	Hindi	29,237	59.7%	18.9	23,980	55.8%	18.9	0.21	Small
8	Science	29,437	38.5%	13.0	24,650	37.4%	13.1	0.08	-

N - Number, Avg - Average, SD - Standard deviation

District level variations were also examined, which revealed that in class 3 and class 5 there are very few cases with meaningful gender differences but in class 8 some districts showed substantial gender differences. Wherever gender differences exist, girls are performing better than boys except in Mewat, where boys have done better than girls in class 8.

Table 6: Performance comparison of boys and girls across districts

District	Class 3 English	Class 3 Maths	Class 3 Hindi	Class 5 English	Class 5 Maths	Class 5 Hindi	Class 8 English	Class 8 Maths	Class 8 Hindi	Class 8 Science
Panchkula										
Ambala										
Yamunanagar										
Kurushetra										
Kaithal										
Karnal										
Panipat										
Sonipat										
Jind										
Fatehabad										
Sirsa										
Hisar										
Bhiwani										
Rohtak										
Jhajjar										
Mahendragarh										
Rewari										
Gurgaon										
Faridabad										
Mewat										
Palwal										



2.4.3 Performance comparison of rural and urban students

On examining the performance of students of rural and urban schools, there are no meaningful differences in the performance of rural and urban students in most classes and subjects. Rural students perform meaningfully better than urban students only in Class 8 Maths and Science with small differences (based on Cohen's D criterion)

Table 7: Performance comparison of urban and rural schools

Class	Subject	Rural			Urban			Cohen's d	Effect Size
		N	Avg	SD	N	Avg	SD		
3	English	34,889	46.7%	20.2	8,429	47.3%	19.7	-0.03	-
3	Maths	36,116	44.3%	21.8	9,252	44.0%	19.2	0.01	-
3	Hindi	37,033	57.3%	24.3	9,607	60.3%	23.3	-0.12	-
5	English	37,668	38.2%	19.8	8,717	38.4%	19.3	-0.01	-
5	Maths	43,196	38.2%	19.2	10,088	37.9%	17.9	0.02	-
5	Hindi	41,693	51.5%	23.5	9,741	54.0%	22.6	-0.11	-
8	English	40,641	47.1%	16.2	7,871	45.4%	14.8	0.11	-
8	Maths	46,343	34.7%	15.7	8,491	30.5%	13.1	0.27	Small
8	Hindi	44,991	58.2%	19.2	8,231	56.7%	17.9	0.07	-
8	Science	45,944	38.6%	13.2	8,160	34.9%	11.6	0.28	Small

N - Number, Avg - Average, SD - Standard deviation

2.4.4 Performance of social categories

Information regarding different Social groups(GEN ,SC ,SBC ,BC-A ,BC-B) was collected to understand if there are any meaningful variations in the levels of students from different social categories. The performance of students was compared to the state average in each subject to check for any substantial differences in the average scores. The analysis shows that different social groups perform similar to the state average, with the exception of SBC category students who perform meaningfully better than the state average in Hindi across classes.

Table 8: Performance comparison across social categories

Category	Class 3 English	Class 3 Maths	Class 3 Hindi	Class 5 English	Class 5 Maths	Class 5 Hindi	Class 8 English	Class 8 Maths	Class 8 Hindi	Class 8 Science
General	0.14	0.10	0.12	0.11	0.11	0.06	0.16	0.13	0.15	0.09
SC	-0.03	-0.03	-0.09	-0.01	-0.07	-0.07	-0.03	-0.06	-0.10	-0.08
SBC	-0.17	-0.14	0.21	-0.26	-0.08	0.22	-0.06	-0.05	0.16	0.23
BC-A	-0.02	-0.05	0	-0.03	-0.02	0.02	-0.03	0	0.03	0.01
BC-B	-0.07	0.02	0.09	0	0.12	0.10	-0.11	-0.01	0.01	0.11

SOME INSIGHTS ON SPECIFIC LEARNING AREAS

3 SOME INSIGHTS ON SPECIFIC LEARNING AREAS

3.1 STUDENT PERFORMANCE AND LEARNING LEVEL ANALYSES

Diagnostic assessments was carried out to understand student learning levels. However, performance alone cannot give us the holistic picture. It is essential to look at the data from various perspectives to come up with holistic recommendations to improve the learning levels.

To understand the overall learning levels of students of Haryana, six different types of subject specific analyses were carried out:

1. Analysis of performance in different skills
2. Analysis of performance of graded questions at different class levels
3. Analysis of low and high performing questions
4. Analysis of misconceptions and common errors
5. Learning benchmarks at different proficiency levels.
6. Writing ability analysis for Hindi and English

3.1.1 Analysis of performance in different skills:

Analysis was carried out on the performance of Haryana students in the various skills across different classes and subjects. This analysis enables one to identify patterns in performance across the different skills and understand which skills show high and low performances. This understanding will pave the way for appropriate action in the classroom. It is important to note at the very outset that the question types along with their levels of difficulty and complexity varied within skill sets, and also varied in tested classes (Class 3, 5 and 8). The skill-wise performance is only a broad indicator of student competencies, and the analysis should not be understood as a standalone observation of all questions within a skill. For each subject question wise analysis, analysis of misconceptions and scale anchoring was also carried out. For Hindi and English students' writing abilities were also analysed.

The skills where performance is less than 35% are highlighted as relatively weak skills – this means that these skills require more attention in the class. The skills where performance is more than 60% are highlighted as relatively strong skills. Strong and weak skills have been highlighted by green and red colour in the table.

	Weak skill		Strong skill

3.1.2 Analysis of performance of graded questions at different class levels

For each subject, separate average scores were calculated for items which were at the same grade level at which students are tested and for others which belonged to lower grades. The performances were compared to understand whether students of a particular grade level could do questions of the lower grades or not.

The analysis can give insightful understanding about whether students can perform well in the questions of lower grades. The lower grade skills are the founding skills and students not having mastery in these skills may show poor performance in class specific skills because of weak foundation.

3.1.3 Analysis of High and low performing questions [10]

We have examined questions wise performance in each class and subjects to understand students learning abilities and to find if there are any patterns in the way they learn. The report mentions of specific examples where we have seen students doing really well and some examples where we found students struggling with the concept.

[10] All question examples in this section shows the percentage of students who have selected each option. It is to be noted that a small percentage of students may have left the question unanswered (blank) which accounts for the difference in the total, if any

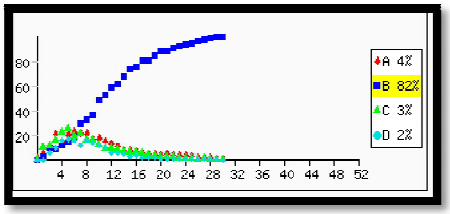
This analysis helps in understanding the types of questions which students can do better as compared to others irrespective of the skill.

Questions having less than 35% are highlighted as low performing questions and questions having 60% or above performance were seen as high performing questions.

3.1.4 Analysis of misconceptions and common errors:

Students develop a cognitive understanding of the world around them through interactions based on their daily experiences. Teachers and schools help build this understanding. Misconceptions are concepts that students acquire which are not in line with or do not match the conventional expert view in that topic. These result in cognitive gaps in their understanding. Any question in an assessment test that attempts to identify the misconceptions of the students must force the students to actively use their conceptual understanding. A detailed understanding of these misconceptions through large scale diagnostic assessments provides the teacher with a starting point to explore these in the classroom and eventually help to build correct notions or conceptual understanding. Question-wise performance data can be analysed to understand what students are able to do and the gaps in their understanding. Looking at the different options students have selected in MCQs one can pinpoint the specific error students are making, and even go deeper and find out students of which particular ability level are making that error.[11] One way of doing this analysis is to study the Item Response Curves (IRCs). It plots the percentage of students selecting different options at each ability level.

Example of an IRC:



The X-axis of the plot indicates the possible scores (ability levels) and the Y-axis indicates the % of students. For all possible scores, % of students selecting different options is plotted. Different options are indicated by different shapes. Scores indicate the ability levels of students. As we can see, among the students who scored 1 to 8 marks, equal number of students selected different options. But as the scores increase beyond 8, students selecting the correct answer, option B steadily increases and the percentage of other options drop. Also, among the incorrect options, no particular option is being selected more than the others. For each class and subject, we have identified misconception questions; questions which point at gaps in understanding of a concept.

3.1.5 Analysis of learning benchmarks at different proficiency levels

This section attempts to explain the learning levels of students in terms of what students know and are able to do in each grade. The method of 'scale anchoring' has been used to study this. Scale anchoring uses student response data on test items to establish what students know and can do at different learning levels within a grade. Four levels of proficiency were defined within a grade – *Advanced Level (students above 90th percentile), High Level (students above 75th percentile), Intermediate Level (students above 50th percentile) and Low level (students above 25th percentile).*Items anchoring at each proficiency level have been analysed in order to summarise the knowledge and ability of students at different levels of proficiency in all the subjects.

[11] All question examples in this section shows the percentage of students who have selected each option. It is to be noted that a small percentage of students may have left the question unanswered which accounts for the difference in the total, if any

3.1.5.1 Methodology followed

Scale anchoring uses student response data on test items to establish what students know and can do at different proficiency levels within a grade. Proficiency levels were set at 25th percentile, 50th percentile, 75th percentile and 90th percentile. Item Response Theory (IRT) was used to score the student data and 25th percentile, 50th percentile, 75th percentile and 90th percentile levels were calculated based on IRT scores. The items that students at these proficiency levels could answer correctly (with a specified probability) were then identified and grouped together for each proficiency level. An item is said to anchor at a certain proficiency level (say 90th percentile level) if 60% or more students at that proficiency level answer the item correctly while students at the lower proficiency level (75th percentile) show a performance of lower than 50% on the item. Subject-matter experts reviewed these items at each anchor level and delineated the content knowledge and conceptual understandings each item represented. The item descriptions were then summarized to yield descriptions of what students scoring at the anchor points are likely to know and be able to do. The detailed procedure of Scale Anchoring is explained in the appendix. The questions which anchor at the 25th percentile are the questions which even the weakest students get correct. Questions which anchor at the 50th percentile are difficult for the weaker students but are grasped by the students slightly better. Questions that anchor at the 75thpercentile are got correct by students who have comparatively better ability and Questions that anchor at 90th percentile are got correct only by the best students. In every paper, there are questions which have not anchored in any of the percentile groups. The reason is twofold – 1) It may be that none of the groups have conclusively got the question correct, i.e. in none of the groups have 60% of the students who got that question correct, 2) it may be that 60% of the children got it correct in one group (say, 75th percentile group) but more than 50% of the students got it correct in the previous group (say, 50th percentile group). In such a case, it would not be correct to anchor the question in the 75% quartile as even the 50% quartile group has fared fairly well in that question.

3.1.5.2 Number of items anchoring at each anchor level

Table 9: Number of questions anchoring at different proficiency levels

Paper	Low Benchmark (25th percentile)	Intermediate Benchmark (50th percentile)	High Benchmark (75th percentile)	Advanced Benchmark (90th percentile)	Total anchored items	Number of items in the paper
Hindi - Class 3	6	20	13	1	40	58
Hindi - Class 5	7	20	27	7	61	77
Hindi - Class 8	31	13	16	5	65	108
Maths - Class 3	5	10	12	6	33	64
Maths - Class 5	5	5	24	15	49	96
Maths - Class 8	2	2	12	33	49	156
English - Class 3	6	12	9	7	34	48
English - Class 5	1	7	18	7	33	66
English - Class 8	10	6	11	4	31	76
Science - Class 8	3	6	12	13	34	152

3.1.5.3 Distribution of students at different proficiency levels

Along with the learning benchmarks we have also provided charts showing the distribution of students across these proficiency levels for all the districts. These tables and charts give us detailed idea of the current learning level of the students at district level. For example by looking at class 3-Hindi charts we can say that 90% of the students from the Gurgaon district are at or above the low benchmark, whereas only 56% students of Yamunanagar districts are at or above the low benchmark.

3.2 Overall findings of learning levels in Maths

3.2.1 Analysis of performance in different skills:

Analysis of skill wise performance in different classes of Maths was done for both questions asked from lower grade skills and for the same grade level competencies.

- Class 3 students have performed in the range of 43% to 53% in all the skills which shows that a lot of improvement is required to build strong foundation in basic mathematical concepts.
- In class 5, 'Area and perimeter' and problem solving need more attention where performance is very low at 24.3% and 34.0% respectively.
- The overall performance in class 8 is substantially low. Students have performed very low across all the skills.
- Students' performance in 'Number sense' is decreasing in higher classes which shows that they may have got the basic concept right but are lagging in advanced/complex concept of same skill.

Table 10: Performance across skills in class 3 Maths

S.No.	Skill	# questions per test form	Performance
1	Number sense	6	53.3%
2	Four basic arithmetic operations	6	51.9%
3	Fractions	3	43.0%
4	Geometry: Basic Shapes	4	49.0%
5	Measurement and its applications	5	47.1%
6	Applications in daily life	6	45.9%

Table 11: Performance across skills in class 5 Maths

S.No.	Skill	# questions per test form	Performance
1	Number sense and basic number competency	3	45.4%
2	Factors and Multiples	3	35.0%
3	Four arithmetic operations	6	49.6%
4	Fractions and Decimals, Percentages: concepts, use and conversion	5	40.2%
5	Geometry	2	43.4%
6	Area and Perimeter	4	24.3%
7	Data interpretation and analysis	2	35.4%
8	Application in daily life and word/visual problems	6	40.2%
9	Measurement and its applications	5	37.8%
10	Problem Solving	4	34.0%

Table 12: Performance across skills in class 8 Maths

S.No.	Skill	# questions per test form	Performance
1	Number sense, related competency and computation skills	4	35.9%
2	Integers, rational and irrational numbers	6	29.5%
3	Powers and bases: concepts and applications	5	32.8%
4	Fractions , Decimals, Ratios & Percentages: concepts, use and conversion	6	36.3%
5	Area and Perimeter, Volume and Surface Area	6	30.3%
6	Geometry: concepts and applications	5	36.7%
7	Algebra: concepts and applications	9	35.3%
8	Applications in daily life	6	33.6%
9	Data interpretation and analysis	6	42.4%
10	Problem Solving	7	26.8%

3.2.2 of graded questions at different class levels in Maths:

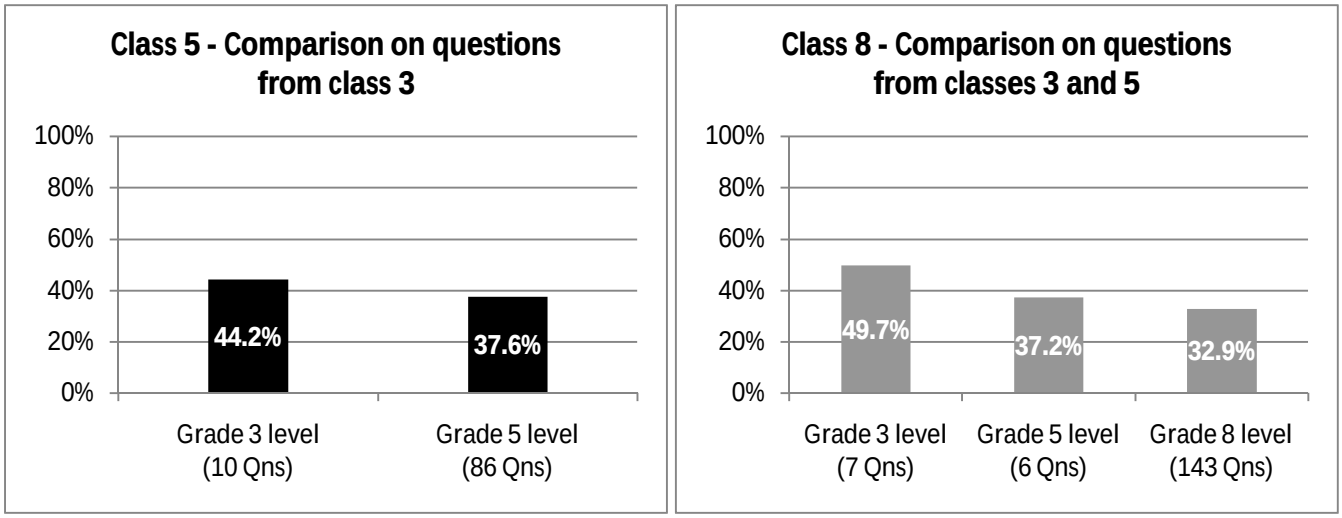


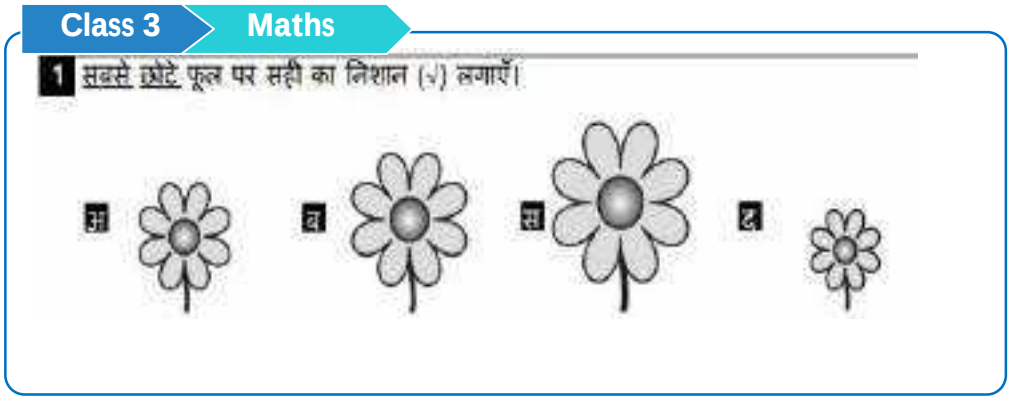
Figure 14: Performance breakup across different level of questions

- Grade 5 students were tested on 10 items mapped against skills introduced at grade 3 levels across the grade 5 forms. The average performance of the lower grade questions was found to be 44.2%. The performance of the 86 unique questions that were mapped against the skills of the same grade level is 37.6%. The difference between the average performances in both the grades is not very wide. As can be seen from the data, students still have not mastered the concept of lower grades.

- 7 items from grade 3 were tested across all the forms of grade 8. The average performance was found to be around 49.7% for grade 3 items. For 6 questions of grade 5 level, the average performance was 37.2% and for 143 unique questions of grade 8, the performance was around 32.9%. The average performances for both the grades appear very low and students seem to be struggling even with the concepts related to lower grades. Not being able to do the lower grade questions can be one of the reasons for showing poor performance even at the higher grades. The lower grade skill tested at grade 8 level included skills like basic arithmetic operations, fractions, area and perimeter, number sense and some application based questions. Since most of these are founding skills, weaker grip over these can be the reason for lower performance even in the grade appropriate skills.

3.2.3 Analysis of low and High performing questions in Maths:

In class 3 Maths, students perform relatively well on simple arithmetic operations without carry over and straightforward questions on number sense involving place value or the use of zero. They have also scored more on questions testing patterns or similar shapes or objects. A few conceptual questions also show good performance. Students seem to be struggling with concepts of place value and measurement. They show low performance on conceptual questions testing these concepts.



Option	Performance %
A	4.5
B	2.6
C	4.5
D ✓	81.4

This question is testing the concept of bigger and smaller objects. Performance on this question is 81.4%.

Class 3 **Maths**

27 हल करें।

3 इकाइयाँ + 4 दहाइयाँ = _____

Answers	Performance %
Correct answer ✓	32.6
Wrong answer	39. 2
Left unattempted	20. 4
Invalid answer	9.8

This question tests place value concept in a straightforward manner. The performance was only 32.6%.

In class 5 Maths, only 7 out of 96 questions show performance above 60%. Students find questions with concepts of measurement, applied area and perimeter questions, and data interpretation tougher than others.

Class 5 **Maths**

2 हल करें।

6859
+ 2130
_____

_____

A 4729
B 4720
C 8989
D 8980

Option	Performance %
A	2.6
B	5.6
C ✓	74.3
D	5.4

This is a lower grade item. The skill is tested at class 4 level. This is an addition problem without carryover and performance on this question is 74.3%.

Class 5 **Maths**

10 माचिस की 4 तीलियाँ लेकर एक वर्ग बनाया गया। हर एक तीली 3 सेमी लंबी है।

इस वर्ग का क्षेत्रफल कितना है?

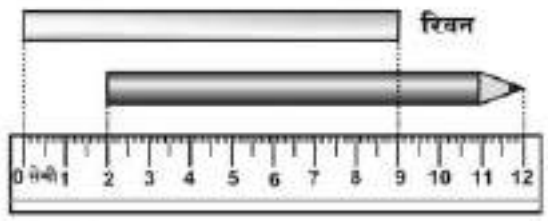
A 3 वर्ग सेमी
B 7 वर्ग सेमी
C 9 वर्ग सेमी
D 12 वर्ग सेमी

Option	Performance %
A	14.1
B	9.7
C ✓	21.5
D	42.2

This is a straight forward question and it tests the concept of area. Only 21.5% students could answer this question. Most of the students chose option D which actually shows the perimeter value for the given question.

Class 5 Maths

9 नीचे दिए गए चित्र में पेन्सिल, रिबन से कितनी अधिक लंबी है?



A 1 सेमी
B 2 सेमी
C 3 सेमी
D 12 सेमी

Option	Performance %
A ✓	16.9
B	13.3
C	25.1
D	32.2

This question tests students on the concept of length. Only 16.9% of students could answer this question. Most students chose Option D.

In class 8 Maths, students have performed above 60% only in 5 questions out of 156 questions. Students seem to be struggling in most concepts especially like Integers, Fractions and Algebra.

Class 8 Maths

11 सुनील और उसके दोस्त एक गणित क्लब चलाते हैं। वे हर शाम एक साथ क्लब जाते हैं और गणित का खेल खेलते हैं। वे जीते गए अंकों की संख्या को दिखाने के लिए प्रतीकों का प्रयोग करते हैं। उन्हें एक कठिन खेल को जीतने के लिए δ और एक आसान खेल को जीतने के लिए μ मिलता है। उनके द्वारा प्राप्त किए अंक नीचे दिये गये चार्ट में दिखाए गए हैं।

सुनील	μ μ δ
मोनल	μ μ μ μ μ μ
सूरज	μ δ δ δ
मिनाक्षी	μ δ δ
प्रन्जल	δ δ δ δ

कुंजी
μ = 3 अंक
δ = 5 अंक

अभी तक किसने सबसे ज़्यादा अंक प्राप्त किये हैं?

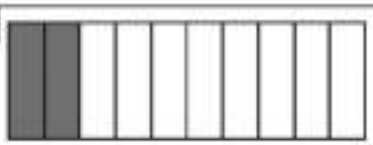
A सुनील
B मोनल
C सूरज
D प्रन्जल

Option	Performance %
A	8.1
B	18.6
C	7.6
D ✓	60.2

In this question, the data is given in a tabular format and students were asked to interpret given information. 60.2% students were able to answer this question correctly. The question is an application based question testing basic arithmetic operation capability of students.

Class 8 Maths

15



इस आकृति का छायांकित (रंगा हुआ) हिस्सा कौन-सी संख्या दर्शा रहा है?

A 2.8
B 0.5
C 0.2
D 0.02

Option	Performance %
A	42.1
B	8.3
C ✓	28.1
D	9.1

The question here is a lower grade question as it tests conceptual understanding of fractions in students. Students start learning fractions through such diagrams at grades as low as grade 5. As can be seen from the data, only 28% students at grade 8 level are able to give the correct answer.

Class 8 Maths

26 $(\frac{-5}{4}) \times \square = 1$

इनमें से कौन सी संख्या खाली बक्से के स्थान पर आएगी?

A $(\frac{-8}{10})$

B $(\frac{-1}{5})$

C $(\frac{4}{5})$

D $(\frac{4}{1})$

Option	Performance %
A ✓	20.3
B	17.8
C	42.3
D	11.8

This question tests the concept of fraction and their reciprocal equals. Performance on this question is only 20.3%.

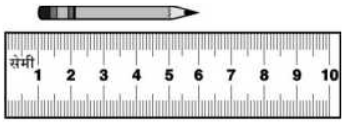
3.2.4 Analysis of Misconceptions and common errors in Maths:

Students show misconceptions and common errors in their grade level skills in Maths. There are misconceptions prevalent even in the concepts taught in lower grades.

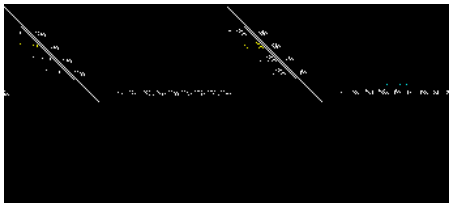
	Most common wrong answer		Correct answer

Question	Graphs
Class 3 / Question 8 Form A	

8 चित्र में दिखाई देने वाली पेंसिल कितनी लंबी है? सही जवाब पर सही (√) का निशान लगाएँ।
(चित्र में दिखाई देने वाले स्केल/पैमाने का उपयोग करें)



अ 4 सेमी
ब 5 सेमी
स 6 सेमी
द 7 सेमी



Option A	Option B	Option C	Option D
6.9%	15.4%	56.5%	6.5%

Explanation: This question tests if students can identify the length of the given pencil. Only 15.4% of the students answered the question correctly. 56.5% students chose C as the answer. It appears that students are learning about measurement mainly by reading about it in the textbook and without much exposure to actually measuring! Most textbooks illustrate measurement by showing a line being measured by starting from the zero mark. So students seem to have learnt the strategy - 'look where the pencil ends to determine the answer'. This strategy fails in questions like this.

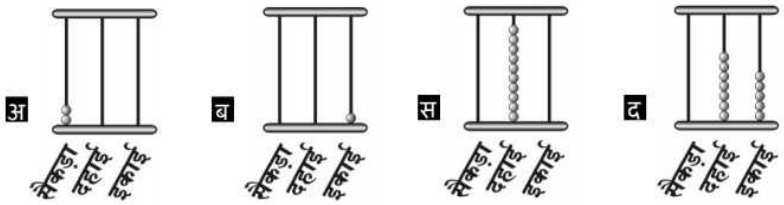
Talks with students reveal that many of them do not completely understand what it means to represent a length with a number. When asked why the length is 6 cm, they explain that counting from 1 to 6, they have counted '6 cm'. In essence, they are counting marking on the scale instead of actual 1 cm spans. So when asked to show 2 cm on the scale, they show the 2 cm mark and not the total span.

The IRC shows that as the marks increase, more and more students select B as the answer and the number of students selecting C goes down.

Question	Graphs

Class 3 / Question 19 Form B and Class 8/Question 47 Form B

19 यहाँ हर गिनतारा (एबेकस) एक संख्या प्रस्तुत करता है। कौन-सा गिनतारा सबसे बड़ी संख्या प्रस्तुत कर रहा है? सही जवाब पर सही (√) का निशान लगाएँ।



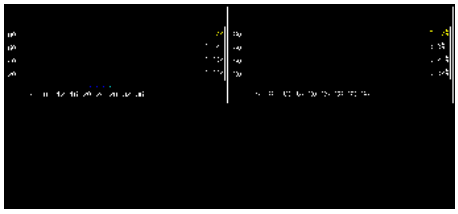
Class 3:

Option A	Option B	Option C	Option D
17.9%	6.0%	29.1%	32.2%

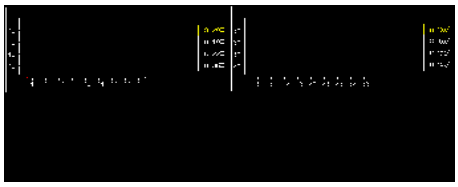
Class 8:

Option A	Option B	Option C	Option D
20.9%	10.1%	22.0%	36.8%

Class 3:



Class 8:



Explanation: This question tests if students understand the concept of place value and can identify the number represented on the abacus. The abacus clearly shows the places ones, tens and hundreds and each abacus represents a different value – for e.g. Option A represents 2 hundreds, i.e. 200, Option B represents 1 ones, i.e. 1 and so on. Only around 18% students answered the question correctly. Around 32% students chose D as the answer. A probable reason could be that in D, the number of beads is the maximum and students have wrongly understood that higher number of beads means a higher value. They have not paid attention to the place values attached to the beads and haven't realized that 2*100=200 in option A is the largest value and not 7*10 + 5*1= 75 in option D.

This question was also asked in class 8 and the data indicates a stronger misconception there.

The IRC for class 3 shows that as the marks increase, greater numbers of students are selecting A as the answer which means that students who perform better in the assessments have been able to arrive at the correct answer.

Question	Graphs

Class 3 / Question 4 Form A and Class 5/ Question 18 Form C

4 इनमें से कौन-सा चित्र त्रिभुज है? सही जवाब पर सही (√) का निशान लगाएँ।

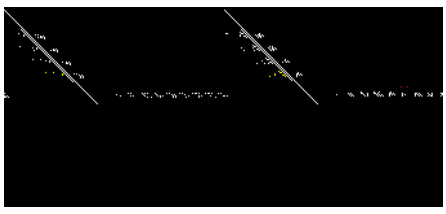
Class 3:

Option A	Option B	Option C	Option D
12.2%	17.8%	35.0%	21.4%

Class 5:

Option A	Option B	Option C	Option D
11.5%	23.2%	26.0%	23.7%

Class 3:



Class 5:

Explanation: This question tests if students can identify a triangle from the given options. Only 21.4% students answered the question correctly. 35.0% students chose C as the answer. A probable reason could be that only in option C, the shape of the figure is similar to how students are used to seeing triangles – 2 slanting sides and a sleeping line at the base. They don't seem to have internalised that a triangle is any closed figure formed using three lines. Students selecting option B (~18.0%) are probably confused between a cone and a triangle and may feel that if you invert the shape, it will become a triangle.

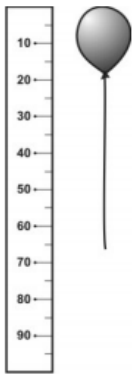
This question was also asked in class 5 where almost the same % of students selected the correct answer. While the % of students selecting option C decreased, that selecting option B increased.

The IRC for class 3 shows that as marks increase, more number of students select D as the answer while in class 5 also the same pattern is seen. In class 5, the wrong answer C is selected by high scoring students also.

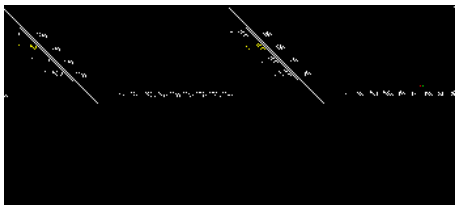
Question	Graphs

Class 5 / Question 5 Form A

5 गुब्बारे के नीचे कितना सेमी लम्बा धागा है?



A लगभग 20 सेमी
B लगभग 45 सेमी
C लगभग 60 सेमी
D लगभग 65 सेमी



Option A	Option B	Option C	Option D
6.8%	14.8%	16.1%	49.5%

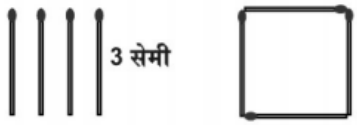
Explanation: This question tests if students can estimate the length of the string using the scale given. Only 14.8% students answered the question correctly. Close to 50.0% students chose D as the answer. A probable reason could be that students are only looking where the string ends and hence choosing D, 65 cm. The issue perhaps is not in reading the scale but in understanding that the string starts from 20 cm and ends at 65 cm hence it is around 45 cm long.

The IRC shows that as the marks increase more students choose B as the answer. The number of students choosing option D as the answer decreases but high scoring students are also choosing it.

Question	Graphs

Class 5 / Question 10 Form A

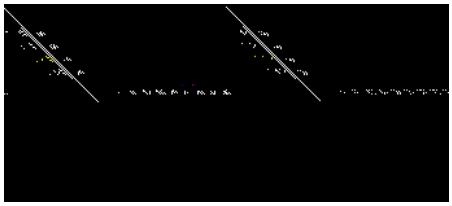
10 माचिस की 4 तीलियाँ लेकर एक वर्ग बनाया गया। हर एक तीली 3 सेमी लंबी है।



इस वर्ग का क्षेत्रफल कितना है?

A 3 वर्ग सेमी
B 7 वर्ग सेमी
C 9 वर्ग सेमी
D 12 वर्ग सेमी

Option A	Option B	Option C	Option D
14.1%	9.7%	21.5%	42.2%



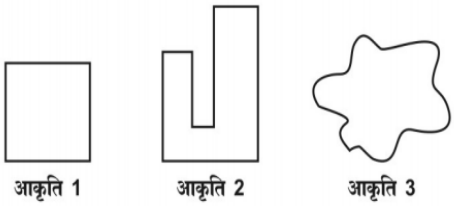
Explanation: This question tests if students can calculate the area of the square given the measure of its side. Only 21.5% students answered the question correctly and 42.2% students chose D as the answer. A probable reason could be that the students are unable to differentiate between area and perimeter. In the question, 4 sticks have been shown and students have to find the area which is (side) $^2 = 3^2 = 9$ cm^2. Students choosing D have probably added the lengths of the 4 sides $3+3+3+3 = 12$ cm, which is the way to calculate the perimeter.

The IRC shows that as the marks increase, more and more students select C as the answer and the number of students selecting D goes down.

Question	Graphs

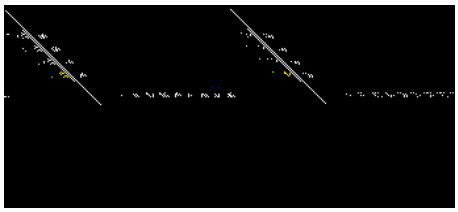
Class 5 / Question 38 Form B

38 यहाँ एक कागज पर बनायी गयी 3 आकृतियों को दिखाया गया है। उनमें से किस आकृति का क्षेत्रफल हो सकता है?



A केवल आकृति 1
B केवल आकृति 2
C केवल आकृति 1 एवं 2
D तीनों आकृतियों का क्षेत्रफल हो सकता है।

Option A	Option B	Option C	Option D
27.0%	13.5%	23.4%	14.3%



Explanation: This question tests if students understand the concept that all closed shapes, regular or irregular, have an area.

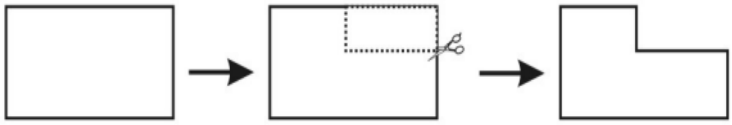
Only 14.3% students answered the question correctly. 27.0% students chose A as the answer - only figure 1 has an area. A probably reason could be that students are used to 'calculate' area only for regular shapes like square, circle, triangle etc. and have not really understood what area means. So when a figure is presented in a different format, students think that it doesn't have area.

A little over 23.0% students chose C as the answer which says that only figures 1 and 2 (as shown in the question) have an area. These students may have a wrong notion that only figures with straight sides have area.

Question	Graphs

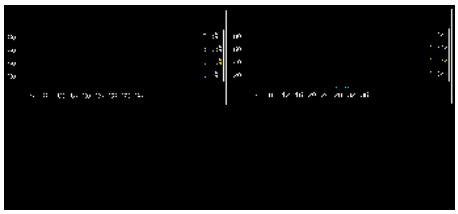
Class 5 / Question 30 Form C

30 आशा ने एक आयताकार कागज़ से चित्र में दिखाए गए तरीके से एक टुकड़ा काटा है।



काटने के बाद आयताकर कागज़ के परिमाप में क्या परिवर्तन होगा?

A बढ़ जाएगी।
B कम हो जाएगी।
C वही रहेगी।
D वर्ग के आकार पर निर्भर करेगा।



Option A	Option B	Option C	Option D
8.1%	53.5%	15.1%	9.2%

Explanation: This question tests if students understand the concept of perimeter and identify what will happen to the perimeter on removing a part of the figure.

Only 15.1% students answered the question correctly. Over 53.0% students chose option B as the answer which says that the perimeter of the shape after a cut is made will decrease. There could be 2 possible reasons for this –

1. Confusion between area and perimeter: Students may know the terms area and perimeter and since these topics are generally taught in conjunction with one another, students may be confusing one with the other. In this case, the area will decrease, but the perimeter will remain the same.

2. A wrong notion that if something is removed, all associated quantities will decrease – in some cases area can decrease even if perimeter increases. Students may have this wrong notion which leads them to select option B without realising that sides of same length will be present in the new shape and so the perimeter won't decrease.

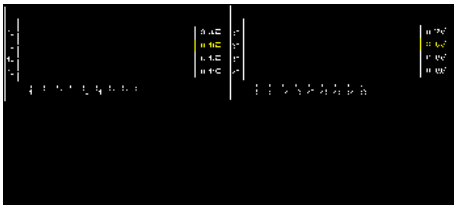
The IRC shows that as the marks increase, more and more students select C as the answer and the number of students selecting B goes down but even in high scoring students, the misconception is prevalent.

Question	Graphs

Class 5 / Question 23 Form A

23 एक 20 सेमी लम्बे तार से एक आयत बनाया गया। यदि इसकी चौड़ाई 4 सेमी है, तो इसकी लंबाई क्या होगी?

A 5 सेमी
B 6 सेमी
C 12 सेमी
D 16 सेमी



Option A	Option B	Option C	Option D
35.5%	16.6%	15.2%	19.3%

Explanation: This question tests if students can find the length of the rectangle after understanding that the perimeter of the rectangle is 20 cm, the length of the wire.

Only 16.6% students answered the question correctly. 35.5% students chose A as the answer. The students have probably confused *perimeter* and *area.* Length multiplied by breadth is the area. 4*5=20 and probably students have followed this.

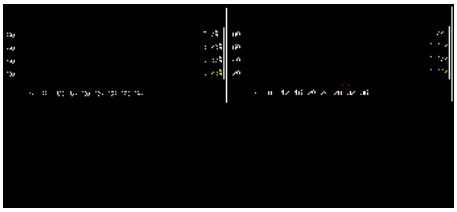
They have not realized that 20 cm is the perimeter. The breadth is 4 cm so the length will be [20- (4*2)]/2= 6 cm.

Question	Graphs

Class 8 / Question 8 Form A

8 -402 में से 415 घटाने पर _____ मिलेगा।

A 817
B 13
C -13
D -817



Option A	Option B	Option C	Option D
7.3%	26.8%	37.0%	23.7%

Explanation: This question tests if students can subtract a positive integer from a negative integer. Only 23.7% students answered the question correctly. Thirty Seven per cent students chose C as the answer. These students have probably subtracted 415 from 402 (402-415) and ignored the minus sign in 402.

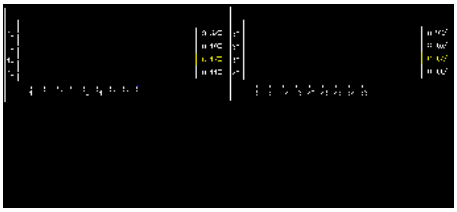
26.8% students chose B as the answer. These students have probably subtracted 402 from 415 (415-402). These students might have thought that it is not possible to subtract a larger number from a smaller number and have ignored the minus sign in 402.

Question	Graphs

Class 8 / Question 37 Form B

37 43 दहाई के मुकाबले 48 दहाई कितना ज़्यादा है?

A 5
B 48
C 50
D 91



Option A	Option B	Option C	Option D
52.7%	10.6%	17.6%	11.6%

Explanation: This question tests if students understand place value, identify the numbers and subtract them correctly. Only 17.6% students answered the question correctly. 52.7% students chose A as the answer. A probable reason is that students have subtracted 43 from 48 and have ignored the 'tens' written along with the numbers. It could be a silly mistake or lack of understanding of place value.

When place value is considered, the question reduces to subtraction of 43*10=430 from 48*10=480 and 480-430=50.

The IRC shows that the students across the performance band are choosing option A. Option C is chosen by very high scoring students only.

Question	Graphs

Class 8 / Question 26 Form C

26 $(\frac{-5}{4}) \times \square = 1$

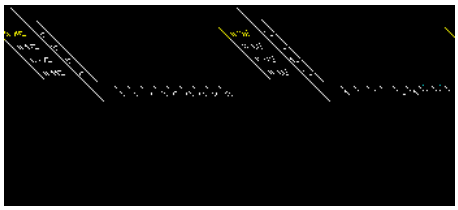
इनमें से कौन सी संख्या खाली बक्से के स्थान पर आएगी?

A $(\frac{-8}{10})$

B $(\frac{-1}{5})$

C $(\frac{4}{5})$

D $(\frac{4}{1})$



Option A	Option B	Option C	Option D
20.3%	17.8%	42.3%	11.8%

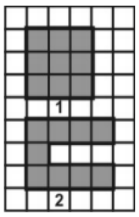
Explanation: This question tests if students understand that the multiplication of a number with its reciprocal equals 1and whether they understand simplification of fractions.

Only 20.3% students answered correctly. 42.3% students marked C as the answer. These students understand that 5/4 when multiplied with 4/5 will give 1 but what they seem to have missed is the minus sign in 5/4. The issue lies in understanding that to get 1, (-5/4) has to be multiplied by a negative fraction, which in this question is option A. Students may have looked for (-4/5) and since they did not find it, they may have chosen 4/5.

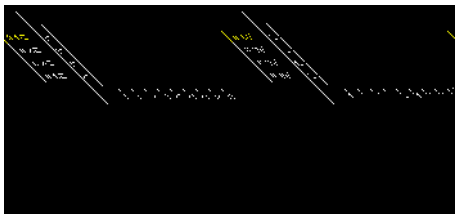
Question	Graphs

Class 8 / Question 58 Form C

58 आकार '1' का परिमाप 12 इकाई है और उसका क्षेत्रफल 9 वर्ग इकाई है। आकार '2' का परिमाप और क्षेत्रफल कितना है?



A परिमाप: 20 इकाई, क्षेत्रफल: 9 वर्ग इकाई
B परिमाप: 9 इकाई, क्षेत्रफल: 9 वर्ग इकाई
C परिमाप: 14 इकाई, क्षेत्रफल: 12 वर्ग इकाई
D परिमाप: 12 इकाई, क्षेत्रफल: 20 वर्ग इकाई



Option A	Option B	Option C	Option D
17.9%	25.9%	24.5%	15.1%

Explanation: This question tests if students can find out the area and perimeter of a figure.

Only 17.9% students answered correctly. Over one-fourth of the students chose B as the answer. They have probably confused the area with perimeter and not understood the difference between the two.

Students choosing option C are not clear with the difference between the area and the perimeter.

It is important to make it clear to students that perimeter is the boundary of a figure and area is the extent to which a figure is covered.

3.2.5 Learning benchmarks at different proficiency levels

State Benchmark of Maths Achievement: Class 3

Low Benchmark (Students at or above 25 percentile)

- Students can identify the object which has the smallest size
- Students can count and write the number of balls shown in a figure
- Students can identify the number which is larger amongst the two numbers given
- Students can count the 1 and 2 rupee coins and a 2 rupee note shown in the picture and write the amount
- Students can identify the vessel which has the least amount of water out of vessels with differently shaped base and height.

Intermediate Level (Students at or above 50 percentile)

- Students can identify the given number in word form and write it in numbers.
- Students can add two digit numbers with carry over in a horizontal format
- Students can solve a problem to identify the number which has to be added to a given number to get the answer
- Students can solve an addition problem involving addition of a zero and a two digit number in a horizontal format
- Students can identify the longest ribbon from 3 given ribbons
- Students can identify the figure which is similar in shape to the figure shown
- Students can identify the position (number) at which the object is standing on a stair case
- Students can solve a subtraction problem involving subtraction of a two digit number from a three digit number without borrowing and in a horizontal format

High Benchmark (Student at or above 75 percentile)

- Students can understand the concept of volume that a smaller measuring tool will take longer time to fill a vessel
- Students can identify what time it will be after half an hour for a given clock
- Students can identify the day for a given date given another date and day from the same year
- Students can solve a problem involving subtraction of two digit number from another two digit number with borrowing in a horizontal format
- Students can identify the figure which is half shaded
- Students can identify the tallest person from a given graph showing the height of the persons
- Students can calculate the difference between the number of objects from a given graph
- Students can write the number in a box which will make the number statement true which tests multiplication as repeated addition
- Students can identify the property of a triangle that it has 3 sides
- Students can identify the pieces used to make a figure
- Students can identify the figure which is one-fourth shaded
- Students can count and write the number of squares in a figure

Advanced Benchmark (Student at or above 90 percentile)

- Students can identify the sign (+,-,*,/) that will make a number statement true
- Students can identify the figure that is half-shaded
- Students can add two numbers written in expanded form according to the place values (ones and tens)
- Students can identify the smallest fraction out of 3 given fractions
- Students can identify the figure which is made only of straight lines

State Benchmarks of Maths Achievement

Maths — **3rd Class**

District	Percentage of Students Above State Benchmarks	Low Benchmark	Intermediate Benchmark	High Benchmark	Advanced Benchmark
MAHENDRAGARH	9.3 18.3 24.6 22.3 25.5	91%	72%	48%	26%
SIRSA	9.8 20.5 26 21.3 22.4	90%	70%	44%	22%
FARIDABAD	11.3 24.1 34.1 19.9 8.6	89%	63%	29%	9%
MEWAT	11.9 11.6 22.6 25.6 28.3	88%	77%	54%	28%
JIND	12.3 20.6 24.1 18.4 24.6	88%	67%	43%	25%
REWARI	13.4 24.7 26.8 19.1 16	87%	62%	35%	16%
JHAJJAR	13.7 16.2 24.2 24.3 21.6	86%	70%	46%	22%
GURGAON	13.7 23.8 33.8 19.5 9.2	86%	63%	29%	9%
HISAR	17.6 20 23 18.4 21	82%	62%	39%	21%
KAITHAL	20.6 23.2 28.7 17.2 10.3	79%	56%	28%	10%
SONIPAT	22.4 27.1 23.2 13.1 14.2	78%	51%	27%	14%
FATEHABAD	22.4 23.5 27.4 12.2 14.5	78%	54%	27%	15%
BHIWANI	24.2 24.1 25.3 16.5 9.9	76%	52%	26%	10%
KARNAL	25.3 25.6 23.5 16.5 9.1	75%	49%	26%	9%
ROHTAK	27 37.5 24.4 7.7 1	73%	36%	11%	3%
PANIPAT	27.2 20.7 23.1 13.4 15.6	73%	52%	29%	16%
PALWAL	30 18 23.1 16 12.9	70%	52%	29%	13%
PANCHKULA	31.2 32.8 24.5 7.5 4	69%	36%	12%	4%
KURUKSHETRA	32.6 31.6 23 8.9 3.9	67%	36%	13%	4%
AMBALA	36 33.3 23 5.8 2	64%	31%	8%	2%
YAMUNANAGAR	49.2 26.3 14.7 6.8 3	51%	25%	10%	3%

0 20 40 60 80 100

Legend:

- ■ Percentage of students at or above **Advanced** Benchmark.
- ■+■ Percentage of students at or above **High** Benchmark.
- ■+■+■ Percentage of students at or above **Intermediate** Benchmark.
- ■+■+■+■ Percentage of students at or above **Low** Benchmark.
- ■ Percentage of students **below Low** Benchmark.

State Benchmark of Maths Achievement: Class 5

Low Benchmark (Students at or above 25 percentile)

- Students can perform addition of four digit numbers without carry over in vertical format
- Students can identify the larger number from two given numbers and use the <,>,= sign to represent the same
- Students can identify the vessel which has the least amount of water out of vessels with differently shaped base and height[12]

Intermediate Level (Students at or above 50 percentile)

- Students can solve a word problem based on money/ currency
- Students can identify the figure which is similar in shape to the figure shown[12]
- Students can read a calendar and identify the day on a specific date
- Students can solve a problem to identify the number which has to be added to a given number to get the answer[12]
- Students can identify an odd number from the given numbers

High Benchmark (Student at or above 75 percentile)

- Students can estimate the fraction for the shaded region in a figure[12]
- Students can identify a 60 degree angle from 4 options which have angles represented in unfamiliar orientation
- Students can identify the correct bar graph representation of given data
- Students can read the price tags of objects and calculate the cost when given quantities of objects are purchased
- Students can carry out addition and identify which two numbers on adding will give the same result as on adding other two numbers
- Students can understand the concept of perimeter and identify which of the shapes placed vertically to each other having the same length and width will have a larger size
- Students can read and interpret data presented in a tabular form to answer a logic based question
- Students can understand the rules of divisibility by 5 and 10 and identify a number divisible by both
- Students can find out the sum of three 4 digit numbers given the sum of other three 4 digit numbers by understanding the place value concept and using it to find the sum than calculating it
- Students can solve an addition problem involving 2 numbers represented in an expanded form according to place values (ones and hundreds)
- Students can understand measurement of objects on a weighing scale and make a valid statement about the weight of the object placed with respect to an object weighing 1kg
- Students can identify a common multiple for three single digit numbers
- Students can add two quantities given in litre-millilitres form involving carry over in a horizontal form
- Students can apply the divisibility rule of 9 and solve a word problem based on it

[12] Based on Grade 3 level skills

- Students can carry out the subtraction of a mixed fraction from a proper fraction
- Students can understand the commutative property of multiplication
- Students can solve a word problem involving finding the number of objects bought given the total cost and price per object
- Students can solve a word problem based on direct proportion.
- Students can interpret a pie chart and answer a question based on the information presented.

Advanced Benchmark (Student at or above 90 percentile)

- Students can count the number of 2*2 squares in a 3*3 square
- Students can identify the unknown value of two numbers given the sum of the numbers
- Students can solve a word problem involving division of a number into 6 equal parts and calculating the value of 2 such parts
- Students can calculate the amount to be paid when given quantities of objects are bought, given the prices per kg
- Students can solve word problem involving subtraction of a fraction from a whole number
- Students can identify two numbers which when multiplied by a given number will give the given product.
- Students can identify the number obtained on performing operations of division and addition on a three digit number
- Students can compare two numbers and solve how much is one number more than the other
- Students can find the time after given number of hours have based from an analog clock
- Students can read a bill and solve word problem based on it
- Students can identify what fraction is shaded in a figure in terms of percentage
- Students can solve a word problem involving addition of two time periods given in the form of years and months
- Students can solve a word problem involving division of a quantity given in litre-millilitre format in equal parts and give the answer in millilitres

State Benchmarks of Maths Achievement

Maths — **5th Class**

District	Percentage of Students Above State Benchmarks	Low Benchmark	Intermediate Benchmark	High Benchmark	Advanced Benchmark
MAHENDRAGARH	9.2 13.5 24.2 24 29.1	91%	77%	53%	29%
REWARI	11.5 19 25.1 18.7 25.7	89%	70%	44%	26%
HISAR	14.5 26.9 27.3 19 18.3	86%	65%	37%	18%
GURGAON	14.9 22.6 33.6 19.3 9.6	85%	63%	29%	10%
FATEHABAD	15.4 20.4 21.7 22.2 20.3	85%	64%	43%	20%
PANIPAT	16 20 28.6 17.8 19.6	84%	64%	37%	20%
JIND	16.1 19.6 26.1 18.9 19.3	84%	64%	38%	19%
SONIPAT	18 20.2 28.4 16.6 16.8	82%	62%	33%	17%
JHAJJAR	18.3 24.7 22.6 19.7 14.7	82%	57%	34%	15%
MEWAT	19.2 18 12.3 26.1 24.4	81%	63%	51%	24%
FARIDABAD	20.2 25.7 31 13.9 9.2	80%	54%	23%	9%
KAITHAL	21 27.1 30.4 12.7 8.8	79%	52%	22%	9%
KARNAL	21.2 29.5 25.2 14.4 9.7	79%	49%	24%	10%
SIRSA	22.6 32.3 23.1 12.8 9.2	77%	45%	22%	9%
PALWAL	25.5 17.3 20.2 20.4 16.6	75%	57%	37%	17%
PANCHKULA	26.9 31.2 28.2 10.8 2.9	73%	42%	14%	3%
ROHTAK	27.7 33.1 26.8 9.6 2.8	72%	39%	12%	3%
BHIWANI	34 28.5 22.1 9.2 6.2	66%	38%	15%	6%
KURUKSHETRA	35.7 28.7 22.9 8 4.7	64%	36%	13%	5%
AMBALA	39.2 32.6 20.3 5.8 2.1	61%	28%	8%	2%
YAMUNANAGAR	40.6 30 18.4 8.2 2.8	59%	29%	11%	3%

0 20 40 60 80 100

Legend:

- ■ Percentage of students at or above **Advanced** Benchmark.
- ■+■ Percentage of students at or above **High** Benchmark.
- ■+■+■ Percentage of students at or above **Intermediate** Benchmark.
- ■+■+■+■ Percentage of students at or above **Low** Benchmark.
- ■ Percentage of students **below Low** Benchmark.

State Benchmark of Maths Performance: Class 8

Low Benchmark (Students at or above 25 percentile)

- Students can understand the relation between the capacity of a container and the shape of the container[13].
- Students can identify a parallelogram in different orientations.

Intermediate Benchmarking (Students at or above 50 percentile)

- Students can read a pictograph when represented as a bar chart and when one picture in the key represents one item[13].
- Students can read a pictograph having two symbols where each symbol represents a different number.

High Benchmarking (Students at or above 75 percentile)

- Students can identify a 3-digit even number which is a multiple of 3.
- Students identify a triangle when shown in an unfamiliar orientation (narrow base and tilted)[13].
- Students can apply proportional reasoning to real life situations to calculate one quantity where change in two quantities is directly proportional.
- Students can calculate the cube root of a 3-digit whole number which is a perfect cube.
- Students can find the ratio and the equivalent ratio of two quantities, when given in the same units of measure.
- Students can interpret and analyse data presented in a table to solve problems.
- Students can find the square of the product of two 1-digit numbers.
- Students can calculate the volume of a cube when the length of the side of the cube is given.
- Students can translate from the jumbled expanded form of a 3-digit number to its numeral form.
- Students can find the square root of a fraction when the numerator and the denominator are whole numbers which are perfect squares.

Advanced Benchmarking (Students at or above 90 percentile)

- Students can measure the area of the overlapping region of two rectangles[14].
- Students can solve a linear equation in one variable with variables on both the sides of the equal sign.
- Students can apply the laws of exponents to find the product of two numbers that have the same base but different exponents.
- Students can identify the correct operation to use in a word problem and correctly divide a larger unit to smaller units.
- Students can find the measure of the fourth angle of a quadrilateral when the measures of the remaining angles are given.
- Students can multiply two binomials with two variables.

[13] Based on the grade 3 level skill

[14] Based on the grade 5 level skill

- Students can find the greatest from a set of 4-digit negative integers.
- Students can calculate the volume of a cube when the length of the side of the cube is given.
- Students can find the exterior angle of a triangle when the other two exterior angles are given.
- Students can reduce an equation to its linear form (having one variable on both sides) and solve it.
- Students can calculate the quantity of one part when the ratio of three parts is given.
- Students can apply distributive law of multiplication over addition on whole numbers to evaluate an expression.
- Students can apply laws of exponents and simplify and evaluate an expression in one variable.
- Students can identify any closed figure with 4 or more number of straight sides as a polygon.
- Students can transpose exponents and simplify a number having rational exponents.
- Students can apply the properties of linear pair of angles and the angle sum property of a quadrilateral to find the unknown angle of a quadrilateral.
- Students can identify repeated addition as multiplication and find one factor when the other factor (in decimal form) and the product are given.
- Students can factorise the given expression using square identity and can divide a trinomial by a binomial.
- Students can apply the divisibility by 9 rule to find the missing number in an 8-digit number which is divisible by 9.
- Students can frame an algebraic expression in one variable by analysing the given context and can multiply a binomial by a monomial.
- Students can round off a 5-digit number to its nearest hundred.
- Students can translate an 8-digit number from its numeral form to its number name.
- Students can identify and apply the rule in a Fibonacci sequence to find the next numbers in the sequence.
- Students can divide a polynomial in one variable by a monomial.
- Students can find the divisor when given the quotient and the dividend in a division problem (involving rational numbers).
- Students can comprehend a word problem and find the whole when the amount for a fraction of the whole is given.

State Benchmarks of Maths Achievement

Maths | **8th Class**

District	Percentage of Students Above State Benchmarks	Low Benchmark	Intermediate Benchmark	High Benchmark	Advanced Benchmark
PALWAL	10.6 12.3 21.9 24.4 30.8	89%	77%	55%	31%
REWARI	11.2 21.5 28 17.9 21.4	89%	67%	39%	21%
MAHENDRAGARH	12.8 12.7 26 19.7 23.8	87%	70%	44%	24%
JIND	15.3 21.9 21.9 16.9 24	85%	63%	41%	24%
HISAR	15.7 23.4 27.2 20.3 13.4	84%	61%	34%	13%
BHIWANI	18.3 23.4 26 17 15.3	82%	58%	32%	15%
GURGAON	18.8 23.6 29.5 16.1 12	81%	58%	28%	12%
KAITHAL	19.5 26.6 27.6 17.9 8.4	81%	54%	26%	8%
SIRSA	19.7 27.8 20 19.1 13.4	80%	53%	33%	13%
SONIPAT	20 23.2 27.6 17.3 11.9	80%	57%	29%	12%
MEWAT	20.4 16.7 25.5 25.5 11.9	80%	63%	37%	12%
PANIPAT	21.3 25.4 22 15.1 16.2	79%	53%	31%	16%
JHAJJAR	21.9 24.7 27 13.8 12.6	78%	53%	26%	13%
ROHTAK	24.3 29.4 25.7 13.1 7.5	76%	46%	21%	8%
FARIDABAD	25.4 30.5 31.1 9 4	75%	44%	13%	4%
KARNAL	27 27.9 25.7 11.7 7.7	73%	45%	19%	8%
FATEHABAD	28.2 20.8 21 19.6 10.4	72%	51%	30%	10%
KURUKSHETRA	31 29.7 23.9 10 5.4	69%	39%	15%	5%
PANCHKULA	36.2 31.1 25.2 5.3 2	64%	33%	8%	2%
YAMUNANAGAR	26.2 29.1 22.3 8.8 3.6	64%	35%	12%	4%
AMBALA	40 31.8 20.8 4.6 3	60%	28%	7%	3%

Legend:

- Percentage of students at or above **Advanced** Benchmark.
- Percentage of students at or above **High** Benchmark.
- Percentage of students at or above **Intermediate** Benchmark.
- Percentage of students at or above **Low** Benchmark.
- Percentage of students **below Low** Benchmark.

3.3 OVERALL FINDINGS OF LEARNING LEVELS IN HINDI

3.3.1 Analysis of Performance in different skills:

- Overall students' performance is above average in Hindi with no skill showing overall performance below 35%.
- Students of all classes have performed above 60% in the skill 'knowing names of animals/birds and objects'.
- 'Understand information from various forms' is the weakest skill in class 5 and 8 which shows students are struggling in interpretation.
- Class 8 students' have also performed above 60% when it comes to 'knowing antonyms and synonyms' and 'writing sentences'.

Table 13: Performance across skills in class 3 Hindi

S.No.	Skill	# questions per test form	Performance
1	Recognises letters and words of 3-4 letters, by their sound and form, writes them, and knows the starting sound as well as letter of familiar words	5	58.9
2	Knows names of objects, birds and animals seen in daily life	4	71.3
3	Uses words appropriate to the context based on their meanings and gender endings	4	54.3
4	Reads, understands, writes and constructs simple and short sentences that have less than 5 words in a sentence	3	43.6
5	Understands simple, short stories of 8-10 sentences when told and comprehends beyond the stated facts	7	49.2
6	Reads short text of 5-6 sentences that describes daily activity, routine context, simple description, simple story independently and comprehends state	5	57.7

Table 14: Performance across skills in class 5 Hindi

S.No.	Skill	# questions per test form	Performance
1	Knows a wider range of names of objects, birds and animals not seen in daily life and words denoting actions and feelings	6	66.4
2	Uses words appropriate to the context based on their meaning, time, number, gender and description	7	55.7
3	Reads, understands, constructs and punctuates simple sentences that have 5-6 words in a sentence	6	49.3
	Reads descriptive text, short stories of 8-10 sentences independently and comprehends beyond stated facts	13	47.2
4	Understands written information presented in various forms as Tables, Notices, Tickets, Posters, Labels, etc seen in real life	3	39.3

Table 15: Performance across skills in class 8 Hindi

S.No.	Skill	# questions per test form	Performance
1	Reads and writes simple words (that are class level appropriate) and knows names of objects, birds, animals, etc seen in daily life	7	69.6
2	Reads and writes sentences using grammar concepts	8	59.5
3	Knows synonyms, antonyms and deduces word meanings from clues in context	8	60.2
4	Reads descriptive text and comprehends explicit and implicit details for class level	11	54.5
5	Understands written information presented in various forms as Tables, Notices, Tickets, Posters, Labels, etc seen in real life for class level	11	49.9

3.3.2 Analysis of performance of graded questions at different class levels in Hindi

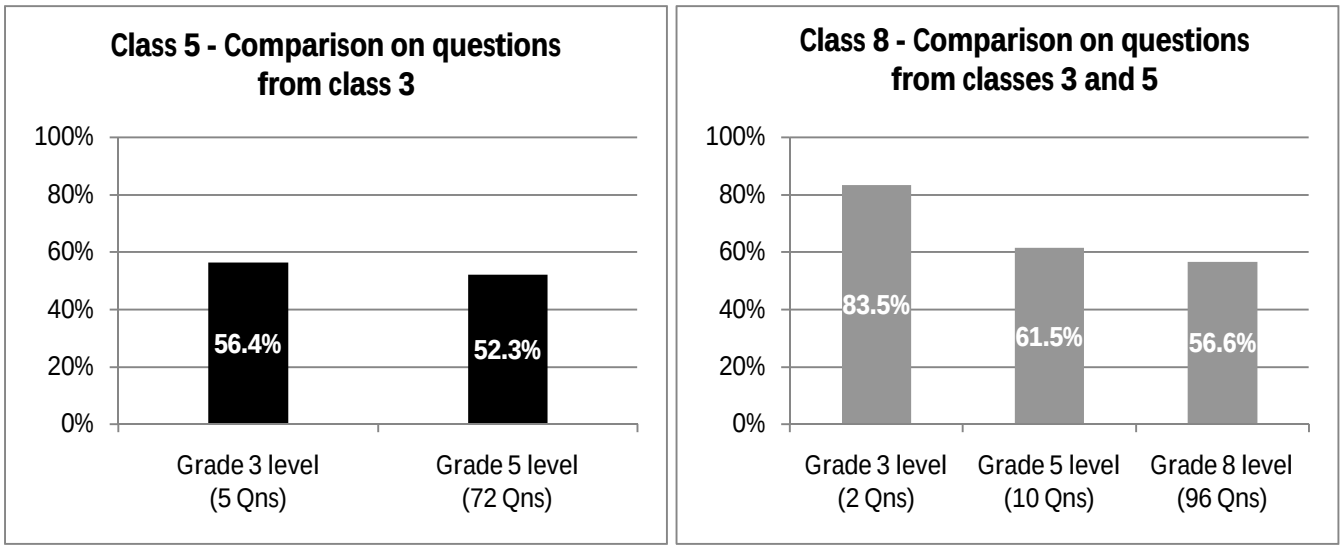


Figure 15: Performance breakup across questions of different levels

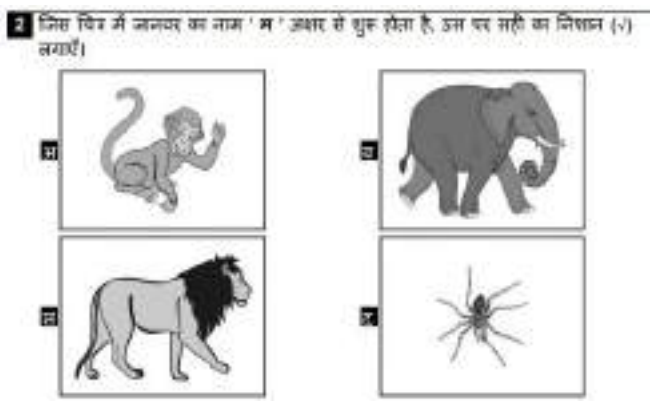
- Grade 5 students were tested on 5 items from skills introduced at grade 3. As can be seen from the graph, for lower grade items, the performance is 58.18% while for the 72 unique items of grade 5 items is 52.13%. The performance on class 3 level items show that students have not mastered the concepts of grade 3.

- At grade 8 level, questions both from grade 3 & 5 level competencies were included in the tools. 2 questions of grade 3 levels were in grade 8. The performance on these questions was 71.75%. 8 while that on 92 unique questions including grades 5 & 8 was around 58.03%. As expected the students of higher grades are seen performing well on questions of lower grade level testing the basic fundamental understanding. 8 questions from grade 5 level were tested across the forms in grade 8. The performance on these questions was found to be around 62.975%. The overall performance of 98 unique questions was found to be around 57.2%. Skills like identifying familiar words, grammar and vocabulary were tested for lower grades as well. The data indicate that the students have better understanding of class 5 concepts. However, they still do not seem to have mastered the concepts.

3.3.3 Analysis of low and high performing questions in Hindi:

In class 3 Hindi, students show high performance on questions testing vocabulary by identifying the image of an object or identifying the word/action from an image or its given meaning. While these questions testing basic vocabulary saw high performance, students also perform well on direct questions based on a reading comprehension where the answer is directly derived from the passage. Only 3 questions show low performance and these are questions involving comprehension of a given passage and inferring the answer. Students seem to struggle with comprehension and inference.

Class 3 **Hindi**



Option	Performance %
A	4.5
B	2.6
C	4.5
D ✓	81.4

Class 3 students have performed 81.4% in this question testing vocabulary of everyday words.

Class 3 Hindi

Option	Performance %
A ✓	70.0
B	9.2
C	6.5
D	4.3

This question tested picture comprehension vocabulary and reading skills. 70.0% students have answered this question correctly.

Class 3 Hindi

नज़रुद्दीन आर भिखारा

एक दिन, नज़रुद्दीन अपनी घर की छत पर, एक छेद की मरम्मत कर रहे थे। उनका काम खत्म होने ही वाला था कि तभी उन्हें नीचे किसी की आवाज़ सुनाई दी। नज़रुद्दीन को नीचे एक आदमी खड़ा दिखाई दिया।

"आपको क्या चाहिए?", नज़रुद्दीन ने पूछा।
"नीचे आओ, तब मैं तुम्हें बताऊँगा", आदमी ने कहा।

नज़रुद्दीन थोड़ा चिड़े, लेकिन वह एक विनम्र आदमी थे। तो, वह सीढ़ियाँ उतरकर नीचे पहुँचे। नीचे पहुँचकर कर उन्होंने पूछा,"आपको क्या चाहिए?"
"क्या तुम बूढ़े भिखारी को कुछ रुपए दोगे?", बूढ़े आदमी ने पुछा।

नज़रुद्दीन ने कहा,"मेरे साथ आइए।" वह फिर से सीढ़ियाँ चढ़ने लगे । वह बूढ़ा आदमी ऊपर तक उसके पीछे गया। जब दोनों छत पर पहुँच गए, तो नज़रुद्दीन भिखारी की ओर मुड़े और कहा,"नहीं"।

20 इनमें से क्या सबसे आखिर में हुआ?
सही जवाब पर सही (✓) का निशान लगाएँ।

A नज़रुद्दीन ने कुछ आवाज़ सुनी।
B नज़रुद्दीन ने उस आदमी की विनती का उत्तर दिया।
C नज़रुद्दीन ने एक आदमी को देखा।
D नज़रुद्दीन छत से नीचे गए।

Option	Performance %
A	16.2
B ✓	23.4
C	16.1
D	26.6

This question was from an unseen text paragraph and students should comprehend and infer answer. Only 23.4% students have attempted this question correctly.

In class 5 Hindi, students perform well on vocabulary questions, sentence construction and comprehension, and reading comprehension questions based on a passage. However, they still show lower performance on questions requiring the students to infer messages from the text.

Class 5 Hindi

6 रिक्त स्थान के लिए उचित विकल्प चुनें ।

'बच्चों, पानी के एक बड़े गोल मटके _____ एक टूटा हुआ टुकड़ा लाओ।'

A के
B को
C का
D की

Option	Performance %
A	8.7
B	12.7
C ✓	60.8
D	6.5

61.0% of students could correctly answer this question. The question checked understanding of basic concepts of

Class 5 Hindi

जब वह किसी इलाके में शिकारी पशुओं का सर्वेक्षण करता है, तो ज़ेबरा एक सतर्क मुद्रा में खड़ा होता है। उसके कान सीधे होते हैं, सिर ऊंचा होता है, और वह चारों ओर घूरता है। जैसे ही कोई शिकारी पशु दिखाई देता है या उसका आभास होता है, ज़ेबरा ज़ोर से रेंकता है। पीछा किए जाने पर, आम तौर पर वे घोड़ों से धीमे भागते हैं, लेकिन अपने बल के कारण वे शिकारी पशुओं से आगे निकल जाते हैं। वे एक ओर से दूसरे ओर होते हुए टेढ़े-मेढ़े दौड़ते हैं, जिसके कारण शिकारी पशुओं के लिए उनका पीछा करना और भी मुश्किल हो जाता है।
ज़ेबरा को अपने निकटतम सम्बन्धियों जैसे घोड़ों और गधों की तरह पालतू नहीं बनाया जा सकता है।

32 परिच्छेद 3 के लिए सही शीर्षक चुनें।

A उत्पत्ति
B भोजन और आवास
C शरीर कि आकृति
D आक्रमण और बचाव

Option	Performance %
A	9.2
B	22.1
C ✓	27.4
D	26.8

This question asked the students to choose an appropriate title for a passage in the text given. Only 26.8% students correctly answered this question.

In class 8 Hindi, Students show high performance on questions testing vocabulary, grammar and identifying the word/action from an image or its given meaning. Students also perform well on direct questions base on a reading comprehension where the answer is directly derived from the passage. Very few questions show low performance in Hindi, and these questions are involving interpretation of pictorial information presented in various forms as Tables, Notices, Tickets, Posters, and Labels etc., seen in real life to derive the answer. Even though students were able to understand synonyms and antonyms a few questions shows low performance.

Class 8 Hindi

7 रिक्त स्थान पर आने वाला उचित विकल्प चुनें।

मैंने _____ टोपी को देखा था।

A दुकान में
B दुकान के लिए
C दुकान को
D दुकान के साथ

Option	Performance %
A ✓	86.5
B	3.8
C	2.4
D	4.7

This question tested appropriate use of prepositions and 86.5% students have answered this question correctly. The

Class 8 Hindi

22 इनमें से कौन-सा शब्द-जोड़ा विलोम है?

A संक्षेप-विस्तार
B मूल्यवान-अमूल्य
C दिक्कत-मुसीबत
D विफल-निष्फल

Option	Performance %
A ✓	24.1
B	26.5
C	19.4
D	25.0

In this question students' were asked to find out a pair of antonyms but only 24.1% could answer this question correctly.

Class 8 **Hindi**

अली और सलीम दोनों अच्छे मित्र थे। अपने व्यापार के लिए, अली को कुछ वर्षों के लिए शहर से बाहर जाना था। उसने सलीम से कहा, " मेरे पास एक बहुत भारी और मूल्यवान लोहे की छड़ है। क्या तुम मेरे लौटने तक उसे अपने पास रख लोगे?" सलीम राज़ी हो गया।

कुछ वर्षों बाद अली लौटकर आया और सलीम से मिलने गया। उसने अपनी लोहे की छड़ के बारे में पूछा। सलीम ने अफ़सोस जताते हुए कहा कि उस लोहे की छड़ को तो चूहे खा गए। अली ने कहा, " कोई बात नहीं, जीवन में कोई भी चीज़ हमेशा के लिए नहीं रहती। तुम अपने बेटे इमरान को मेरे साथ भेज दो। मैं तुम्हारे लिए जो भेंट लाया हूँ, वह उसके हाथों भेज दूँगा।" सलीम ने इमरान को अली के साथ जाने को कहा।

अली इमरान को अपने साथ ले गया और उसे कुछ खिलौने देकर ऊपर के कमरे में खेलने भेज दिया। जब इमरान लौटकर नहीं आया तो सलीम को चिंता हुई। वह अली के घर गया और उसने अपने बेटे के बारे में पूछा। अली ने उत्तर दिया, " रास्ते में एक भयानक घटना घटी। इसके पहले कि मैं कुछ कर पाता, एक चील उसको झपट्टा मार कर ले गई।" सलीम ने पूछा कि ये कैसे संभव है। अली ने कहा, " यदि तुम्हारे यहाँ मेरी लोहे की छड़ को चूहे खा सकते हैं, तो चील लड़के को उठा कर क्यों नहीं ले जा सकती है?" सलीम को अपनी गलती का एहसास हुआ और वह लोहे की छड़ अली को लौटा कर, अपने बेटे को ले आया।

26 इस कहानी में कौन लालची था?

A अली
B सलीम
C इमरान
D तीनों लालची थे

Option	Performance %
A	10.6
B ✓	61.7
C	9.3
D	13.2

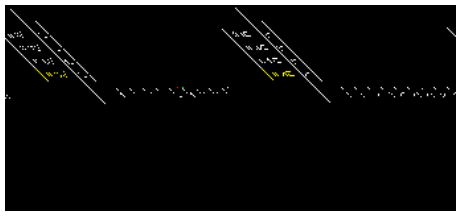
This question was based on unseen text and students have answered this question with inference. 61.7% students have answered this question correctly.

3.3.4 Misconceptions and common errors in Hindi:

Question	Graphs
Class 3 / Question 13 Form B	

13 इनमें से कौन-से शब्द भोलू के लिए सबसे सही हैं?
सही जवाब पर सही का निशान (√) लगाएँ।

अ जवान और असभ्य
ब भोला और मेहनती
स ईमानदार और बातूनी
द बेवकूफ़ और आज्ञाकारी



Option A	Option B	Option C	Option D
8.1%	32.0%	17.0%	26.7%

Explanation: This question tests if students have analyzed the character in the story correctly.

Only 26.75 students answered the question correctly. 32.0% students chose B as the answer. A probable reason is that the word 'भोला'comes as part of the title 'नासमझ भोलू' and the first line of the passage says 'भोलू एक बहुत ही भोला और नासमझ आदमी था'. The students have just gone by this word and not paid attention to the second word 'मेहनती' which does not fit here.

Option D fits the description of भोलू.

Question	Graphs

Class 3 / Question 19 Form C

नज़रुद्दीन और भिखारी

एक दिन, नज़रुद्दीन अपनी घर की छत पर, एक छेद की मरम्मत कर रहे थे। उनका काम खत्म होने ही वाला था कि तभी उन्हें नीचे किसी की आवाज़ सुनाई दी। नज़रुद्दीन को नीचे एक आदमी खड़ा दिखाई दिया।

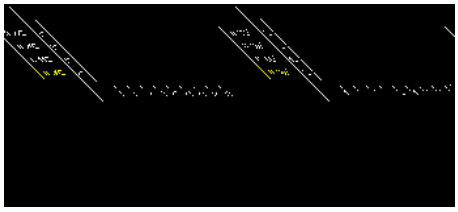
"आपको क्या चाहिए?", नज़रुद्दीन ने पूछा।
"नीचे आओ, तब मैं तुम्हें बताऊँगा", आदमी ने कहा।

नज़रुद्दीन थोड़ा चिड़े, लेकिन वह एक विनम्र आदमी थे। तो, वह सीढ़ियाँ उतरकर नीचे पहुँचे। नीचे पहुँचकर कर उन्होंने पूछा,"आपको क्या चाहिए?"
"क्या तुम बूढ़े भिखारी को कुछ रुपए दोगे?", बूढ़े आदमी ने पुछा।

नज़रुद्दीन ने कहा,"मेरे साथ आइए।" वह फिर से सीढ़ियाँ चढ़ने लगे । वह बूढा आदमी ऊपर तक उसके पीछे गया। जब दोनों छत पर पहुँच गए, तो नज़रुद्दीन भिखारी की ओर मुड़े और कहा,"नहीं"।

19 नज़रुद्दीन ने उस आदमी को छत पर क्यों चढ़वाया?
सही जवाब पर सही (√) का निशान लगाएँ।

अ उसे कुछ रुपए देने के लिए
ब छत की मरम्मत में मदद लेने के लिए
स अकेले में साथ पाने के लिए
द उससे बदला लेने के लिए



Option A	Option B	Option C	Option D
22.2%	20.9%	11.5%	30.3%

Explanation: This question tests if students have understood and comprehended the passage.

Only 30.3% students answered correctly. Around 22.0% students chose A as the answer. The students have probably gone by only the statements in the story and have not understood the crux.

The passage mentions that the beggar called Nasruddin down to ask for money and then Nasruddin called him up and once they reached the top, he said, 'No I will not give you money'.

Question	Graphs

Class 3 / Question 7 Form C and Class 5/ Question 16 Form C

7 खाली जगह पर आने वाले उचित शब्दों पर सही का निशान (√) लगाएँ।

'हमारी कक्षा पिकनिक पर _____।'

अ जा रही है
ब जा रही हैं
स जा रहे हैं
द जा रहे है

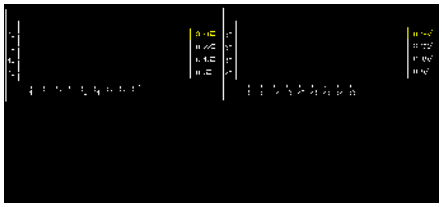
Class 3:

Option A	Option B	Option C	Option D
46.1%	22.2%	15.2%	5.5%

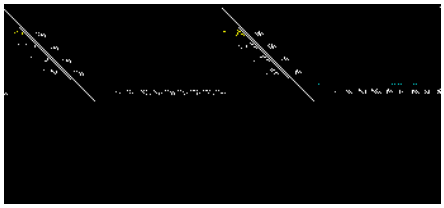
Class 5:

Option A	Option B	Option C	Option D
52.4%	21.7%	10.0%	4.7%

Class 3:



Class 5:



Explanation: This question tests if students can identify the form of the noun (कक्षा(and select an appropriate singular or plural verb to complete the sentence correctly.

They need to understand that here the noun 'कक्षा' is a collective noun, and the whole group is being referred to as a single entity. Hence a singular verb should be used. 'रहीहै' is the appropriate singular verb that would be used in this context. हैं is used for plural nouns and cannot be used here.

Over 45.0% students answered the question correctly. However, 22.2% students chose B as the answer. A probable reason is that the understanding of the usage has not developed in the students. Another reason could be that students are treating कक्षा as plural given that many students are there in one class.

The same question was also asked in class 5 and a similar pattern was observed with around 22.0% students choosing option B.

The IRC for both the classes show that the number of students choosing option A increases as the marks increase. Option B is selected by almost same number of students across marks.

Question	Graphs

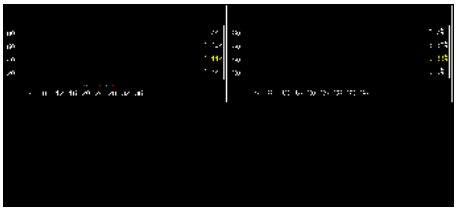
Class 5 / Question 20 Form A

20 रिक्त स्थान पर आने वाला उचित विकल्प चुनें।

जो विद्यालय में पढ़ाते हैं, उन्हें _____ कहते हैं।

A रसोइया
B विद्यार्थी
C अध्यापक
D कुम्हार

Option A	Option B	Option C	Option D
7.3%	30.1%	44.7%	5.4%



Explanation: This question tests if students can complete the sentence with a word that fits the context.

Around 45% students answered correctly. 30.1% students chose B as the answer. They have probably not understood the statement correctly which asks, 'जो विद्लालय में पढ़ाते हैं' and not 'जो विद्लालय में पढ़ते हैं'.

Question	Graphs

Class 5 / Question 27 Form A

अकबर-बीरबलः भगवान की गलती

एक बार जहाँपनाह अकबर ने बीरबल से कहा कि इस दुनिया में भगवान ने बहुत सारी गलतियाँ की हैं। चलो हम उन्हें एक काग़ज पर लिखें, जिससे भगवान के यहाँ जाने पर शिक़ायत कर सकें।

बीरबल ने कहा- "जहाँपनाह भगवान ने जो भी किया है वह सही किया है।"

फिर भी राजा की आज्ञा से वे उनके साथ कागज़-कलम लेकर ग़लतियाँ ढूँढने निकल पड़े। सबसे पहले उन्हें तरबूज़ की एक बेल दिखाई पड़ी जिस पर बड़े-बड़े तरबूज़ लगे थे।

बादशाह बोले- "बीरबल पहली गलती लिखो कि इतनी पतली और कमज़ोर डाल पर इतने बड़े-बड़े भारी-भरकम तरबूज़ लगे हैं।"
वहीं पर पास के एक बगीचे में आम के पेड़ लगे थे।

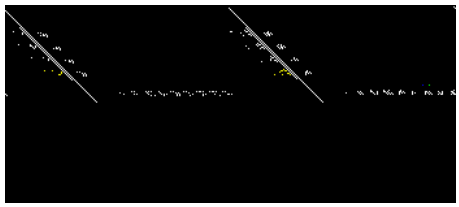
अकबर बोले- "बीरबल दूसरी गलती यह कि इतनी मोटी डाल पर इतने छोटे-छोटे आम लगे हैं।

बीरबल चुपचाप लिखने लगे। फिर अकबर बोले- "बीरबल मैं बहुत थक गया हूँ और अब मेरा आराम करने का जी कर रहा है।"

बीरबल ने वहीं आम के पेड़ के नीचे एक कपड़ा बिछा दिया, बादशाह अकबर वहीं आराम से लेट गए और झपकी लेने लगे। तभी एक आम पट-से उनकी नाक पर आ गिरा और वे हड़बड़ाकर उठ बैठे और गुस्से से बोले- "बीरबल इस पेड़ को अभी काटकर फेंक दो।"

बीरबल बोले- "जहाँपनाह, भगवान जो भी करता है अच्छे के लिए ही करता है। यह तो एक छोटा-सा आम ही था, लेकिन इसकी जगह अगर पेड़ पर तरबूज़ लगा होता, तो आप का क्या हाल होता?"

तब अकबर की समझ में आया और वे बोले- "हाँ बीरबल, तुम बिलकुल ठीक कह रहे हो।"



27 'तब अकबर की समझ में आया।'

यहाँ 'तब' से क्या अर्थ हो सकता है?

A जब आराम करते समय अकबर की नाक पर आम गिर पड़ा।
B जब अकबर ने पतली-सी बेल पर भार-भरकम तरबूज देखे।
C जब अकबर बीरबल के साथ भगवान की गलतियाँ खोजने निकले।
D जब अकबर ने सोचा कि आम की जगह तरबूज होता, तो क्या होता।

Option A	Option B	Option C	Option D
31.4%	14.7%	12.8%	30.0%

Explanation: This question tests if students have comprehended the last three lines in the passage.

Only 30.0% students answered the question correctly. 31.4% students chose A as the answer. The students have probably gone by just the statement and not understood its meaning.

In the third last line, Birbal says that had it been a melon instead of a mango, then what would have happened? 'Then' Akbar realized that what Birbal is saying is correct.

Students may have related 'then' to an event which Akbar was lying down to rest under the mango tree.

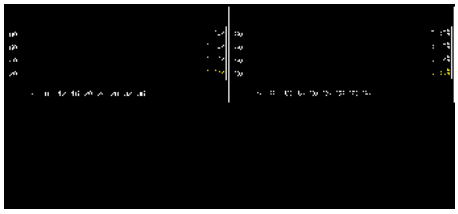
Question	Graphs

Class 5 / Question 6 Form C

6 नीचे दिए वाक्य में ' उत्सुक ' शब्द के स्थान पर आने वाला कोई दूसरा शब्द चुनें।

जब रश्मि दीदी ने कहा कि उनके पास हमें अचंभित करने वाली चीज है तो हम जानने को उत्सुक हो गए।

A प्रसन्न
B धीर
C संतुष्ट
D उत्तेजित



Option A	Option B	Option C	Option D
30.6%	10.2%	12.0%	35.5%

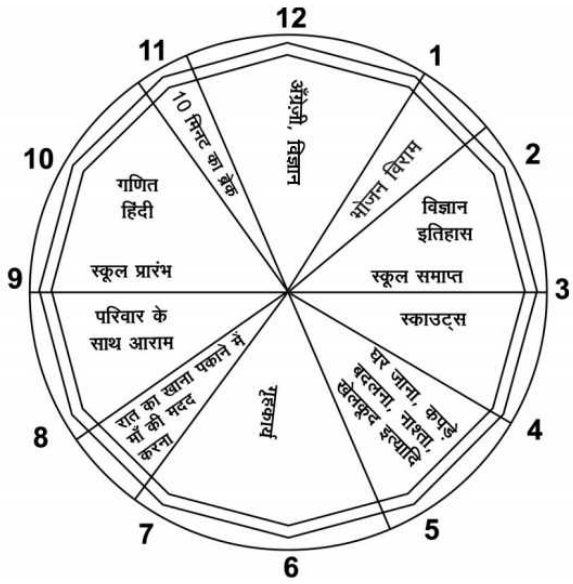
Explanation: This question tests if students can replace a word with a synonym based on the context.

Only 35.5% students answered correctly. Over 30.0% students chose option A as the answer. A probable reason is that children usually feel happy when a surprise is given to them and hence students have gone for A.

Here, the context is of getting excited to see something than being happy.

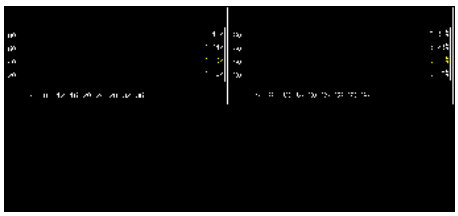
Question	Graphs

Class 8 / Question 30 Form A



30 इस जानकारी से पता चलता है कि रौनक अपने परिवार के साथ आराम करने के बजाय पढ़ने में_____ समय बिताता है।

A काफ़ी
B सबसे ज़्यादा
C ज़्यादा
D कम



Option A	Option B	Option C	Option D
41.5%	24.1%	19.8%	10.8%

Explanation: This question is based on a timetable and test if students can comprehend the information and answer this question.

The question here involves comparing the time spent by Ronak on two different activities during the day. In the blank, a comparative word has to come. Only 19.8% students answered the question correctly.

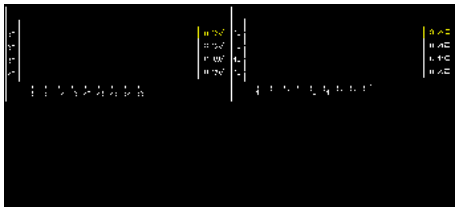
Over 40.0% students chose A as the answer. They have probably understood the timetable correctly and that Ronak spends more time in studying, but they don't realise that काफ़ी is not a comparative word. Option C ज़्यादा is a word which conveys the same meaning but in a comparative form.

Question	Graphs

Class 8 / Question 22 Form B

22 इनमें से कौन-सा शब्द-जोड़ा विलोम है?

A संक्षेप-विस्तार
B मूल्यवान-अमूल्य
C दिक्कत-मुसीबत
D विफल-निष्फल



Option A	Option B	Option C	Option D
24.1%	26.5%	19.4%	25.0%

Explanation: This question tests if students can find the pair of opposite words.

Only 24.1% students answered correctly. 26.5% students chose B as the answer. They have probably selected B because of the word 'अमूल्य'. 'अ' as a prefix is used in many words to give it a negative connotation. Probably students have gone by this without realizing that मूल्यवान and अमूल्य, both mean precious.

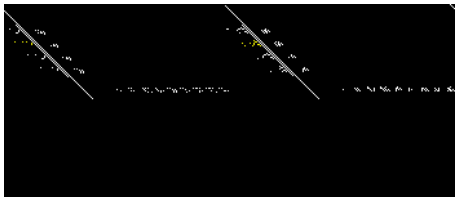
Question	Graphs

Class 8 / Question 15 Form A

15 कौन सा विकल्प नीचे दिए गए दोनों वाक्यों को एक वाक्य में सबसे अच्छी तरह जोड़ता है ?

स्मिता अच्छा लिखती है। स्मिता अच्छा गाती भी है।

A स्मिता अच्छा लिखती है और स्मिता अच्छा गाती भी है।
B स्मिता अच्छा लिखती और गाती भी है।
C स्मिता लिखती और गाती दोनों अच्छा है।
D स्मिता लिखती और गाती है।



Option A	Option B	Option C	Option D
30.8%	32.6%	20.2%	13.1%

Explanation: This question tests if students can join two sentences in the best possible manner, without changing the meaning.

Only 32.6% students answered the question correctly. 30.8% students chose A as the answer. They have combined the two statements with 'and'. In textbooks, students are taught that to combine, use 'add'.

Here, the best way to combine is option B.

Students choosing option C have put 'अच्छा'in the end as they may be feeling that since it comes in both the sentences, it has to be placed at the end.

3.3.5 Learning benchmarks at different proficiency levels

State Benchmark of Hindi Achievement: Class 3

Low Benchmark (Students at or above 25 percentile)

- Students can identify the picture of the animal based on the description given
- Students can identify the first letter for the object shown in the picture
- Students can identify the name of an object seen regularly in daily life from the shown picture
- Students can identify the picture of the animal given its name
- Students can identify the name of the part of the body shown in the picture
- Students can identify the name of the animal shown in the picture

Intermediate Level (Students at or above 50 percentile)

- Students can identify explicitly stated information from the first 3-4 sentences of the passage
- Students can fill in the blank to complete the spelling of the shown object with the first letter
- Students can identify the correct contextual word to complete a sentence
- Students can identify an explicitly stated fact from the first line of the passage
- Students can identify the correct spelling of the word given
- Students can match the profession of a person to the place of working
- Students can write the missing letter in a two lettered spelling for the picture shown
- Students can identify the mood of the sentence and fill the blank with the appropriate word
- Students can write the first letter of the name of the animal shown to complete the spelling
- Students can identify the word that has the same letters as the given word

High Benchmark (Student at or above 75 percentile)

- Students can read and comprehend information presented in a picture story
- Students can comprehend the passage and draw conclusions from it
- Students can identify the profession based on the picture shown
- Students can identify the pair of antonyms
- Students can comprehend the passage and draw conclusions from it
- Students can rearrange the given 3 letters to form a meaningful word.
- Students can identify explicitly stated information from the passage
- Students can read and comprehend information presented in a picture story
- Students can rearrange the given 3 letters to form a meaningful word.
- Students can rearrange 6 words given to form a grammatically correct and meaningful sentence.

Advanced Benchmark (Student at or above 90 percentile)

- Students can write a meaningful sentence using the given word.

State Benchmarks of Hindi Achievement

Hindi | **3rd Class**

District	Percentage of Students Above State Benchmarks	Low Benchmark	Intermediate Benchmark	High Benchmark	Advanced Benchmark
GURGAON	10.2 21.3 29.2 22.2 17.1	90%	69%	39%	17%
MAHENDRAGARH	11.1 21 30.9 17.3 19.7	89%	68%	37%	20%
SIRSA	13.2 27.8 23.8 16.9 18.3	87%	59%	35%	18%
FARIDABAD	13.6 23.5 29.9 20.2 12.8	86%	63%	33%	13%
JIND	14.1 26.5 28.6 18.2 12.6	86%	59%	31%	13%
JHAJJAR	14.7 20.1 24.9 19.2 21.1	85%	65%	40%	21%
MEWAT	17.3 19.6 29.2 18.2 15.7	83%	63%	34%	16%
KAITHAL	18.6 24.7 30.7 16.2 9.8	81%	57%	26%	10%
SONIPAT	18.9 24.6 26.6 17.3 12.6	81%	57%	30%	13%
REWARI	20 23.3 27 18.6 11.1	80%	57%	30%	11%
HISAR	20.4 19.7 24.9 16.4 18.6	80%	60%	35%	19%
BHIWANI	22.9 22.9 24.1 15.5 14.6	77%	54%	30%	15%
FATEHABAD	24.7 28 21.3 12.8 13.2	75%	47%	26%	13%
KARNAL	27.2 27 20.8 13.5 11.5	73%	46%	25%	12%
KURUKSHETRA	27.3 26.4 26 13.8 6.5	73%	46%	20%	7%
ROHTAK	27.6 29.6 25.7 11.3 5.8	72%	43%	17%	6%
PANIPAT	28.8 22.3 20.7 12.9 15.3	71%	49%	28%	15%
PANCHKULA	30.4 28.6 22 10.9 8.1	70%	41%	19%	8%
AMBALA	32.5 28.4 24.1 9.8 5.2	68%	39%	15%	5%
PALWAL	34.7 28.3 21.3 9.8 5.9	65%	37%	16%	6%
YAMUNANAGAR	43.8 24.9 18.9 8.3 4.1	56%	31%	12%	4%

0 20 40 60 80 100

Legend:

- Percentage of students at or above **Advanced** Benchmark.
- Percentage of students at or above **High** Benchmark.
- Percentage of students at or above **Intermediate** Benchmark.
- Percentage of students at or above **Low** Benchmark.
- Percentage of students **below Low** Benchmark.

State Benchmark of Hindi Achievement: Class 5

Low Benchmark (Students at or above 25 percentile)

- Students can identify the name of an object by seeing the picture
- Students can identify an animal by the description given
- Students can identify a fruit from a given picture and knows the correct spelling
- Students can identify the name of a spice used in daily life from a given picture

Intermediate Level (Students at or above 50 percentile)

- Students can fill the blank with the appropriate preposition
- Students can identify the correct pronoun in context
- Students can understand the mood of a sentence and fill the blank with a context appropriate word
- Students can join two sentences such that they form a meaningful sentence
- Students can identify explicitly stated information from the first 3-4 sentences of the passage
- Students can fill a blank with the correct tense of the verb used for a given context
- Students can identify the mood of the sentence and fill the blank with the appropriate word[15]
- Students can identify the word which has the same starting sound as the word for a given picture
- Students can match the profession of a person to the place of working
- Students can identify an explicitly stated fact from the first line of the passage
- Students can fill a blank with one word for a given sentence
- Students can identify a synonym for a word based on the context of a sentence[15]
- Students can match a given sentence to a picture which depicts the sentence
- Students can identify a sentence which has the correct order of words
- Students can fill the blank with the correct spelling of a word
- Students can match a given sentence to a picture which depicts the sentence

High Benchmark (Student at or above 75 percentile)

- Students can analyse the characteristic trait of a person based on the description given
- Students can identify the opposite for a word based on the context of the sentence.
- Students can identify a grammatically correct sentence out of 4 options
- Students can identify an explicitly stated fact from the first line of the passage
- Students can identify an explicitly stated fact from the passage
- Students can identify a sentence which is grammatically complete and correct
- Students can rearrange given words to form a meaningful sentence[15]
- Students can complete a sentence by understanding the mood and using a conjunction appropriate to the context.
- Students can identify the question to be asked in a dialogue, for a given answer

[15] Based on the grade 3 level skill

- Students can interpret 2-3 lines from a passage and draw a conclusion
- Students can identify a trait of a character from a given sentence/situation
- Students can identify the sentence which has an incorrectly spelt word
- Students can identify a sentence which is grammatically complete and correct
- Students can identify an explicitly stated fact from a passage
- Students can identify the profession of a person based on the description provided[15]
- Students can read information given on a wrapper and identify the information required to answer
- Students can identify the meaning of a given word
- Students can interpret the traits of the characters in the story.

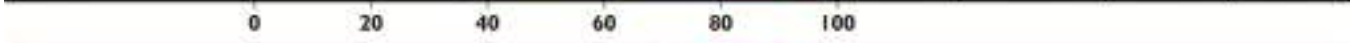
Advanced Benchmark (Student at or above 90 percentile)

- Students can sequence a series of events in the correct order
- Students can sequence the dialogues in a conversation in the correct order
- Students can read and compare two different wrappers.
- Students can find a synonym for a given word
- Students can comprehend a passage and draw conclusion from the same.

State Benchmarks of Hindi Achievement

Hindi | **5th Class**

District	Percentage of Students Above State Benchmarks	Low Benchmark	Intermediate Benchmark	High Benchmark	Advanced Benchmark
MAHENDRAGARH	10.4 18.8 37.5 22.8 20.5	90%	71%	43%	21%
GURGAON	14.8 26.8 23.1 18.4 16.9	85%	58%	35%	17%
REWARI	15.1 21.6 22.8 18.9 21.6	85%	63%	41%	22%
HISAR	15.7 20 27.3 19.3 17.7	84%	64%	37%	18%
PANIPAT	16.3 22.3 25.2 18.7 17.5	84%	61%	36%	18%
SONIPAT	16.7 22 28.8 17.7 14.8	83%	61%	33%	15%
JIND	17.4 20.9 27.4 19 15.3	83%	62%	34%	15%
KAITHAL	17.8 27 29.3 14.1 11.8	82%	55%	26%	12%
FATEHABAD	18.8 18.5 24.8 19.4 18.5	81%	63%	38%	19%
FARIDABAD	20.2 26.9 26.7 14 12.2	80%	53%	26%	12%
PANCHKULA	21.7 28 29 13.7 7.6	78%	50%	21%	8%
ROHTAK	22.9 31.2 29.4 11.8 4.7	77%	46%	17%	5%
JHAJJAR	23 18.7 21.1 16 21.2	77%	58%	37%	21%
KARNAL	24.3 26.5 26.7 14.1 8.4	76%	49%	23%	8%
KURUKSHETRA	28.5 29.2 24.7 11.5 6.1	72%	42%	18%	6%
MEWAT	29.8 18.6 23.7 13.3 14.6	70%	52%	28%	15%
AMBALA	30 30.7 24.5 10.2 4.6	70%	39%	15%	5%
BHIWANI	32.5 25.9 18.6 12.4 10.6	68%	42%	23%	11%
YAMUNANAGAR	32.7 30.2 22.4 9.8 4.9	67%	37%	15%	5%
PALWAL	33.6 23.3 22.1 12.8 8.2	66%	43%	21%	8%
SIRSA	35.1 26.6 18.8 11.8 7.7	65%	38%	20%	8%



Legend:

- ■ Percentage of students at or above **Advanced** Benchmark.
- ■+■ Percentage of students at or above **High** Benchmark.
- ■+■+■ Percentage of students at or above **Intermediate** Benchmark.
- ■+■+■+■ Percentage of students at or above **Low** Benchmark.
- ■ Percentage of students **below Low** Benchmark.

State Benchmark of Hindi Achievement: Class 8

Low Benchmark (Students at or above 25 percentile)

- Students can identify the name of a wild animal shown in figure.
- Students can identify people (based on their occupation) who use the given tool.
- Students can identify an occupation based on the given description.
- Students can read time shown in a clock accurately.
- Students can identify an appropriate post-position (परसर्ग) to complete the given sentence.
- Students can analyse a given situation and select the logical action that can follow.
- Students can comprehend and recall facts from a given literary narrative[16].
- Students can identify the name of an insect when given a description of its body part.
- Students can identify a person (based on occupation) when given examples of objects the person makes.
- Students can identify correct verb tense to use in a sentence when given the time reference of an action.
- Students can identify the correct order of words to make a meaningful and grammatically correct sentence.
- Students can comprehend the context in a sentence and complete it with the correct verb[17].
- Students can identify that one missing letter which can be used to complete and form three different meaningful words.
- Students can identify an appropriate post-position for the given sentence.
- Students can identify the pair of antonyms from a given set of words.
- Students can comprehend the context in a sentence and complete it with the correct adjective[16].
- Students can identify the correct adjective that can be used to describe a person's action.
- Students can identify the word with the correct spelling to complete a given sentence.
- Students can identify the name of the sound a frog makes.
- Students can identify the correct common noun to complete a given sentence.
- Students can identify the correct name of the phenomena based on the given description in the sentence.
- Students can identify the name of an insect based on the given picture.
- Students can identify the starting sound of the name of an animal given in a picture and identify another word starting with the same sound.
- Students can analyse characters and situations in a given literary narrative[16].

Intermediate Level (Students at or above 50 percentile)

- Students can describe a common noun.
- Students can identify the tense to use for a verb based on the context.
- Students can comprehend and recall facts from a given literary narrative.
- Students can analyse characters and situations in a given literary narrative.
- Students can compare information provided in a list inside a graphic.
- Students can interpret information provided in a graphic and relate it to prior knowledge.
- Students can identify an adjective with a different meaning from the others.
- Students can identify synonym for the word 'सही' in the given sentence.
- Students can identify the meaning of a given idiom.
- Students can identify a grammatical complete and meaningful sentence.

[16] Based on the grade 5 level skills

[17] Based on the grade 3 level skills

High Benchmark (Student at or above 75 percentile)

- Students can analyse characters and situations in a given literary narrative.
- Students can identify the correct adjective based on the context.
- Students can comprehend and recall facts from a given literary narrative.
- Students can identify the main theme/idea behind a literary narrative.

Advanced Benchmark (Student at or above 90 percentile)

- Students can identify the correct order of words to make a meaningful and grammatically correct sentence.
- Students can comprehend and recall facts from a given literary narrative.
- Students can infer ideas from a literary narrative.
- Students can comprehend and recall facts from a given literary narrative.

State Benchmarks of Hindi Achievement

Hindi | **8th Class**

District	Percentage of Students Above State Benchmarks	Low Benchmark	Intermediate Benchmark	High Benchmark	Advanced Benchmark
GURGAON	11.1 20.2 24.5 21 23.2	89%	69%	44%	23%
REWARI	14.3 23.6 27.7 19.7 14.9	86%	62%	35%	15%
MAHENDRAGARH	14.7 23.5 28.4 19.2 15	85%	62%	33%	15%
BHIWANI	16 23 28.1 19 13.9	84%	61%	33%	14%
PALWAL	16.3 21.5 28.3 17.7 16.2	84%	62%	34%	16%
JIND	17.1 24.1 24 16.9 17.9	83%	59%	35%	18%
ROHTAK	17.2 23.9 27.2 15.6 16.7	83%	60%	32%	17%
FARIDABAD	19.7 28.2 30 13.2 8.9	80%	52%	22%	8%
JHAJJAR	20 25.8 27.1 16 11.1	80%	54%	27%	11%
HISAR	20.6 23.5 26 18.4 13.5	79%	58%	32%	14%
SONIPAT	21 26.1 23.6 15.3 13.8	79%	53%	29%	14%
KURUKSHETRA	21.4 29 23.5 14.8 11.3	79%	50%	26%	11%
PANCHKULA	22.2 25.6 26.2 16.2 9.8	78%	52%	26%	10%
KAITHAL	25.3 27.4 21.7 15 8.6	75%	47%	23%	8%
AMBALA	26.2 28.9 26 12.3 6.6	74%	45%	19%	7%
PANIPAT	26.9 26 23.2 13.1 10.8	73%	47%	24%	11%
FATEHABAD	29.3 25.3 22.6 13.5 9.3	71%	45%	23%	9%
YAMUNANAGAR	31 29.7 24.6 9.5 5.2	69%	39%	15%	5%
KARNAL	38 27.3 21.3 9.3 4.1	62%	35%	13%	4%
SIRSA	38.5 17.6 17.9 11.4 14.8	62%	44%	26%	15%
MEWAT	39.5 23 19.5 8.3 9.8	61%	38%	18%	10%

0 20 40 60 80 100

Legend:

- ■ Percentage of students at or above **Advanced** Benchmark.
- ■+■ Percentage of students at or above **High** Benchmark.
- ■+■+■ Percentage of students at or above **Intermediate** Benchmark.
- ■+■+■+■ Percentage of students at or above **Low** Benchmark.
- ■ Percentage of students **below Low** Benchmark.

3.4 ENGLISH

3.4.1 Analysis of performance in different skills:

- In English also, students lag in 'Understanding information from various forms' in class 5 and 8.
- Reading comprehension is weak across classes
- Class 8 students have performed above 70% in skill 'identifying the names of animals, birds and other objects'.

Table 16: Performance across skills in class 3 English

S.No.	Skill	# questions per test form	Performance
1	Identifies letters and sounds	5	50.8
2	Identifies words for everyday objects, animals, etc.	8	54.5
3	Uses grammar concepts correctly	7	36.4
4	Identifies explicit and implicit details and ideas from an unseen passage	4	36.6

Table 17: Performance across skills in class 5 English

S.No.	Skill	# questions per test form	Performance
1	Identifies letters and sounds	3	54.1
2	Identifies words for everyday objects and animals	7	51.1
3	Uses grammar concepts correctly	12	39.3
4	Identifies explicit and implicit details and ideas from an unseen passage	4	37.4
5	Identifies explicit and implicit details and ideas from the given authentic information in form of posters, tables, covers etc.	4	34.1

Table 18: Performance across skills in class 8 English

S.No.	Skill	# questions per test form	Performance
1	Knows names of animals, birds, objects and people	4	72.1
2	Understands grammar concepts	7	44.0
3	Uses words appropriate to the context based on their meanings, opposites gender, number	6	39.2
4	Reads, understands and constructs simple sentences	4	40.8
5	Reads descriptive and narrative texts of 10 -12 sentences and comprehends stated information	10	39.1
6	Understands and infers from written information presented in various forms as Tables, Notices, Tickets, Posters, Labels, etc seen in real life	4	35.4

3.4.2 Analysis of performance of graded questions at different class levels

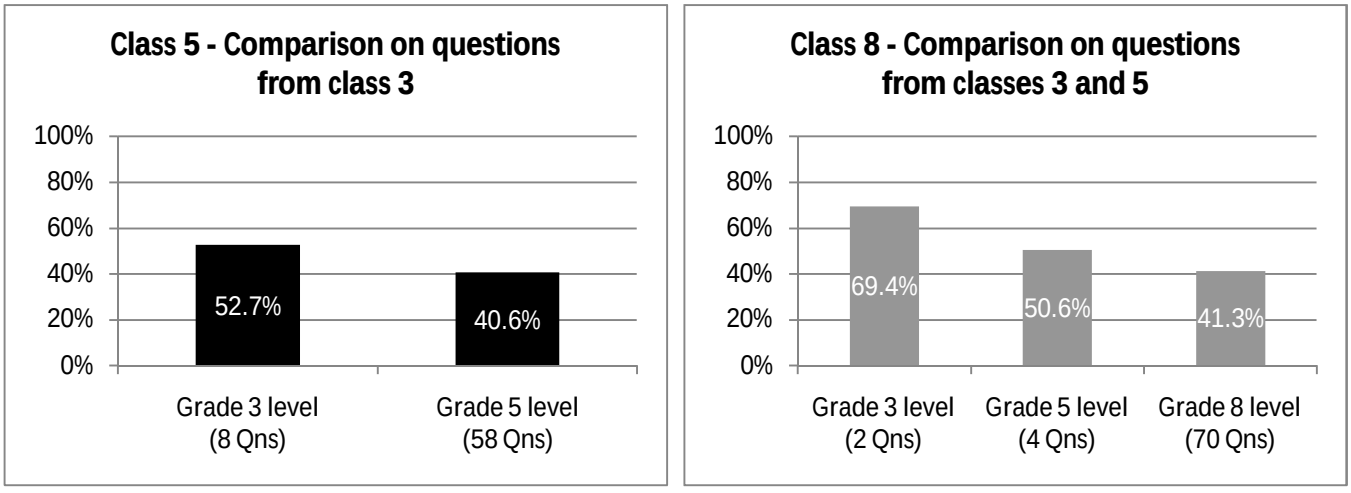


Figure 16: Performance breakup across questions of different levels

- In English, at class 5 level 7 questions from grade 3 have been tested. The overall performance for these questions was 53.2%. For 59 unique questions which were grade 5 specific, the performance was found to be 40.74%. As can be seen from the data students are struggling considerably even at the lower grade skills. There is a scope of learning and improvement on those skills itself.

- In grade 8, 2 items of grade 3 level and 4 items of grade level are tested. The average performance of the 2 items which are of grade 3 level was 69.4% while The average performance of 4 items of grade 5 level was observed to be 52.15%. There were 70 unique questions tested which also included grade 3 questions. Performance on them was 41.25%. As the performance indicates the students of grade 8 have pretty well internalized the grade 3 level concepts. However, they are still seen to be struggling with grade 5 level skills. Skills like identifying objects or animals or birds, understanding grammar concepts, contextual use of vocabulary and sentence construction were tested for lower grade items as well. Students were found struggling in some of these lower grade items as well.

3.4.3 Low and high performing questions in English:

In Class 3 English, students perform well on questions where they have to identify commonly used words or objects they see in daily life. They also perform well when they have to choose a letter or letters matching a sound. However, when the question asks them to identify a complete word, performance shows a substantial drop. This indicates that their learning and comprehension skills in English are limited to identifying images and letters. They do not do as well with word and sentence formation. This is even more clearly highlighted with the questions which show a performance of less than 30%. These are questions where the student has to read a short passage to answer a question - which requires comprehension, and free response questions asking them to write a word or sentence read out to them.

Class 3 English

10 Tick (√) the correct option to complete the sentence below.

The first ball in the picture is big. The second ball is _____.

A small
B tall
C thin
D fat

Option	Performance %
A ✓	63.0
B	11.0
C	7.4
D	7.8

This question tested appropriate use of everyday words in given context. Most Students were able to read, understand and answer this question. Performance on this question is 63.0%.

Class 3 English

6 Tick (√) the correct option to complete the sentence below.

Sunil welcomed Ramesh. They _____ tea.

A has
B have
C had
D be

Option	Performance %
A	14.4
B	39.4
C ✓	23.2
D	8.3

In this question students were asked to put a correct verb based on given context. Performance is only 23.2% which shows most students couldn't understand the concept very well.

In class 5 English, students struggle with concepts like punctuation, tenses and the use of singular-plural. While they perform better on reading comprehension questions which are directly from the text, comprehension and

inference based questions show low performance. Answer response patterns also indicate that students seem to be guessing to answer these questions.

Class 5 English

26 From the story we can say that Johnny is really _____

A a happy boy
B a clever boy
C a boy who wants to have some fun
D a boy who does not like barbers

Option	Performance %
A	24.9
B	26.3
C ✓	23.5
D	14.0

This passage starts with the statement "A boy called Johnny always wanted to show that he was clever" It seems that students have just read the word and answered the question. The passage goes on to recount a story where Johnny plays a trick on a barber but the barber outsmarted him. Performance on this question is 23.5%.

Class 5 English

Option	Performance %
A	14.5
B	24.7
C	21.5
D ✓	28.3

Only 28.3% of Class 5 students correctly answered this question.

In class 8 English, students perform well where they have to identify everyday words or objects. They also perform well on questions testing understanding on basic grammar concepts. However, when they are asked to put words, complete sentences and use grammar concepts based on context there is sudden drop in performance. Also, performance is low in all the questions when it comes to read narrative texts and comprehend.

Class 8 English

11 _____ you leave early, you will reach in time.

A If
B Unless
C So
D Until

Option	Performance %
A ✓	60.5
B	11.9
C	18.7
D	6.5

60.5% students were appropriately able to use conjunctions. The question is a straightforward question and is of lower grade competency level.

Class 8 English

34 How old was Tendulkar when he first played a Ranji Trophy match

A 14
B 15
C 16
D 17

Option	Performance %
A	5.1
B ✓	12.4
C	71.2
D	7.3

This was a passage based question and passage says that, "In 1988, when he was not yet 16, he played his first Ranji Trophy match." Only 12.4% students were able to derive the meaning and choose correct answer.

3.4.4 Analysis of misconceptions and Errors in English:

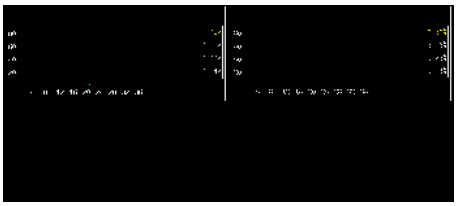
Question	Graphs

Class 3 / Question 5 Form A

5 Tick (√) the correct option to complete the sentence below.

Sachin took my book. I want _____ back.

A it
B its
C him
D her



Option A	Option B	Option C	Option D
30.7%	17.0%	23.7%	14.4%

Explanation: This question tests if students can fill the blank with a pronoun appropriate for the context.

Only 30.7% students answered correctly and 23.7% students chose C as the answer. A probable reason is that students have comprehended the statement differently and they seem to think that we want 'Sachin' back. Since Sachin is a boy's name, students are choosing C as the answer. Another reason could be that students know of him and her as the only pronouns used for beings and not 'It' which is used for non-living things generally.

The IRC shows that the number of students choosing A as the answer increases steeply as marks increase. Low scoring students are choosing option C as the answer.

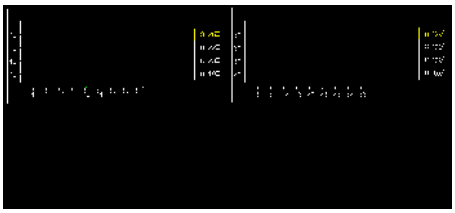
Question	Graphs

Class 3 / Question 17 Form B

THE SNAIL'S HOUSE

One day, a mouse went out for a walk. He saw his friend snail carrying his shell on his back. The mouse asked, "You carry your house on your back?" The snail said, "Yes, I carry it wherever I go."

Hearing this, the mouse said, "You move so much slower because of the weight of your house! See how fast I run! It's because I do not carry my house."



Just then the snail saw a cat coming their way. He told the mouse, "You have to run now! A cat is coming this way." The snail then pulled back his head and body safely into his shell. The frightened mouse ran away quickly.

17 Which word could best describe the snail's house in the story? Tick (√) the correct answer.

A heavy
B big
C beautiful
D cheap

Option A	Option B	Option C	Option D
26.6%	22.8%	23.4%	10.2%

Explanation: The question tests if students can comprehend and identify the characteristic of the snail's house.

Over one-fourth of the students answered the question correctly. 22.8% students chose B as the answer and 23.4% students chose C as the answer. Students have probably not understood the meaning of the sentence 'You move so much slower because of the weight of your house!'

Students may have related 'weight' to 'big' and hence marked option B.

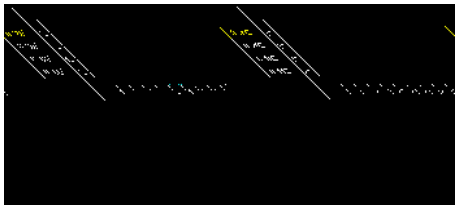
Question	Graphs

Class 5 / Question 22 Form A

22 Choose the option that combines the two sentences given below meaningfully.

I missed the school bus. I woke up late.

A I missed the school bus because I woke up late.
B I missed the school bus and I woke up late.
C I missed the school bus so I woke up late.
D I missed the school bus but I woke up late.



Option A	Option B	Option C	Option D
39.6%	20.2%	18.7%	11.5%

Explanation: This question tests if students are able to combine two sentences meaningfully. 39.6% students answered correctly. Only 20.2% students chose B as the answer. The students have probably learnt in the textbooks that 'and' is used to join two sentences and hence have marked B. They have not realized that in the given case, to join the sentences 'meaningfully', 'because' has to be used as a cause-effect relation is shown here.

The IRC shows that low scoring students chose B as the answer and as the marks increase, more students chose A as the answer.

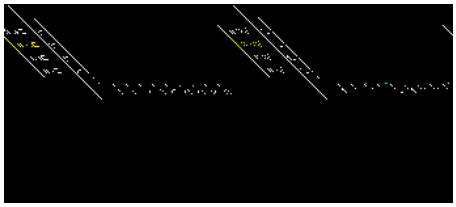
Question	Graphs

Class 5 / Question 1 Form A

1 'fell' and 'tell' sound the same.

Identify the word that sounds the same as 'doll'.

A bell
B call
C let
D fail



Option A	Option B	Option C	Option D
34.4%	43.8%	8.9%	5.0%

Explanation: This question tests if students can identify the word that sounds the same as 'doll'. Close to 44.0%students answered correctly. 34.4% students chose A as the answer. They have probably not understood the question and selected a word that sounds the same as 'fell' and 'tell'.

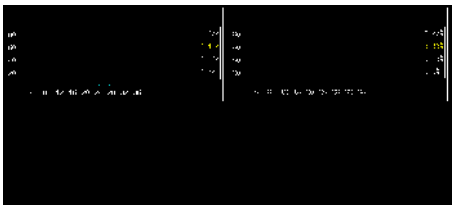
The IRC shows that low scoring students choose A as the answer and as the marks increase, the number of student choosing B goes up and those choosing A goes down. Though A is being chosen by high scoring students also.

Question	Graphs

Class 8 / Question 11 Form A

11 Have you _____ Sonu Nigam's latest song?

A herd
B heard
C heared
D herded



Option A	Option B	Option C	Option D
27.5%	46.4%	18.1%	6.0%

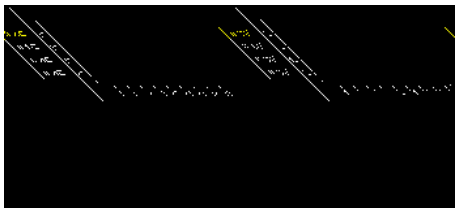
Explanation: This question tests whether students can identify the correct word for the context out of similar sounding options.

Over 45% students answered correctly. 27.5% students chose A as the answer. These students may not be well versed with the meaning of the two words. 'Herd' is a group and 'heard' is to listen. In the given context, 'heard' will fill the blank correctly. Since both 'herd' and 'heard' sound the same, they may be going simply by the sound and not by the meaning.

The IRC shows that students scoring low are choosing A as the answer and as the marks increase, more students choose B as the answer and the students choosing wrong options decreases.

Question	Graphs

Class 8 / Question 22 Form A



22 Which of these does the poster say?

- **A** The highest discount offered on books is 85%.
- **B** The lowest discount offered on books is 85%.
- **C** All books are sold for a discount of 85%.
- **D** A discount is offered only on 85% of the books.

Option A	Option B	Option C	Option D
23.3%	17.3%	28.7%	27.0%

Explanation: This question tests if students have understood the poster and a specific line 'Upton 85.0% off' to answer the question.

Only 23.0% of the students answered correctly. 28.7% students chose C as the option. They have not clearly understood the meaning of the phrase 'Up to 85.0% off' which means that the maximum discount offered is 85.0%.

Due to lack of clarity of the meaning, students have chosen C as the answer.

The IRC points that only very high scoring students choose A as the answer else most of the students choose the wrong options.

3.4.5 Learning benchmarks at different proficiency levels

State Benchmark of English Achievement: Class 3

Low Benchmark (Students at or above 25 percentile)

- Students can identify the name of a vegetable seen in daily life from the picture given
- Students can identify the first letter of the name of the object shown in the picture
- Students can identify the first letter of the picture shown

Intermediate Level (Students at or above 50 percentile)

- Students can identify the picture for a given word
- Students can fill the blank with the correct word for an activity which is done daily
- Students can identify the correctly spelt word out of 4 options
- Students can write the first letter of the name of a fruit shown
- Students can fill the blank with a word that is the opposite of another word based on comparing two images which are different in size
- Students can identify the sentence that depicts the activity shown in a picture

High Benchmark (Student at or above 75 percentile)

- Students can identify the correct verb for plural noun
- Students can identify a sentence where the words have been ordered correctly to form a meaningful sentence
- Students can identify the correct preposition to fill the blank appropriately
- Students can identify the name of the animal with which a character is playing in the image shown
- Students can identify the name of a relation from the description given

Advanced Benchmark (Student at or above 90 percentile)

- Students can identify an explicitly stated fact from a passage
- Students can interpret the passage and draw conclusions from it
- Students can identify the letters which will complete three words to form meaningful words
- Students can identify the word which sounds the same as the given word

State Benchmarks of English Achievement

English 3rd Class

District	Percentage of Students Above State Benchmarks	Low Benchmark	Intermediate Benchmark	High Benchmark	Advanced Benchmark
MAHENDRAGARH	9.2 18.9 29.2 21.7 21	91%	72%	43%	21%
JIND	10.5 19.9 29.4 21.3 18.9	90%	70%	40%	19%
FARIDABAD	10.8 21.8 30.9 19.8 16.7	89%	67%	37%	17%
GURGAON	11.5 23.7 33.8 18.4 12.6	89%	65%	31%	13%
JHAJJAR	13.2 18.1 24.7 21.2 22.8	87%	69%	44%	23%
SIRSA	14.7 22.4 24.1 19.8 19	85%	63%	39%	19%
MEWAT	15.3 10.7 26.6 25.4 22	85%	74%	47%	22%
KAITHAL	18.5 24.9 28.2 17.1 11.2	82%	57%	28%	11%
HISAR	20.1 18.8 27.9 19 14.2	80%	61%	33%	14%
SONIPAT	21.2 27.8 23.4 12.1 13.5	79%	51%	26%	14%
REWARI	21.2 21.3 23.1 17.9 16.5	79%	58%	34%	17%
FATEHABAD	21.9 21.5 24.7 19.2 12.7	78%	57%	32%	13%
BHIWANI	22 23.8 24.8 13.4 16	78%	54%	29%	16%
KARNAL	24.7 25.1 26.3 15.5 8.4	75%	50%	24%	8%
ROHTAK	26.2 34.5 25.3 10.3 3.7	74%	39%	14%	4%
PANIPAT	28.3 19.9 20.7 15.6 15.5	72%	52%	31%	16%
PALWAL	29 24 23.7 15.3 8.1	71%	47%	23%	8%
PANCHKULA	29.5 31.4 24.6 9.2 5.3	71%	39%	15%	5%
KURUKSHETRA	30.3 34 21.1 7.4 7.3	70%	36%	15%	7%
AMBALA	34.8 33.5 20.4 8.1 3.2	65%	32%	11%	3%
YAMUNANAGAR	52.1 26.1 12.8 5.4 3.6	48%	22%	9%	4%

0 20 40 60 80 100

Legend:

- ■ Percentage of students at or above **Advanced** Benchmark.
- ■+■ Percentage of students at or above **High** Benchmark.
- ■+■+■ Percentage of students at or above **Intermediate** Benchmark.
- ■+■+■+■ Percentage of students at or above **Low** Benchmark.
- ■ Percentage of students **below Low** Benchmark.

State Benchmark of English Achievement: Class 5

Low Benchmark (Students at or above 25 percentile)

- Students can identify the first letter of the name of the picture shown[18]

Intermediate Level (Students at or above 50 percentile)

- Students can identify the correct contextual word for the situation described
- Students can identify the profession based on the description given
- Students can fill the blank with a word that is the opposite of another word based on comparing two images which are different in size[18]
- Students can identify the synonym of a given word in a sentence
- Students can identify the correct letters to complete the 6 lettered spelling of the name of the object shown[18]
- Students can identify the part of the body which does he activity described
- Students can identify the correct masculine-feminine pair

High Benchmark (Student at or above 75 percentile)

- Students can identify the word having similar letters to a given word
- Students can identify the synonym of a given word in a sentence
- Students can identify the correct contextual word in a sentence[18]
- Students can identify the correct contextual word for the situation described
- Students can identify the letters which will complete three words to form meaningful words
- Students can identify the antonym of a given word in a sentence
- Students can identify the correct gender for which a pronoun has been used in the sentence[18]
- Students can identify the correct conjunction to join two given sentences meaningfully
- Students can understand the rules of grammar for capitalization of nouns.
- Students can comprehend the sentences given and draw conclusion from it
- Students can identify a letter repeated twice in a word
- Students can read descriptive test and comprehend question based on it
- Students can identify a word rhyming with a given word[18]

Advanced Benchmark (Student at or above 90 percentile)

- Students can identify the correct auxiliary verb to complete a sentence
- Students can identify the correct pronoun for a blank in a given sentence[18]
- Students can identify the correct sequences of sentences to form a coherent paragraph
- Students can identify the correct contextual word to complete a sentence
- Students can identify the correct plural form of the noun in the sentence
- Students can read information presented in a poster and answer question based on it
- Students can identify the correct pronoun to replace a set of words in a sentence

[18] Based on the grade 3 level skills

State Benchmarks of English Achievement

English 5th Class

District	Percentage of Students Above State Benchmarks	Low Benchmark	Intermediate Benchmark	High Benchmark	Advanced Benchmark
MAHENDRAGARH	9.8 15.4 19.6 23.6 31.6	90%	75%	55%	32%
REWARI	13.1 17.8 27.6 19.5 22	87%	69%	42%	22%
HISAR	13.2 19 23.9 22.2 21.7	87%	68%	44%	22%
GURGAON	14.9 23.5 35.3 18 8.3	85%	62%	26%	8%
JHAJJAR	15.8 17.8 23.9 20.4 22.1	84%	66%	43%	22%
KAITHAL	16.8 26 29.4 17.1 10.7	83%	57%	28%	11%
JIND	16.8 17.4 25.9 21 18.9	83%	66%	40%	19%
FATEHABAD	17.1 19.6 28.5 19.6 15.2	83%	63%	35%	15%
FARIDABAD	20.4 25.4 29.8 13.6 10.8	80%	54%	24%	11%
SONIPAT	22.2 24.1 28.9 12.6 12.2	78%	54%	25%	12%
PANIPAT	22.4 23 22.2 18.2 14.2	78%	55%	32%	14%
KARNAL	22.6 23.8 24 17.1 12.5	77%	54%	30%	13%
ROHTAK	22.7 31.6 27.7 11.9 6.1	77%	46%	18%	6%
BHIWANI	23.1 28.5 24.7 12.2 11.5	77%	48%	24%	12%
PANCHKULA	27.2 30.8 27.8 9 5.2	73%	42%	14%	5%
SIRSA	27.5 23.1 26.3 15.1 8	73%	49%	23%	8%
MEWAT	29.7 15.5 20.3 21 13.5	70%	55%	35%	14%
PALWAL	30.2 23.4 15.9 15.4 15.1	70%	46%	31%	15%
KURUKSHETRA	30.7 35.2 19.3 8.5 6.3	69%	34%	15%	6%
AMBALA	34.2 31.6 22.1 8.1 4	66%	34%	12%	4%
YAMUNANAGAR	38.3 30.2 19 8.1 4.4	62%	32%	13%	4%

0 20 40 60 80 100

Legend:

- Percentage of students at or above **Advanced** Benchmark.
- Percentage of students at or above **High** Benchmark.
- Percentage of students at or above **Intermediate** Benchmark.
- Percentage of students at or above **Low** Benchmark.
- Percentage of students **below Low** Benchmark.

State Benchmark of English Achievement: Class 8

Low Benchmark (Students at or above 25 percentile)

- Students can read and identify the name of a common fruit/vegetable shown in a picture.
- Students can identify the name of a wild animal shown in a picture.
- Students can identify the first letter of the name of a common object shown in a picture.[19]
- Students can identify the name of a public place shown in a picture.
- Students can recall directly stated information from a passage.

Intermediate Benchmark (Students at or above 50 percentile)

- Students can identify the correct gender-specific pronoun for a singular subject in a given context.
- Students can recall directly stated information from a passage.
- Students can use the correct sequence of days in a week to identify the day after tomorrow of a given day.
- Students can identify the correct subordinating conjunction to use in a given context.

High Benchmark (Students at or above 75 percentile)

- Students can identify the correct gender-specific pronoun for a plural subject in a given context.
- Students can identify the correct action word/phrase for a given context in a sentence.
- Students can identify the correct adjective based on the context given context.
- Students can combine two sentences meaningfully using the appropriate conjunction.
- Students can correctly analyze characters based on situations described in passages.
- Students can identify the appropriate response for a specific question in conversation.
- Students can arrange words correctly to form a meaningful sentence.

Advance benchmark (Students at or above 90 percentile)

- Students can identify the appropriate response for a specific question in conversation.
- Students can identify the correct tense to be used in a sentence.[20]
- Students can analyse the context and use an appropriate antonym to complete a sentence.

[19] Based on the grade 3 level skills

[20] Based on the grade 5 level skills

State Benchmarks of English Achievement

English 8th Class

District	Percentage of Students Above State Benchmarks	Low Benchmark	Intermediate Benchmark	High Benchmark	Advanced Benchmark
GURGAON	11 | 22.6 | 27.5 | 18.9 | 20	89%	66%	39%	20%
MAHENDRAGARH	11.2 | 21.3 | 25.1 | 21.3 | 21	89%	68%	42%	21%
REWARI	12.3 | 23.6 | 28.5 | 18.6 | 16	88%	64%	35%	16%
ROHTAK	13.3 | 25.6 | 28.4 | 18.3 | 14.4	87%	61%	33%	14%
PALWAL	14.7 | 18.3 | 31.4 | 20.6 | 15	85%	67%	36%	15%
JHAJJAR	16.4 | 27.8 | 30.7 | 14.8 | 10.3	84%	56%	25%	10%
HISAR	17.2 | 21 | 27.6 | 18.8 | 15.4	83%	62%	34%	15%
BHIWANI	18.2 | 25.3 | 28.1 | 17.4 | 11	82%	57%	28%	11%
JIND	18.4 | 17.8 | 22.6 | 20.1 | 21.1	82%	64%	41%	21%
FARIDABAD	19 | 24.3 | 29.5 | 15.7 | 11.5	81%	57%	27%	12%
PANCHKULA	19.6 | 30.6 | 30.5 | 12.3 | 7	80%	50%	19%	7%
SONIPAT	20.1 | 23.3 | 26.3 | 15.1 | 15.2	80%	57%	30%	15%
PANIPAT	23 | 24.6 | 23.2 | 15.2 | 13.5	77%	52%	29%	14%
KURUKSHETRA	25.5 | 31.8 | 25.7 | 10.8 | 6.2	75%	43%	17%	6%
AMBALA	26.4 | 35.1 | 26.5 | 8.2 | 3.8	74%	39%	12%	4%
KAITHAL	26.9 | 27.4 | 23.8 | 13.1 | 9.1	73%	46%	22%	9%
MEWAT	28.3 | 21.8 | 19.8 | 16.7 | 13.4	72%	50%	30%	13%
FATEHABAD	28.5 | 21.6 | 21.2 | 15.6 | 13.1	72%	50%	29%	13%
YAMUNANAGAR	33.9 | 32.8 | 19.1 | 9 | 5.2	66%	33%	14%	5%
KARNAL	41.7 | 25.3 | 17.7 | 9 | 6.3	58%	33%	15%	6%
SIRSA	52.7 | 13.5 | 11.5 | 11.5 | 10.8	47%	34%	22%	11%

Legend:

- ■ Percentage of students at or above **Advanced** Benchmark.
- ■+■ Percentage of students at or above **High** Benchmark.
- ■+■+■ Percentage of students at or above **Intermediate** Benchmark.
- ■+■+■+■ Percentage of students at or above **Low** Benchmark.
- ■ Percentage of students **below Low** Benchmark.

3.5 SCIENCE

3.5.1 Analysis of performance of various skills:

- Performance in Science is low across all the skills though more attention is required in 'Understanding and Application of concepts' and 'Experimentation and hypothesis formulation'

Table 19: Performance across skills in class 8 Science

S.No.	Skill	# questions per test form	Performance
1	Knowledge of facts and instruments	21	42.1
2	Understanding and application of concepts	20	34.2
3	Reasoning and analysis	12	38.7
4	Experimentation and hypothesis formulation	7	35.6

3.5.2 Low and High performing questions:

In class 8 science, it is seen that students are performing well on questions testing knowledge about facts. However, when questions ask them apply those facts and concepts, performance drops substantially. Students seem to be struggling in analysing the given information to formulate hypothesis and conclude reasoning.

Class 8 Science

7 कोशिका के आविष्कार में इनमें से किसकी महत्वपूर्ण भूमिका थी?

A चिमटी
B दूरबीन
C सूक्ष्मदर्शी यंत्र
D आवर्धक काँच

Option	Performance %
A	5.9
B	14.5
C ✓	69.0
D	8.0

Performance on this question is 69.0%.

Class 8 Science

42 इनमें से कौन-सी सतह प्रकाश को परावर्तित करेगी?

दर्पण, जल, भूरा कागज़, श्यामपट्ट (ब्लैकबोर्ड)

A केवल दर्पण
B केवल दर्पण और जल
C केवल दर्पण, जल और भूरा कागज़
D सभी - दर्पण, जल, भूरा कागज़ और श्यामपट्ट (ब्लैकबोर्ड)

Option	Performance %
A	27.2
B	32.0
C ✓	17.6
D	17.5

This was an understanding based question and only 17.6% students have answered it correctly.

3.5.3 Analysis of Misconceptions And Common Errors in Science

Question	Graphs

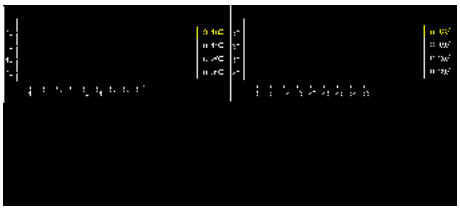
Class 8 / Science/ Question 16 Form A

16 चित्र 1 में एक खाली गिलास सीधा रखा हुआ है। चित्र 2 में वह उल्टा रखा हुआ है।

चित्र 1 चित्र 2

चित्र 1 के गिलास की तुलना में चित्र 2 के गिलास में हवा की मात्रा संभवतः _____।

A चित्र 1 के समान होगी
B ज़्यादा होगी, क्योंकि हवा ऊपर तरफ आसानी से नहीं जा सकती।
C कम होगी, क्योंकि कुछ हवा गिलास से निकल जाएगी।
D ज़्यादा या कम हो सकती है। यह इस बात पर निर्भर करता है कि गिलास को कितना जल्दी पलटा गया।



Option A	Option B	Option C	Option D
18.2%	19.1%	21.0%	39.3%

Explanation: This question tests if students can understand application of concept or air and the space it occupies. Only 18% students have answered this question correctly. 39.0% students believe that when the glass is turned down, the air escapes through it and hence the speed with which the glass is turned down would decide the amount of air retained in the glass put upside down.

The textbooks discuss about air that occupies space. However, for students understanding of such concepts remains limited to a couple of illustrations. Hence, when a real life situation is associated with a scientific concept, they often cannot extend their knowledge to application. Students seem to have various misconceptions as 19.0% and 21.0% students have opted for options B and C respectively. In one the option says that the air will not be able to escape and hence glass B will retain more air. While option C says that turning down the glass will allow air escape.

This clearly explains how students have misconceptions about air and the space it occupies.

As can be seen from the IRC, the misconception is prevalent even in the students scoring decent marks. However, greater number of students scoring higher, are opting for the correct answer option A.

Question	Graphs

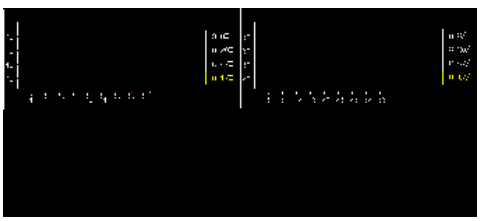
Class 8 / Science/ Question 49 Form A

49 एक सामान्य मानवीय कोशिका में 23 जोड़ गुणसूत्र होते हैं, जिनमें से दो लिंग गुणसूत्र होते हैं।

इनमें से कौन सी कोशिकाओं में लिंग गुणसूत्र होंगे?

i. स्नायु कोशिका
ii. वृषण की कोशिका
iii. अंडाशय की कोशिका

A केवल i
B केवल ii
C केवल ii और iii
D सभी - i, ii और iii



Option A	Option B	Option C	Option D
9.8%	21.4%	44.8%	16.5%

Explanation: This question tests if students can understand and apply the concept of sex chromosomes with clarity or not. While the textbook clearly mentions that each cell has 23 pairs of chromosomes and the 23rd pair is of the sex chromosome, which decides the gender of the child, the students develop this misconception that since it is related to sex decision, they are present only in the sex organs. In question paper form A, only 17.0% students have selected correct answer. 47.6% students believe that they are present only in the sex organs and 20.0% students believe that they are present only in the testes tissues.

Similar performance was observed in form B and C as well.

As we can see from the IRC, the students who are scoring higher scores have selected correct answer option D.

Question	Graphs

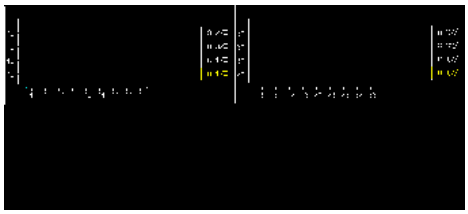
Class 8 / Science/ Question 42 Form C

42 इनमें से कौन-सी सतह प्रकाश को परावर्तित करेगी?

दर्पण, जल, भूरा कागज़, श्यामपट्ट (ब्लैकबोर्ड)

A केवल दर्पण
B केवल दर्पण और जल
C केवल दर्पण, जल और भूरा कागज़
D सभी - दर्पण, जल, भूरा कागज़ और श्यामपट्ट (ब्लैकबोर्ड)

Option A	Option B	Option C	Option D
27.2%	32.0%	17.6%	17.5%



Explanation: This question tests if students knows the facts related to reflections. Only 17.5% students have opted for correct answer option D. While option A mirror and option B mirror and water are selected by 27.2% and 32.0% students respectively.

When the concept of reflection of light is taught to children, often a glossy or reflective surface is shown in the books. That is why students develop a misconception that anything that is not glossy and reflective will not reflect light. That is why many students have selected options having mirror or mirror and water both, which both are reflective surfaces.

However, the very reason for each surface having colour or being seen is because it reflects a part of light.

This question was also asked in class 5 where almost the same % of students selected the correct answer. While the % of students selecting option C decreased, that selecting option B increased.

IRC indicates that even in students scoring high, the misconception is prevalent.

3.5.4 Learning benchmarks at different proficiency levels

State Benchmark of Science Achievement: Class 8

Low Benchmark (Students at or above 25 percentile)

- Students can understand that an open area is the safest outdoor place to be in during an earthquake.
- Students can identify the tool used for harvesting based on its name and/or pictorial representation.
- Students can recognise the damage to buildings, shown in the picture, as caused by an earthquake.

Intermediate Level (Students at or above 50 percentile)

- Students can understand that the weight of an object does not depend on its orientation on the pan of a weighing scale.
- Students can identify the musical instrument based on the description of the mechanism of sound production by it.
- Students can understand the consequences of deforestation on animals, plants and rainfall.
- Students can identify the source of food for a chick embryo growing inside an egg.
- Students can understand that the weight of an object does not depend on its orientation on the pan of a weighing scale.

High Benchmark (Student at or above 75 percentile)

- Students can identify the characteristic that classifies a species of animal as an endemic species.
- Students can recall that gases not useful for the body, in the air breathed in, are breathed out.
- Students can identify the reason behind an increase in the brightness of a camp fire due to fanning.
- Students can identify the parts of an electric bulb that are good conductors of electricity
- Students can identify the main source of energy in the given picture of an ecosystem.
- Students can understand that CNG is the preferred fuel for public transport because it causes less air pollution
- Students can identify the heavenly body based on the given description
- Students can recall the part of the eye on which images are formed.
- Students can apply the definition of combustion to identify its examples.
- Students can identify a material as a metal based on its melting point, lustre, malleability and electrical conductivity.
- Students can recall reasons behind electroplating of iron objects using tin. Can comprehend given information about the mode of functioning of lifts in a multi-storeyed building.

Advanced Benchmark (Student at or above 90 percentile)

- Students can understand why refrigeration keeps food fresh for a longer time
- Students can understand the aim of an experiment based on the linear heat conductivity of metals.
- Students can associate the characteristic property of a fabric with its utility.
- Students can deduce the regions in which a greenhouse would be useful for growing plants, given the working principle of a greenhouse.

- Students can understand why the umbilical cord is not required once the baby is born.
- Students can understand that the presence of the male or the female sex chromosome in the father's sperm determines the sex of the baby.
- Students can identify the gas produced in the reaction between zinc (Zn) metal and hydrochloric acid (HCl) based on its characteristic property.
- Students can recall that travellers can find out directions by recognition of the constellations.
- Students can identify the chemical processes that release energy.
- Students can recall that ductility of a metal is its property of being able to be drawn into long and thin wires
- Students can identify a question that can help distinguish all living organisms from non-living entities.
- Students can recall that lions are an endangered species in India.
- Students can comprehend the meaning of the direction of the arrows in the diagrammatic representation of a food web.

State Benchmarks of Science Achievement

Science — 8th Class

District	Percentage of Students Above State Benchmarks	Low Benchmark	Intermediate Benchmark	High Benchmark	Advanced Benchmark
REWARI	11.1 21.9 27 20 20	89%	67%	40%	20%
PALWAL	12.9 18.4 23 21.4 24.3	87%	69%	46%	24%
BHIWANI	13 23.1 28.8 18.1 17	87%	64%	35%	17%
MAHENDRAGARH	13.2 20.6 24.4 19.2 22.6	87%	66%	42%	23%
JIND	15.1 19.6 22.8 18.6 23.9	85%	65%	43%	24%
JHAJJAR	15.4 27.2 21.4 16.8 9.2	85%	57%	26%	9%
GURGAON	16.2 21 32.4 19.1 11.3	84%	63%	30%	11%
ROHTAK	17.1 28.7 32.2 16.2 5.8	83%	54%	22%	6%
HISAR	18.6 21.5 25.5 16.5 17.9	81%	60%	34%	18%
SONIPAT	19.8 25.3 19.1 16.3 19.5	80%	55%	36%	20%
KAITHAL	21.4 26.7 27.8 13.8 10.3	79%	52%	24%	10%
FARIDABAD	22.7 30.7 27 13.1 6.5	77%	47%	20%	7%
PANCHKULA	23.5 30 28.4 12.6 5.5	77%	47%	18%	6%
PANIPAT	24.5 24.4 26.2 16 8.9	76%	51%	25%	9%
KURUKSHETRA	25.4 31.2 24.4 13.6 5.4	75%	43%	19%	5%
AMBALA	26.4 33.6 27.1 9.4 3.5	74%	40%	13%	4%
YAMUNANAGAR	31.9 30.7 23.2 9.7 4.5	68%	37%	14%	5%
FATEHABAD	34.2 22.8 23 12.8 7.2	66%	43%	20%	7%
MEWAT	38.2 16.4 19.1 8.9 17.4	62%	45%	26%	17%
KARNAL	40.5 26.1 16.1 11.1 6.2	60%	33%	17%	6%
SIRSA	46.1 17.5 13.5 11.3 11.6	54%	36%	23%	12%

0 20 40 60 80 100

Legend:

- Percentage of students at or above **Advanced** Benchmark.
- Percentage of students at or above **High** Benchmark.
- Percentage of students at or above **Intermediate** Benchmark.
- Percentage of students at or above **Low** Benchmark.
- Percentage of students **below Low** Benchmark.

3.6 Analysis of Writing Samples (Free Response Questions)

3.6.1 Background

Free response (FR) questions are the open ended questions through which students can be assessed for their Language acquisition skills. The written responses do not only give insights about students' capacity to comprehend and express, but they also help in influencing the designing of learning, teaching and research and facilitate policy making in the right direction by giving an in depth understanding.

Objectives:

1. To analyze the performance of select students of Haryana Diagnostics on Free Response Questions (FRQs).

2. To analyze writing skills in Hindi and English acquisition on the following points:

    - Legibility and clarity of writing
    - Spelling errors
    - Age-appropriate vocabulary and ability to express
    - Grammar: Sentence construction
    - Effect of dialect

3.6.2 Methodology:

Free response performance in Hindi and English were analyzed for a randomly drawn sample. 5 question papers of each form of class 3 from each district of Haryana were taken. The total number thus was more than 250 papers.

Two types of questions were selected for analysis:

1. Questions where students were tested for the understanding of alphabets/ sounds and letters.

2. Questions where students were tested for their writing and syntax capacities.

3.6.3 Key Insights:

1. Keeping students' age and class-appropriateness in mind, it was observed that the performance in FRQs was not at the expected level. It was seen that the performance of MCQs (Multiple Choice Questions) was better as compared to FRQs (Free Response Questions). This was seen across districts.

2. The average performance of students in questions that tested knowledge of letters was around 65% while those in questions that tested the writing skills was lower for both Hindi and English at 37% and 21% respectively.

3. Legibility and linearity of text was found to be a concern even in higher standards. The concept of good handwriting and spacing between words was seen missing. Linearity in text would refer to the pattern of writing in a straight line.

4. Considerably high number of students were seen skipping the FR questions. The percentage of students skipping FR questions was in the range of 10-40% (10% to 20% are skipping where letter or word has to be written and 20 to 45% are skipping where they have to write sentences). One of the primary reasons for this was the lack of internalization of the rules pertaining to grammar and the inability to express effectively using words. Performance in the skill which tested letters and sounds, was high in comparison to those testing writing skills.more students were seen attempting the question testing words or letters as compared to the writing skills as compared to the skill where they were tested for writing a sentence or word on their own across all the grades.

5. Even in cases where students attempted the question, there were cases of spelling mistakes.

6. Very few students were able to write a complete and a meaningful sentence without any error. A majority of students attempting the question wrote incomplete sentences or sentences with inconsistencies in construction, grammatical usage, coherence and spellings.

7. Students demonstrated very limited creativity in writing. Similarity in ideas and repetitiveness in responses reaffirm the finding. Many students only reproduced words from the question in their answers without actually comprehending the question. In certain cases, students had filled in the answers with completely irrelevant statements/ words. In some cases, some students wrote the Hindi words in English

8. Sentence construction and spelling errors were found across all districts. Students were seen struggling with sentence construction. While students have not been able to show creativity in Hindi expression, writing sentences in accordance to the given words/ pictures, often some of them copied the question in the given place and some also wrote irrelevant answers as can be seen from the examples given herewith.

The above mentioned insights are presented below with specific examples for better understanding. Hindi is the primary language adopted in schools while English is the secondary language. There were certain patterns common to both Hindi and English while in other cases – there were certain patterns particular to English. Both have been elucidated below.

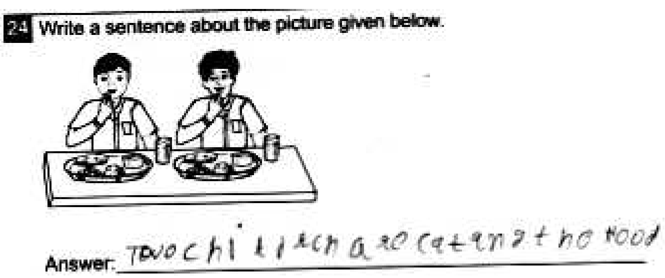
3.6.4 Patterns common for both Hindi and English papers

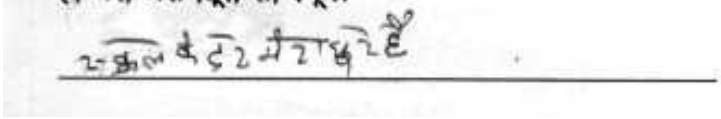
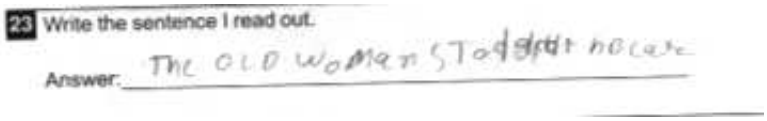
1) Legibility and clarity of writing: Spacing and Orientation

In many cases it was found that space between words in a sentence was missing making it difficult to read and interpret the answers. The orientation of the text was also found to be non-linear.

On analysing the handwriting of students, it was observed that the quality of handwriting still required a lot of improvement. It was evident that a significant number of students found it difficult to write their responses at the allotted location for response.

It was observed that students find it difficult to write in a straight line. A significant number of students find it difficult to maintain the consistent space between letters and words. It was also seen that some students showed varied writing patterns in the question paper. The basic idea of space between words and space between letters seemed not very clear to them.

Class	Question	Description
3		The response shows the absence of spacing between words. The spacing between the letters in words is also not consistent. the lack of spacing is making it difficult to interpret the response.The overall performance for the question was 21.0%. Around 33% students could not attempt the question while around 40% students gave invalid answers.
	Sample: 1 The question requires the student to write a sentence looking at the picture.	

	25 दिए गए शब्दों को क्रम में लगा कर एक वाक्य बनाएँ। है, घर, मेरा ,दूर, से, स्कूल 	The question requires a student to rearrange the words to form a meaningful sentence. It can be seen the student has given a correct response but has made few spelling errors. The text is not spaced out properly making it illegible. The performance in this question was 36%. Around 24.0% students did not attempt the question while around 31.0% students gave invalid answers.
	Sample:2 The question requires the student to rearrange the words and form a meaningful sentence.	
	26 चित्र के बारे में एक वाक्य लिखें। 	The student has made a simple sentence but has left no space between the words. There is considerable scope of creativity in the response. The performance in the question was 33.0% with 32.0% students not attempting the question and 29.0% students giving invalid answers.
	Sample:3 The question requires the student to make a sentence describing the picture.	
3	23 Write the sentence I read out. Answer: 	It can be seen that the text does not follow linearity. Moreover there is unnecessary capitalization in every word. The 'full stop' is missing at the end of the sentence. The performance for this question was 17.0%. Around 40.0% students skipped the question and 35% students gave invalid answers.
	Sample:4 The question requires the student to rewrite a sentence read out orally. The sentence was ' The old woman stopped the car.'	

2) Spelling Errors

Across the sample studied, students were seen to be struggling with correct spellings of words. In many cases, though they gave correct answer or identification, they could not spell the words correctly. Students were unable to write simple and familiar words with correct spellings. It shows that students tend to guess the spellings based on what they hear. The spelling conventions followed in English were also not very well understood. Spelling errors in Hindi included displaced or misplaced "matras", absence of matras and anusvars and replacement of letters.

Class	Question	Description
3	22 नीचे दिखाए गए अंग का नाम खाली जगह में लिखें ।  उत्तर: मारव 22 नीचे दिखाए गए अंग का नाम खाली जगह में लिखें ।  उत्तर: मइ	The question requires the student to spell a very familiar word 'eye'. As it is seen students have not put the proper "chandrabindu". The word "kh" is also been replaced incorrectly by the "ha". The performance in this question was around 66.0%. With around 14.0% students not attempting the question while 20% students giving invalid answers.
	Sample: The question requires the student to spell the word 'eye' shown in the picture.	
	23 Write a sentence using the word 'pencil'. Answer: I have a Pencil	Though the student is able to make a sentence, the spelling of the word 'pencil 'is incorrect. The word pencil is present in the question stem but the student has not been able to copy it properly. The performance in this question was 17.1%.Around 40.0% students skipped the question while 35.0% gave invalid answers.
	Sample:1 The question requires the student to make a sentence from the word ' pencil'	
	24 Write a sentence about the picture given below.  Answer: Boy Eting fat	Students have not been able to relate the words from which a word has been primarily derived or have structural relevance. As seen in this case, the word eating is structurally related to 'eat'. This has been spelt as eting'. The overall performance for the question was 21.0%.Around 33.0% students could not attempt the question while around 40.0% students gave invalid answers.

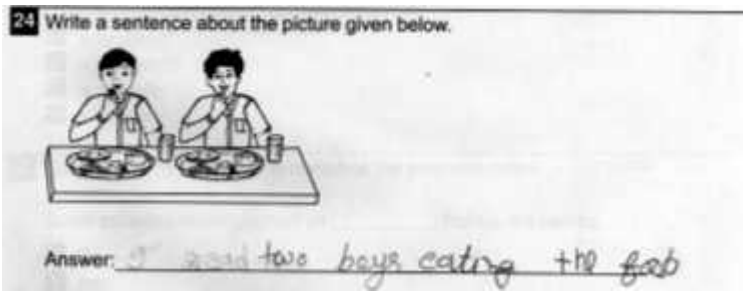
3) Age appropriate vocabulary and capacity to express:

Students were seen struggling at writing a meaningful sentence applying the basic rules of grammar. The variety of responses included fragmented sentences lacking a verb or a subject, choppy or very repetitive sentences, formulaic sentences to even few words.Though it is evident that the students do have the basic thought process, it may not be complete in meaning which gets reflected in the responses. The inability to write a sentence reflects the lack of knowledge of the correct rules of the Hindi and lack of practice on writing skills.

Class	Question	Description
3	25 चित्र के बारे में एक वाक्य लिखें।  मोर, पेड़, सूरज, पहाड़	Students have correctly identified the components in the picture like the peacock, tree, sun and mountains but have been unable to write a sentence on itt. The performance in this question was 32.5%. Around 33.0% students did not attempt the question, while around 29.0% students gave invalid answers.
	Sample 1: The question requires the student to make a sentence describing the picture given	
	26 'बादल' शब्द का प्रयोग करते हुए एक वाक्य लिखें। काले काले बादल	The student has made an adjectival phrase and hasn't been able to elaborate on the idea .The performance in the question was 36.0%. Around 30.0% students were not able to answer the question. Around 27.0% students gave an invalid answer.
	Sample:2 The question requires the student to make a sentence form the word ' बादल'	
3	24 Write a sentence about the picture given below.  Answer: Lunch	As seen here, student has written a single word for food as 'lunch'. The response shows that the student has an understanding of the picture and hence used a very simple and familiar word" lunch" However the student has not been able to construct a sentence capturing the very obvious and visible aspects of the picture. The performance in the question was 16.0%. Around 47.0% students have not attempted the question while 32% students gave an invalid response.
	Sample:3 The question requires the student to make a sentence looking at the picture.	

4) Grammar: Sentence construction

A closer look at the sentence construction pattern revealed responses replete with missing verbs, articles; punctuation marks, lack of subject-verb agreement in gender and number and capitalization of words. The very basic punctuation marks like commas and full stops seem to be prominently missing in sentences. Interestingly, there were sets of papers where identical sentences had the same grammatical errors.

Class	Question	Description
3	24 Write a sentence about the picture given below.  Answer: I saw two boys eating the fish	The sentence constructed lacks capitalization of the subject" Two". The subject verb concord is also absent in the sentence. Thought it is understandable that at class 3 level, students may not be aware to include other punctuation marks, it is expected that they use full stop in the sentences. This shows that students do not seem to follow the basic rules of punctuation, The performance for the question was around 16.0%. 47.0% students have not attempted the question while 32.0% students gave an invalid response.
	Sample:1 The question requires the student to make a sentence looking at the picture.	
	23 Write a sentence using the word 'pencil'. Answer: my Pllllll R	The sentence has an incorrect verb in accordance to the subject 'my pencil'. It also has the usage of a Hindi word 'laal' instead of the word' red'. The word P is capitalized though it is a common noun. The performance for this question. The performance in this question was 17.1%. Around 40.0% students skipped the question while 35.0% gave invalid answers.
	Sample:2 The question requires the student to make a sentence from the word ' pencil'	

5) Influence of local Hindi (dialect)

Hindi and its dialects being the mother tongue for the majority of population in Haryana, and English being a second language, the impact of Hindi on usage of English language is prominently seen**.** The ability to pronounce words or structures is equally important as the knowledge of grammar and vocabulary. The pronunciation problem can be seen stemming up from the interference or the words transferred from Haryanvi or Hindi being spoken. The difference/ gap in the interpretation of sounds gave way to many spelling errors and the words produced have the charateristic pronunciation. It can also been seen that students are seen guessing the spellings.

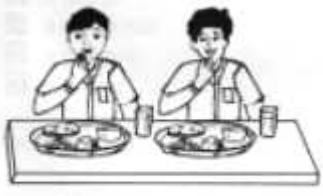
Class	Question	Description
3	23 Write the sentence I read out. Answer: The old woman satop caur	The word 'stop' has been spelt as 'satop' which is due to the strong influence of local dialect. The word car has also been spelt as 'caur'. The performance in this question was around 21.0%. Around 30.0% students did not attempt the question and 37.0% students gave invalid answers.
	Sample:1 The question requires the student to rewrite a sentence read out orally. The sentence was ' The old woman stopped the car.'	

	26 दिए गए शब्दों को क्रम में लगा कर एक वाक्य बनाएं। है, घर, मेरा ,दूर, से, स्कूल मेरा घर स्कूल से दूर है	The question required students to rearrange the words to form a complete sentence. Though the word school has been mentioned in the question stem, the student has mentioned the word "sakool" that reflects the pronunciation in local dialect.Apart from this students are making errors in copying the word given in the question stem. The performance for this question was 38.0%. Around 19.0% students did not attempt the question while 35.0% students gave invalid answers.
	Sample:2 The question requires the student to rearrange the words to form a meaningful sentence.	

3.6.5 Interesting Aspects Observed in English

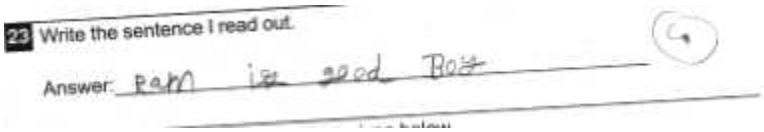
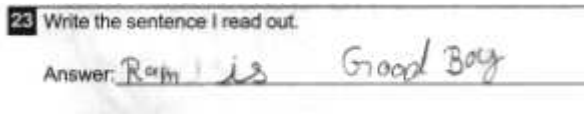
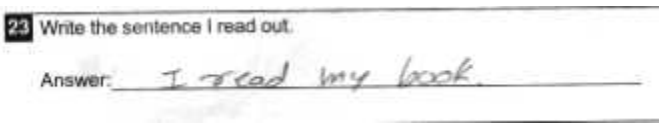
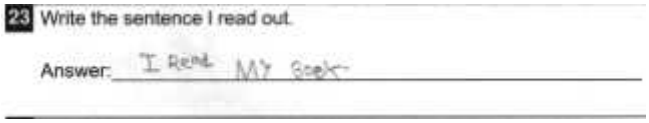
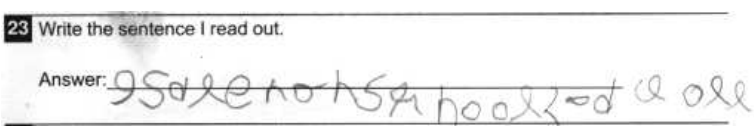
1) Influence of mother tongue

It is observed that students tend to think in a language that they have been exposed to more. In this case the mother tongue is the closest language to which a student has familiarity. Owing to this it can be seen that students are at a very rudimentary level of learning. Learning new words apart from the native language is seen missing.The strong influence of their mother tongue especially Hindi in this case overrides the usage of English words. This has lead the student to think in Hindi and write therby reproduce his/her thoughts in the same language.

Class	Question	Description
3	23 Write a sentence using the word 'pencil'. Answer: my Pencil R	The student has given a response that has usage of both Hindi and English words. The verb are has been wriiten as 'R' while the word for red has been written in Hindi as 'laal'. This reflects students have a tendency to transcribe the thought process basically in Hindi into English.
3	24 Write a sentence about the picture given below.  Answer: Ther Two Boy kana ka Raha Hai.	The student has interpreted the picture correctly however has articulated the same using Hindi.The student has transcribed the sentence in English. It reflects that the basic thought process of students seems to be in Hindi since they do tend to think and are exposed to Hindi primarily, The student here has made a sentence in English using Hindi words. The performance for the question was around 16.0%. 47.0% students have not attempted the question while 32.0% students gave an invalid response.
	Sample:1 The question requires the student to make a sentence looking at the picture.	

2) Conditioned Form of Writing

Students seem to be learning the Hindi only as a subject and not for effectively communicating in real life.Students seem to be struggling with effective expression through Hindi.This can be seen from limited contextual and stereotypical vocabulary or statementsused to express ideas. Errors in spellings and grammar were also observed in the sentences drafted.In several instances students had a tendency to stick to responses that they have been conditioned to give in English.Responses also included certain irrelevant phrases unrelated to the question tested.

Class	Question	Description
3		Ths student was expected to write a sentence based on what they hear. the sentence was 'The old woman stopped the car' Those who were unable to recollect the sentence ended up writing sentences they were familiar withor conditioned. Also, the peculiarity of nonconfirmity to grammar rules, the usage of capital letters intermittently is seen
3		As seen in this one, the sentence is repeated, has the same mistake of an article lacking, the common noun "boy" is in capitals.
3		The sentence though grammatically correct even has a full stop towards the end.
3		Usage of capitals is seen in every word. The same sentence is repeated.
3		The student was expected to reproduce the sentence read out. The student has written an irrelevant phrase making it difficult to decipher the response given by the student.The performance in this question was around 17.0%. 40.0% students did not attempt the question while 34.0% students gave invalid responses.
	Sample:1 The question requires the student to rewrite a sentence read out orally. The sentence was ' The old woman stopped the car.'	

3.6.6 Conclusion:

The analysis shows that students are performing better on questions that involve them to write letters or words in comparison to those questions that involve sentence construction. The analysis of sentence construction reveals there are gaps in **Hindi** acquisition skills namely in spelling construction, basic rules of grammar, syntax, and creative expression. Since these consistencies are at a very nascent stage these can be remediated early.

3.6.7 Possible Recommendations

Students may experience various difficulties in writing in a language due to many reasons. These difficulties may be mild or strong, and vary in their nature and intensity. Teachers need to adopt a student focused approach to help these students get over their difficulties in writing. The aim in equipping students with the knowledge and skill in writing is to enable them to write fluently on a variety of topics for a range of reasons.

Handwriting

The skill of writing legibly though basic and functional is a complex task for beginners in a language. Research has shown that good handwriting skills do translate to better academic achievement. Therefore, it is important to make students proficient in this skill.

Students should be made to understand the importance of the readability of what they write. Teachers should be aware that this is an explicitly taught skill and therefore a learning environment loaded with practice opportunities is key in building this skill. Lack of practice promotes poor handwriting. Research studies support that at least 50 minutes of handwriting per week is essential for progress.

Instruction on how to form upper and lowercase letters should be given so that students can differentiate them better. It is also critical for teachers to instruct good handwriting practices by modelling them. They should demonstrate to students the proper pencil grip, paper position, word position, spacing and letter formation.

Spelling

To ensure that students become competent in spellings, it is important that teachers inculcate the habit of writing practice on a regular basis. On a daily basis, teachers can make flash cards for words or write words on the class board, and ask students to copy the words in their notebook.

To encourage students to develop an interest in words and their spellings, teachers can ask students to maintain a word book. Students should be asked to look up the dictionary and write an unfamiliar word in their wordbook each day. Teachers can randomly choose five students each day and ask them to share their word for the day. If time is a constraint, this can be done as a weekly activity.

Weekly dictation sessions can be conducted to check student improvement levels in correct spelling. These sessions can be made a little more interactive by making students correct each other's spelling by looking at the correct spellings given on the class board.

Another strategy is to give them editing exercises. The teacher can write a short paragraph with a few words spelt incorrectly on the class board. Students should be encouraged to point out the spelling errors in the paragraph.

Punctuation

Confidence in using grammatical rules in terms of punctuation and capitalisation is important for students to be able to express their ideas clearly. Errors in punctuation and capitalisation reflect poor familiarity with a language. Rules regarding usage of period, comma and capitalisation need to be reinforced repeatedly to build the required confidence in students.

Give students a list of simple sentences with punctuation marks (periods, commas) missing and no word with capitalisation. Discuss each sentence with students about the punctuation marks and capitalisation required for the sentence. During such discussions, it is important to emphasize the usage rule for the punctuation, if required. A variant of this exercise is to give students a list of sentences with relevant and irrelevant punctuation marks and ask them to identify the irrelevant ones. Self review and peer review exercises too can be incorporated in classroom activities to strengthen the skills.

Written Expression

Along with good handwriting, good grasp of spelling and punctuation, it is vital that students are aware of good sentence structure. Many students may have difficulty in differentiating between a complete sentence and an incomplete one. Teachers should repeatedly revisit the concept of a complete sentence with the students.

An oral session where students are asked to use complete sentences can provide the setting for practicing written expressions. These sessions can be made engaging by making them into team activities. Teams should challenge each other to complete a partial sentence in as many ways as possible. Exercises to identify complete sentences from a list of complete and incomplete sentences can also provide good practice. Encourage students to use adjectives, adverbs etc. to make their expressions rich and meaningful.

Test Conduction

4 TEST CONDUCTION

Any assessment requires a systematic approach in all its stages for its smooth completion and success. The Test Administration in the Diagnostic Assessment was really a complex exercise. In order to administer the tests across districts, a number of processes such as – collection of enrolment data, identification of location of schools to be tested, spreading awareness among DEEOs/BEEOs/School Principals/Teachers/Students, verification of attendance data, taking care of test material during unseasonal rains etc. were needed to be carried out prior to final test conduction. This chapter describes in details all the steps involved in implementing and carrying out the Diagnostic Assessment in a standardised manner throughout the state.

4.1 PERMISSION

A Permission letter from SCERT was given to the EI to conduct written test of students of class 3, 5 & 8 in the sampled government schools of Haryana. During the Diagnostic survey, government schools had other parallel activities going on such as Board exams and monthly assessments. Care was taken to make sure that there is no conflict between all the scheduled activities by informing the relevant schools and authorities and taking necessary permission well before time. Though it had some impact on the Diagnostic survey in the form of low attendance in few schools but we were able to mitigate most of the issues.

4.2 COLLECTION SCHOOL CONTACT DETAILS

Informing schools about the assessment process, point person for implementation and other relevant details were disseminated to schools well in advance. Also, contact details like name of the principal, telephone numbers of school offices were obtained for the sampled schools from SCERT. In case the schools were not reachable by any other means, it was made sure that they were informed personally and locally.

The schools were informed about the permission to conduct testing in their school by their respective DEEOs. Each evaluator was given contact details of the schools. Prior to administration of tests, schools were contacted and informed about testing so as to ensure no other activity was scheduled during the same time.

4.3 MEETING WITH DEEOS TO DISCUSS DETAILS OF THE FIELD WORK

A meeting of DEEOs and EI team was held at SCERT Gurgaon on 13th February. The objective of this meeting was to make DEEOs aware about this project, introduction of EI team and requesting the required support for the successful completion of the field work.

4.3.1 Appointment/Recruitment of Zonal Managers

As a state, Haryana has 21 administrative districts. To manage the Assessment systematically in all the districts, 5 zones were identified, each zone comprised of 4 to 5 districts. The map below shows the grouping of districts into 5 zones with distinct colour codes.

Figure 17: Zone-wise breakup of Haryana

1 Zonal Manager (ZM) was appointed for each zone to handle overall coordination on field.

ZMs were appointed in each zone based on their educational and professional qualification, hands-on experience in field, past experience of educational / research survey, ability to manage project on their own, willingness to work in rural as well as in urban areas, willingness to travel, proficiency in computers, liaison ability and capacity to recruit, train and manage a large number of field team.

ZM was responsible to recruit field team (including local partner, DC, Evaluators, Field Auditor etc.), Training of Evaluators in each district of his/her allotted zone, making field plan and advance test conduction plan with the help of DC, managing logistics for all districts of zone, making sure testing is happening in a standardised way, daily reporting to the project manager, field auditing, sending data for scanning, look after the invoice and payments of field team.

4.3.2 Identification of Local Partners for field work

In order to implement the project in the field local partners were identified by Zonal manager. Local partners were selected based on their capacity to administer tests in a standardised way across districts with the help of efficient local resources.

While identifying local partners, ZM explored many NGOs, Survey Agencies, Volunteering organizations, social sector professionals etc. and checked their authenticity and ability to drive the project, availability of resources they had and their knowledge of geographic conditions of the area.

To ascertain authenticity of local partners, ZM checked the memorandum of NGO, registration, 3 year's audit report, financial status, their past experience and the details of projects they had implemented, reputation in area, availability of resource with them and finally the willingness and capacity to implement the project.

After long discussion and cross checks, EI finally signed a contract with local partners in 17 districts, out of a total of 21 districts. In remaining 4 districts, ZM hired District Coordinators and evaluators to implement assessments in schools.

4.3.3 Recruitment of District Coordinators

In all, 21 District coordinators were recruited, one for each district. The candidates were identified through local partners, NGOs, advertisements online, personal contacts, Volunteering organizations, B.Ed. colleges in each district. The applications received were screened, followed by telephonic interviews. Shortlisted candidates were given written assignments on planning and project designing. The candidates who successfully cleared this phase were called for face-to-face interview with Zonal Managers for their respective districts and zones.

4.3.4 Recruitment of Evaluators

All Zonal Managers with the help of respective local partners and district coordinators carried out the recruitment of evaluators. The following steps were taken to make a list of suitable candidates who were interested in the project and were willing to work as evaluators:

- Identified through local contacts, advertisement in local job portal etc.
- B.Ed. colleges were contacted to make students available for this study.
- Graduate students were taken from M.Ed., B.Ed., D.Ed., Social Science courses.

Once, the list of 70-120 interested candidates was prepared in each of 21 districts, a rigorous selection process followed. This process is described below:

- An “Aptitude Test” was administered followed by the “Reading Test” for all the candidates
- Reading Test (Voice assessment- asking them to read aloud a passage in Hindi and English, during which they were graded for voice clarity, pronunciation, intonation, fluency and adequate loudness of voice. This exercise was administered in front of all candidates and they were asked to assume that they are in a school with class 3 students (This was done to assess whether the evaluator is fit to handle a classroom).
- Candidates with personal conveyance means were preferred.
- Zeal, high patience level and willingness to work for this project were a few indicators to determine the candidate as a right fit for this project.

Candidates participating in “Evaluator Recruitment Test”, Yamunanagar.

The selected candidates were also given a Certificate for Participation at the end of the study along with a stipend.

4.3.5 Selection of Field Auditors

A few candidates selected as evaluators, were specially trained on Field Audit by the ZM and were assigned Field Audit Tasks. One Field Auditor was recruited in each district to make continuous Field Audit during the assessment drive.

4.4 TRAINING

Multiple trainings were organised for Evaluators, District Coordinators and Zonal Managers and Master Trainers.

4.4.1 Training of Master Trainers

Master Trainers (MTs) and Zonal Managers were overall responsible for training the evaluators and ensuring that quality of test administration is maintained. Master Trainers and Zonal Managers were selected on the basis of the following criteria:

- A basic understanding of the test development process
- A basic understanding about the need for the adherence to standardised procedures in field during data collection in research studies.
- Fluency and high ability in Hindi, working knowledge of English
- Ability to inspire and motivate evaluators
- Willingness to travel to assigned district with ZM for training

Training of Master Trainers (TOMT) was done through a two day workshop in Delhi. There were between 55-60 participants in the Training. These participants were from 21 districts of Haryana, 5 zonal managers of different zones, project manager of EI and EI's expert team and local partners. For each district, minimum 2 to 3 master trainers were identified for the training. During the training, master trainers, zonal managers and district coordinators were given exposure to all aspects of the study, test design and test development. They were all trained on the "What" and "How to" aspects of evaluators training and "Dos" and "Don'ts" to be followed during school. The master trainers were provided with a complete file containing master trainer manual along with sample question papers, OMRs, score cards, student attendance sheet, reporting formats, practice question-paper etc.

The master trainers also practiced using "dummy answered test paper" to evaluate the answer responses by assigning appropriate answer codes as per the score card.

Below is the agenda of Master Training Workshop:

Table 20: Agenda of Master training workshop

Particular	Day	Time
Introduction of Master Trainers	1	10 minutes
Introduction to EI and Project Overview	1	30 minutes
Role of Master Trainers and Flow of Evaluator Training	1	60 minutes
Process of Test Administration	1	120 minutes
Assessment Tools	1	120 minutes
What to do in class – instructions for class 3, 5 & 8	1	90 minutes
Reading instructions and Exercise	2	120 minutes
Coding instructions and Exercise	2	120 minutes
DO's and DONT's	2	60 minutes
Evaluator Manual – Walk through	2	90 minutes
Feedback	2	30 minutes

Below are some snaps from Master Training Workshop:

Master Training Workshop – Delhi, discussion happening in groups

4.4.2 Evaluator Training Workshops

Standardised test administration was not only important but also imperative for ethical and technical reasons. If performance on the test was influenced by anything other than the attribute being measured then clearly this would reduce the accuracy of the result, which in turn would make the relevance of the result to the assessment an issue.

Evaluator Training workshop was conducted in each and every district for a period of 1 day. The evaluators were trained by MTs and Zonal Managers with the support of District Coordinators.

Evaluator Training Workshop, Kurukshetra: Evaluators listening to the Trainer

Evaluator Training Workshop: Sonipat and Kaithal

4.5 Standardising Field Operation Process

4.5.1 Preparing Advance Test Conduction Plan

District wise advance test conduction plan was prepared with the help of respective zonal manager The plan had detailed information on number of schools and classes to be tested, number of students to be tested in each school, date of testing, details of evaluator who is going to conduct test in each school and classroom.

The plan had to be adjusted on day to day basis due to evaluator absenteeism, unforeseen weather condition and sudden announcement of holiday in schools.

4.5.2 Informing School about Testing

Schools were informed about testing, both, by the SCERT and the EI team. Evaluators were asked to remind schools 1 day prior to testing, so that principal and teachers could help EI team/evaluator to conduct the test in their respective schools.

4.6 Test Administration

4.6.1 Test Conduction

Each evaluator was assigned with one classroom for administering the test. The following steps were followed by evaluators during test conduction in schools:

- Reach early to school, meet principal and teachers and be part of school assembly.
- After the school assembly, evaluators took permission from principal to enter the classrooms and started rapport building with the students.
- Students were arranged in properly, attendance was taken, and then evaluators started the test.
- Students were tested in Maths and Hindi on day-1 and English on day-2 in class 3, 5 and English & SCIENCE on day-2 in class 8.
- In each class, the evaluator administered 2 papers on day-1 with a minimum gap of 30 minutes between the two papers. The maths test was administered first followed by the Hindi test on day-1.
- The English paper was administered first on day-2 followed by SCIENCE in class 8. Half an hour break was given between these two subject's test. In class 3 & 5, only English was tested in first half.
- Student's response of class 3 student was coded in OMR on day-2 of test conduction.
- Group Oral form of test conduction was administered in class 3.
- Students of class 5 and class 8 were supplied OMR to answer their test paper.
- Class 3 were asked to give their response on test paper itself and later it was coded in OMR by the evaluator.
- Each evaluator sent to class 3 was given an *Evaluator Copy* of each test paper. The assessments were conducted in group oral mode, where one by one each question was read out twice before students by evaluator from evaluator copy.

Test administration picture from top left – Rewari, Panchkula, Yamuna Nagar and Panchkula.

The total number of students covered in each class and subject are given below:

Table 21: Students covered in all the classes and subjects

Class/Sub	Hindi	Maths	English	Science
Class 3	51,262	51,486	51,128	-
Class 5	55,985	56,135	55,843	-
Class 8	57,080	57,370	57,231	57,113

In total, 1923 schools in Class 3, 1932 schools in Class 5 and 1710 schools in Class 8 were covered in this study.

4.6.2 Field Monitoring

During test conduction, field monitoring was done on daily basis by the Zonal Manager, District Coordinator and by the local partner of EI (wherever required). This team visited schools to check: 1. Testing is happening in a standardised manner, 2. Evaluators have reached the school on time, 3. Test material is not short, 4. Understand the concerns of school authority.

Apart from this, all BEEOs were asked by the SCERT to monitor at least 5 schools of their block every day during testing. BEEOs submitted their report directly to SCERT. A team from SCERT Gurgaon was also sent to monitor test conduction.

Two Field Auditors in a class 5th during auditing in Panchkula and Kurukshetra

4.6.3 OMR coding for class 3

Diagnostic Assessment of each classroom was scheduled in two days. On completion of test conduction on day 2, class 3 and class 5 evaluators coded class 3 student's response in OMR with the help of scorecard for each and every subject and paper code.

Each test paper of class 3 was supplemented with a score card. Score card has a question wise rubric (with scores/coded/answers) for how each response is to be scored. This process ensured that evaluators do not "Correct" questions and award marks, but only assign codes based on student responses. This minimises evaluator bias in correcting a test paper. The score card captured common mistakes that children tend to make while answering questions. The data that was collected by this process was critical for the diagnostic assessment, feedback and analysis. This form of scoring is common practise in international tests like the TIMSS. The evaluators were provided with an OMR sheet.

The evaluator had to darken the oval containing the appropriate answer code for the answer given by the student. Use of OMR sheet eliminated one layer of error that occurs usually in large testing programs during data entry.

4.6.4 Material Management

Material was handled in standardised way and everything was planned and implemented smoothly. The test material was received in packed and sealed condition in each district. It was stored in a secure facility provided by SCERT in each district. Few days before testing, the material was packed organised in terms of different schools, different classes and different subjects. Stock was maintained at the time of distribution and receiving the material back from the evaluators. Once the used test material was received back, it was counted and class 3 test papers were sent for coding. The random quality check on the filling of top labels and OMRs were done. On completion of the survey work, the material was packed and sent for scanning and storage facility.

4.6.5 Data scanning and cleaning

The students marked the responses on the OMR for each question. These OMRs were sent to the scanning facility and the data was saved into the database. After scanning this was further cleaned using special data cleaning programs that identified data errors such as duplicate/triplicate records, errors in fields such as the school code, district and state information, etc. The errors reflected in the error instances file were rectified in a systematic manner.

4.6.6 Possible Cases of Assistance in Testing

As we have observed in other states also, there are some cases of teacher assistance or copying in the diagnostic assessment. The starker cases have been removed from the analysis. The possibility of assistance or copying has been detected based on mathematical and statistical patterns.

This does not have an implication for the nature of the main findings- however it is to be kept in mind that all scores all likely to be overstated to some extent. Since these are low stakes assessments, assistance in the tests or copying does not benefit schools in any way. The target will be to reduce the incidence of such cases in future rounds by- a) emphasizing the low stakes nature of the assessments b) highlighting to schools that assistance and copying patterns are possible to detect c) refining test conduction processes.

4.6.6.1 Extent of cheating

Table 22: Number of schools excluded from the analysis due to cheating

Class-Subject	Total classrooms	Classrooms highlighted as cases of assistance	Percentage
Class 3 - English	1,915	280	15%
Class 3 – Hindi	1,915	168	9%
Class 3 - Maths	1,917	215	11%
Class 5 - English	1,924	312	16%
Class 5 - Maths	1,925	78	4%
Class 5 – Hindi	1,922	132	7%
Class 8 - English	1,673	254	15%
Class 8 – Science	1,674	72	4%
Class 8 - Maths	1,697	53	3%
Class 8 - Hindi	1,694	105	6%

4.6.6.2 District-wise extent of cheating

Table 23: District-wise breakup of schools which were excluded due to cheating

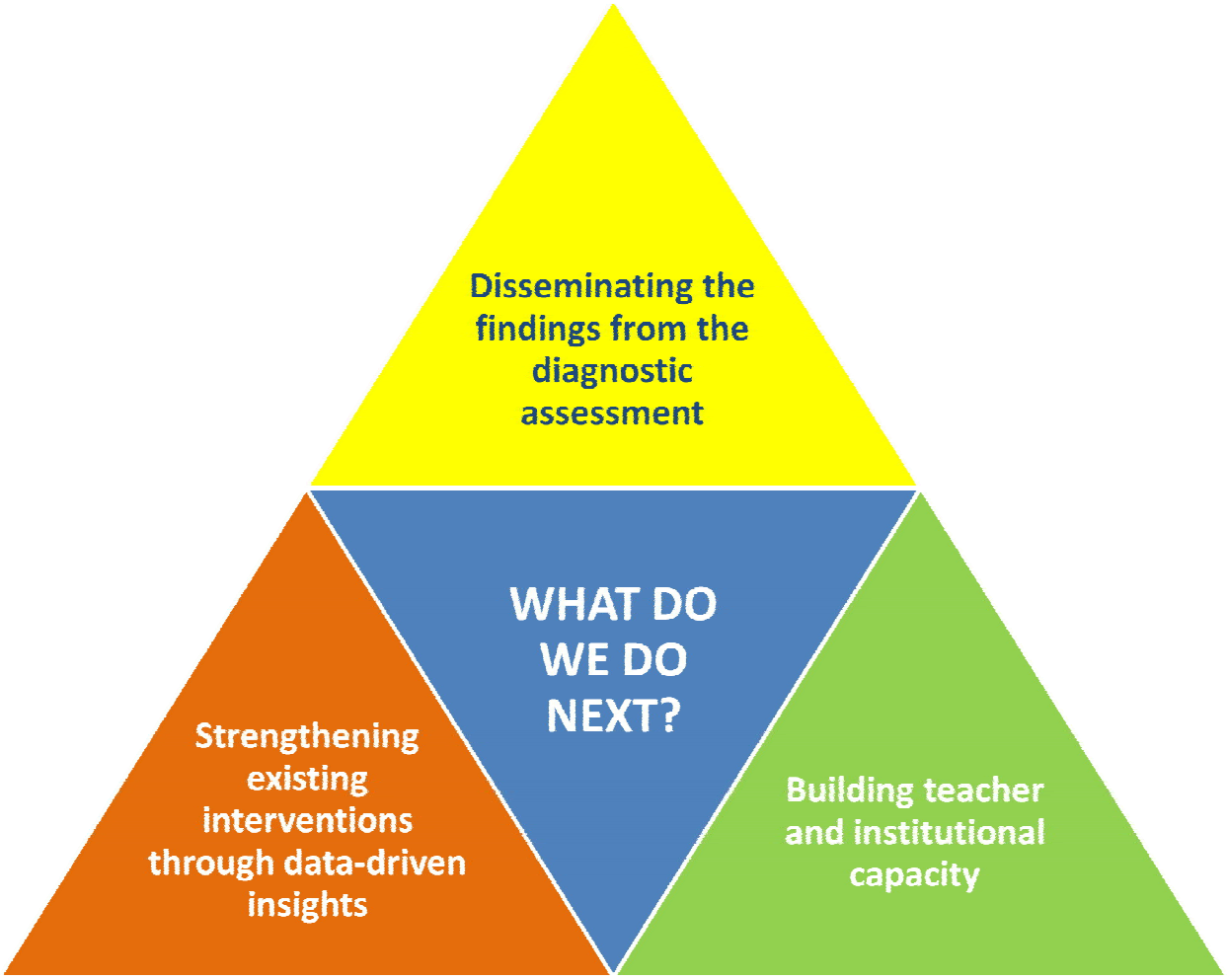
Districts	Class 3 English	Class 3 Hindi	Class 3 Maths	Class 5 English	Class 5 Maths	Class 5 Hindi	Class 8 English	Class 8 Science	Class 8 Maths	Class 8 Hindi
AMBALA	6%	2%	5%	6%	1%	1%	10%	1%	0%	0%
BHIWANI	10%	5%	4%	5%	1%	0%	16%	1%	0%	11%
FARIDABAD	19%	7%	15%	17%	2%	3%	11%	7%	0%	2%
FATEHABAD	19%	9%	13%	19%	6%	4%	15%	4%	0%	5%
GURGAON	24%	9%	12%	14%	4%	7%	14%	9%	4%	8%
HISAR	24%	11%	20%	22%	6%	11%	14%	3%	6%	3%
JHAJJAR	20%	6%	19%	35%	7%	16%	18%	5%	0%	1%
JIND	19%	18%	16%	16%	1%	11%	10%	5%	6%	1%
KAITHAL	10%	5%	7%	9%	5%	4%	8%	2%	2%	2%
KARNAL	10%	8%	9%	10%	0%	3%	10%	0%	1%	4%
KURUKSHETRA	4%	1%	1%	5%	0%	0%	7%	0%	0%	0%
MAHENDRAGARH	20%	13%	11%	26%	6%	10%	26%	3%	7%	17%
MEWAT	23%	40%	30%	28%	20%	22%	19%	10%	14%	19%
PALWAL	17%	11%	16%	22%	10%	15%	41%	16%	7%	13%
PANCHKULA	2%	1%	2%	8%	0%	2%	8%	1%	0%	0%
PANIPAT	26%	15%	22%	32%	6%	14%	19%	5%	4%	11%
REWARI	19%	15%	11%	28%	9%	13%	26%	9%	6%	12%
ROHTAK	0%	0%	5%	5%	1%	0%	7%	1%	0%	1%
SIRSA	20%	16%	16%	15%	5%	5%	19%	5%	7%	12%
SONIPAT	19%	11%	16%	26%	1%	10%	11%	4%	4%	7%
YAMUNANAGAR	5%	1%	2%	0%	0%	0%	7%	1%	0%	2%

Recommendations

5 RECOMMENDATIONS

Diagnostic assessments and the results emerging from it can be used to take specific actions that can lead to improvement in the learning levels of students in the state. While some actions could be short-term and some long-term, it is important to realise that it may take some time to bring about a systemic change especially when the objective is to shift the focus to '*learning with understanding'*.

We recommend 3 major areas that the state can focus on.



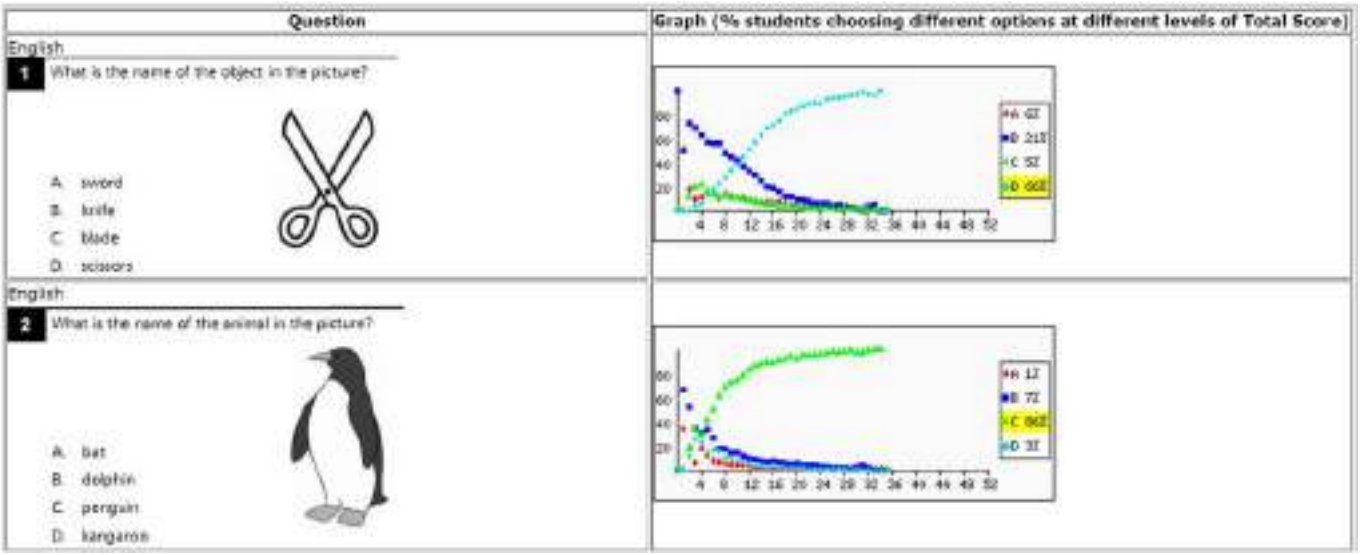
5.1 DISSEMINATE THE FINDINGS FROM THE DIAGNOSTIC ASSESSMENT

We recommend that a systematic plan be made to disseminate the findings from the study. Every education official, principal and teacher should be given a copy of this report. Efforts should be made to ensure that they understand the reports and insights emerging out iof the study through district-specific workshops, meetings at block/cluster/school levels etc.

They should also be given access to the detailed website, with reports for each district and school, with question-wise, skill-wise data, that has been made.

http://54.251.245.119/Haryana/website/

Screenshot of the website and types of reports available



Screenshot of the question-wise data on the website

Key aspects of the report could even be made public so that general public can go through it and comment. It may invite criticism, but will lead to discussions and gradually help ensure the process of change.

The table below describes how different stakeholders can benefit from the different reports of the diagnostic assessments.

Stakeholder	What can they use?	How?
SCERT	Question-wise data Skill-wise data	- Identify misconceptions students have - Use the insights to revise the textbooks and make better teaching learning materials for teachers
DIETs	District-wise performance	- Design trainings in the districts to handle the specific weak areas found in students
District/Block Administrators	District-wise performance	- Work with BRPs, CRCs to ensure they are appropriately educated about the findings from the study and ways by which the reports can be used.
BRPs, CRCs	Skill-wise reports Question-wise data	- During the school visits, sit with teachers and make them understand the type of reports available to them and encourage them to try the difficult questions in their classrooms and see the root cause behind the low performance. That can give them some indication about what to remediate.
Principals and Teachers	Skill-wise reports Question-wise data	- Use the questions in their classrooms to probe students and understand the root cause of specific misconceptions - Use the subject-wise, skill-wise recommendations to remediate specific weak skills

Doing all of the above actions will enable the stakeholders to be aware of the learning levels of students on the ground. This will draw attention to the gap areas, which will then lead to change of behaviour and shift the focus to improving learning outcomes.

5.2 Enhance Monthly Assessments further

Monthly assessments that have been happening in the state is a good initiative. Diagnostic assessment analysis shows that skill performance data and questionwise performance data is also very useful in understanding the student gaps so we should capture this data in monthly assessment test also if possible.

- Along with capturing the different type of questions covered in the monthly assessment test, we should also capture the skill distribution so that we can analyze performance on the skills being tested along with the overall scores. This can be linked to Diagnostic data to understand if there is any improvement or what is the current status vis a vis the Diagnostic

- Based on the Diagnostic assessment data, the monthly assessment test can test those skills or subtopics where performance was relatively weaker in Diagnostic in more depth. This will make monthly assessment test more focused and provide valuable data on how to fill those gaps.

How to use Monthly Assessments data effectively

- A simple report sharing 2 questions found most easy and 2 questions found most difficult can be shared.

- DIET faculties can analyse a sample of questions in their district and analyse trends based on what students are able to do and what they are not able to do.

- Weak areas can be focussed on in the trainings for teachers.

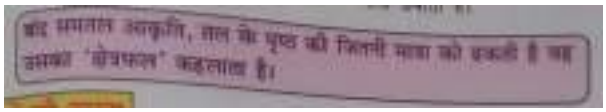
- Teachers can be trained on how to identify 2-3 most critical questions based on data and go deeper by discussing them with the students and remediating the concepts.

5.3 REVISION OF TEXTBOOKS AND TEACHING LEARNING MATERIAL

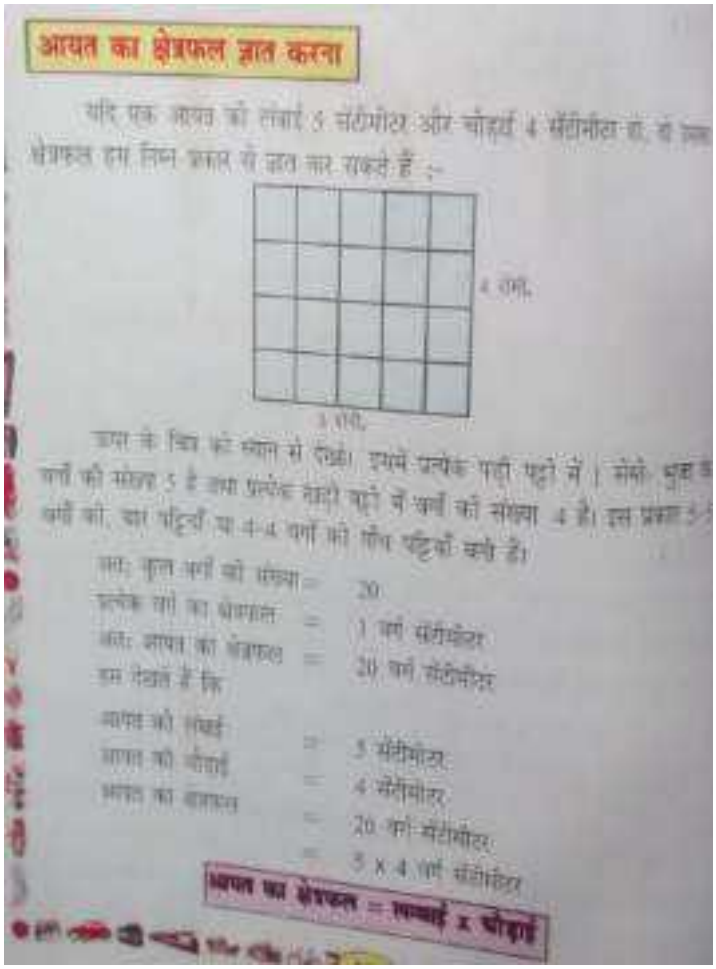
Textbook revision exercise can incorporate findings from the study, specifically to target the misconceptions students have.

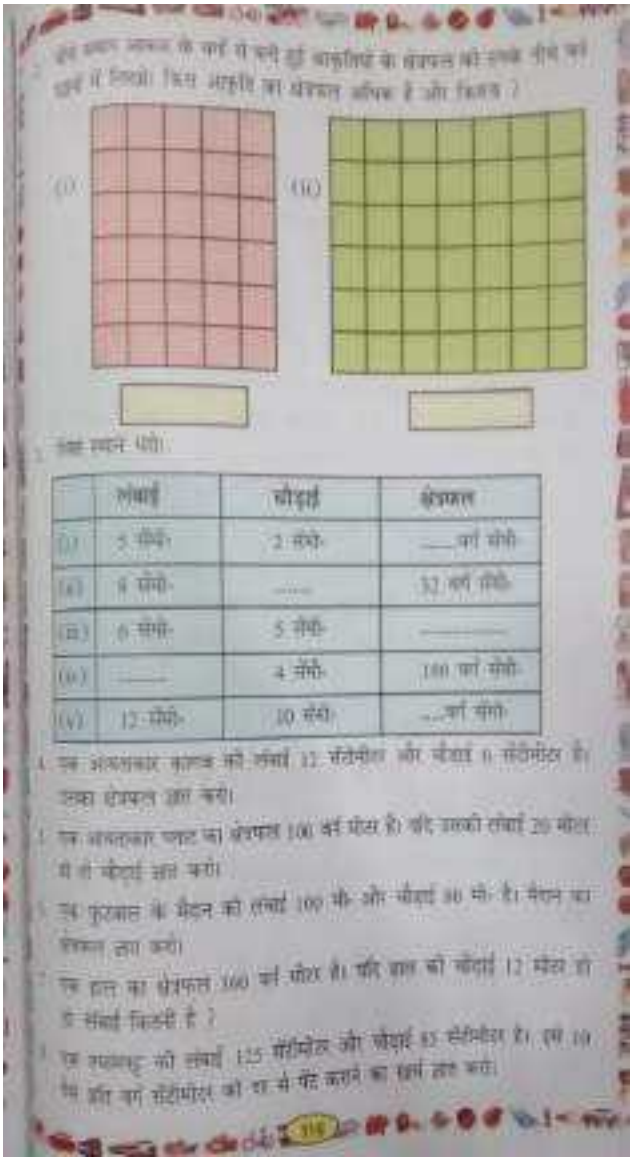
Example:

Class 5 Maths | Chapter: Area



One line definition of area "The amount of surface covered by a closed plane shape is its area."

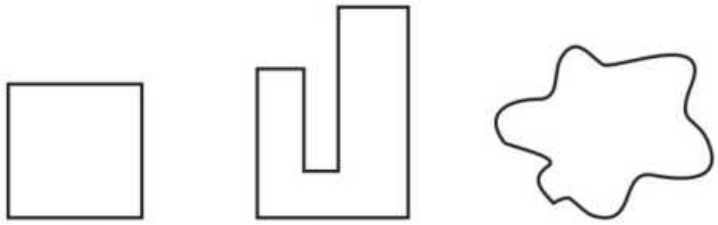




Formula to calculate area of a rectangle and then the exercise which mainly focuses on calculation of area.

Question from Diagnostic Assessment | Class 5 Maths

38 यहाँ एक कागज पर बनायी गयी 3 आकृतियों को दिखाया गया है। उनमें से किस आकृति का क्षेत्रफल हो सकता है?



आकृति 1 आकृति 2 आकृति 3

A केवल आकृति 1
B केवल आकृति 2
C केवल आकृति 1 एवं 2
D तीनों आकृतियों का क्षेत्रफल हो सकता है।

A: 27.0%
B: 13.5%
C: 23.4%
D: 14.3%

The content focuses heavily on the use of formula to find area of squares and rectangles. Given the fact that area is introduced in this class, it doesn't go deeper into the concept of area before diving into the formulas. So students are not really able to answer a fundamental question that checks which shape will have area.

What can be done?

- A team in SCERT studies the data and reviews the textbook content together and gives recommendations on parts of the textbook that can be modified to include more conceptual matter.
- The teacher manual should share a list of misconceptions that they are likely to see in their classrooms.
- Additionally, student interview videos can be used to understand some of the wrong notions students have and the links can be shared at appropriate places.

5.4 Use Academic Monitoring as a Means to Build a Community of Practice

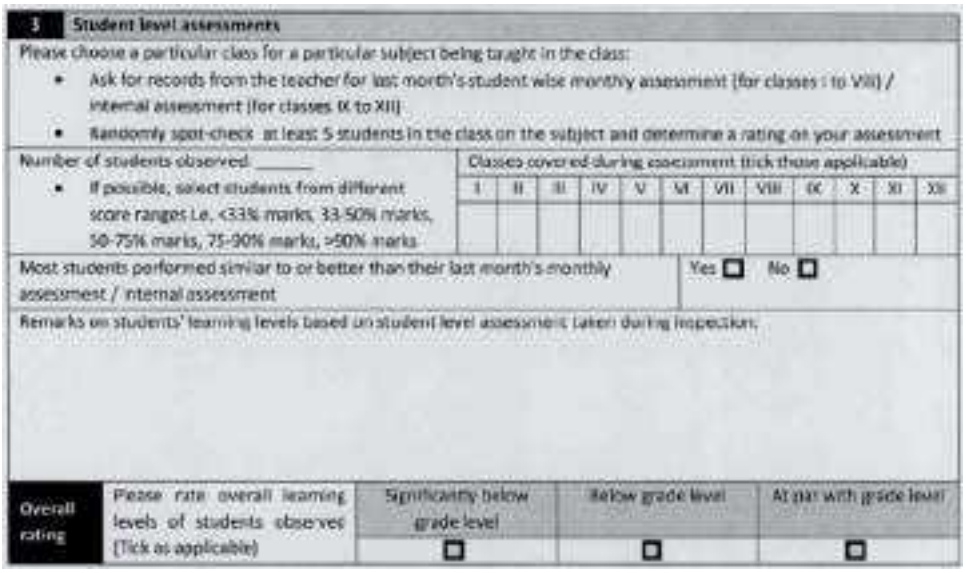
Academic monitoring is a good practice which can be used as a means to build a community that uses insights from data and implements practices that can help in improving the learning levels of children.

Officials visiting schools every month, can randomly select a few schools that were tested in diagnostic assessment.

They look at the class performance report which can help them understand the strengths/weaknesses of the students of that school.

Using the above 2, officers going for academic monitoring can be more specific in the interactions they have with the school staff and students.

Currently the format used to capture learning levels of students (shown below) marks how many students are in which score band.



3	Student level assessments												
Please choose a particular class for a particular subject being taught in the class: • Ask for records from the teacher for last month's student wise monthly assessment (for classes I to VIII) / internal assessment (for classes IX to XII) • Randomly spot-check at least 5 students in the class on the subject and determine a rating on your assessment													
Number of students observed: _____ • If possible, select students from different score ranges i.e. <33% marks, 33-50% marks, 50-75% marks, 75-90% marks, >90% marks	Classes covered during assessment (tick those applicable)												
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Most students performed similar to or better than their last month's monthly assessment / internal assessment								Yes ☐		No ☐			
Remarks on students' learning levels based on student level assessments taken during inspection:													
Overall rating	Please rate overall learning levels of students observed (Tick as applicable)		Significantly below grade level			Below grade level			At par with grade level				
			☐			☐			☐				

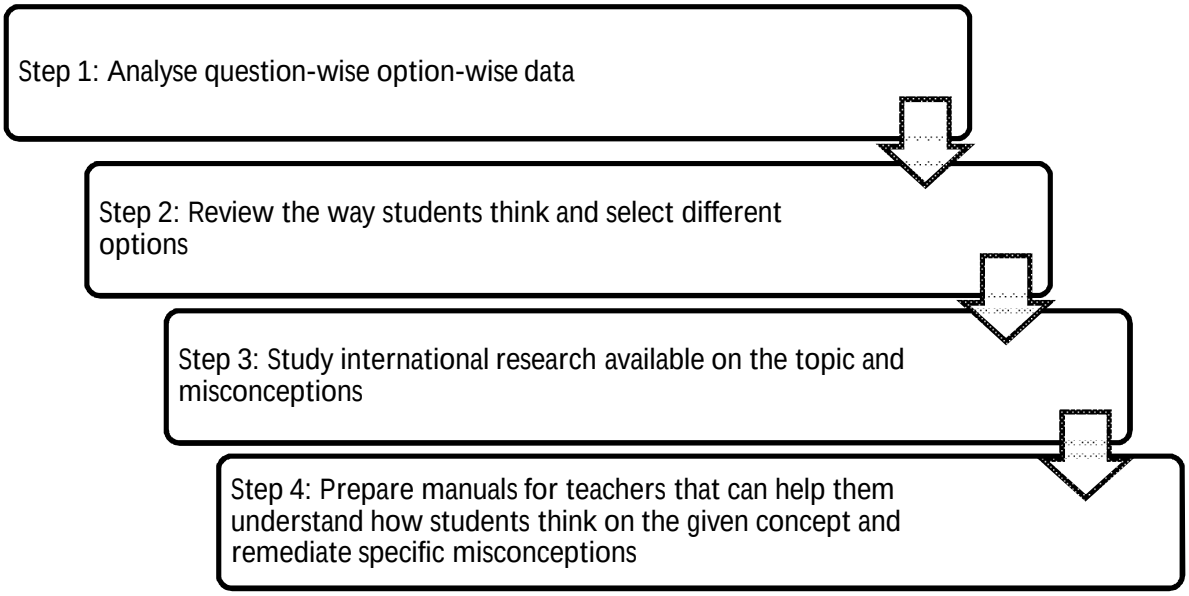
Instead of recording how many students are at which level, they should try and list down 3 things students were able to do and 3 things students were struggling to do.

They should also hold meetings with teachers and encourage them to share their feedback on the observations made, best practices they follow etc.

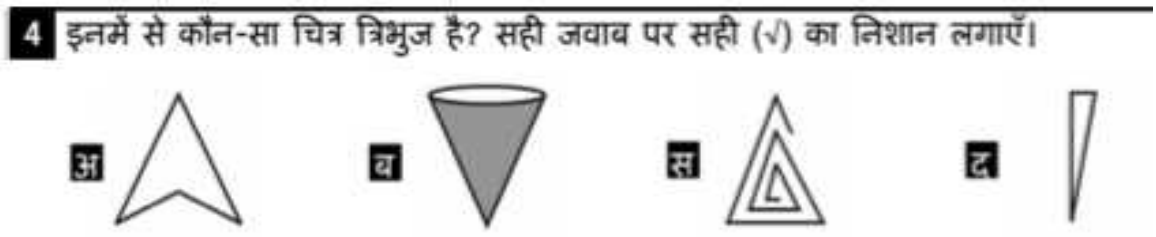
Videos can be shot using mobile phones of teachers sharing best practices and the best ones can even be circulated widely using social media platforms like Whatsapp, Google groups etc. and even build an online repository that can be used by teachers across the state.

5.5 BUILD HIGH QUALITY TEACHER MATERIAL, USING QUESTION-LEVEL INSIGHTS THAT CAN BE WIDELY DISSEMINATED IN LOCAL LANGUAGES

A simple 4 step process can be followed to use the question-level insights to build high quality manuals for teachers.



Consider the following question example used in the assessment. It tests whether students can identify the triangle, presented in a non-standard orientation, from the given shapes.

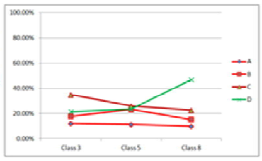


This question can be used to build a *teacher sheet* which educates teachers about why the question was asked, what the data shows, what are the learnings based on that, what do international researchers say on this and how this concept can be handled in the classroom.

Step 1. Take a question from the assessment along with its data

इनमें से कौन-सा चित्र त्रिभुज है? सही जवाब पर सही (√) का निशान लगाएँ।

	Class 3	Class 5	Class 8
A	12.2%	11.5%	10.1%
B	17.8%	23.2%	15.4%
C	35.0%	26.0%	22.9%
D	21.4%	23.7%	46.8%
Students	45411	20419	19362



This question was framed to check if students can recognize a basic shape like a triangle, when presented in a somewhat different orientation from the "standard" presentation.

Step 2. Make videos on how students are reasoning out the different options and document it

Reason for choosing A: Students selecting this option look at the two slanting sides pointing upwards and conclude that it is a triangle.

Reason for choosing B: Students say that a triangle has an angle pointing upwards, but in option B it is pointing downward. So its shape is like a triangle and hence it is a triangle.

Reason for choosing C: Since this shape is erect and looks like a triangle, it is a triangle.

http://youtu.be/KnC3Zf4FoiQ

Step 3. Check what international research talks about the concept

What does international research show?

Research done by Dutch educators Pierre van Hiele and Dina van Hiele-Geldof has shown that there is a certain pattern in the development of geometric thought. A certain level of thought has to be mastered before the next level can be developed.

Level 0 (Visualization), begins with thinking about **what shapes "look like"**, and making a mental model of that shape. It leads to a classification or grouping of shapes that "seem alike". This allows the person to progress to **Level 1 (Analysis)**, where he can start thinking now in terms of **groups of shapes** rather than individual shapes. This leads to a progression towards thinking in terms of properties of shapes (even if it is only intuitively).

These are the two basic levels which **if crossed** by the child will **allow her to think in a more organized way about the properties of the shapes, deduce relationships among properties of different shapes and then proceed with advanced geometry**. One interesting aspect of this research is that the kind of learning activities children are exposed to is far more important than the age of the child. Experiences of many educators around the world have validated these findings.

However it seems that most of the students are stuck at the "visualization" phase. They are unable to disregard irrelevant attributes of the shape like size and orientation and hence fail to analyse those shapes in terms of their properties.

Step 4. Build remedials that teachers can implement in their classroom

How can teachers handle this in their classroom?

Present examples and non-examples of all kinds, so that both the relevant and non-relevant properties are varied.

For example in a triangle, the essential properties are i) it has 3 sides, ii) it is a closed figure and iii) each side is a line segment. The irrelevant properties are i) orientation of the baseline, ii) the relative lengths of the sides.

Construct examples where the irrelevant properties are varied (base not horizontal, side too small etc) and **non-examples where the relevant properties are varied** (sides not straight, open etc.).

Make the students see why a particular figure is a triangle or not **posing appropriate questions**, like -

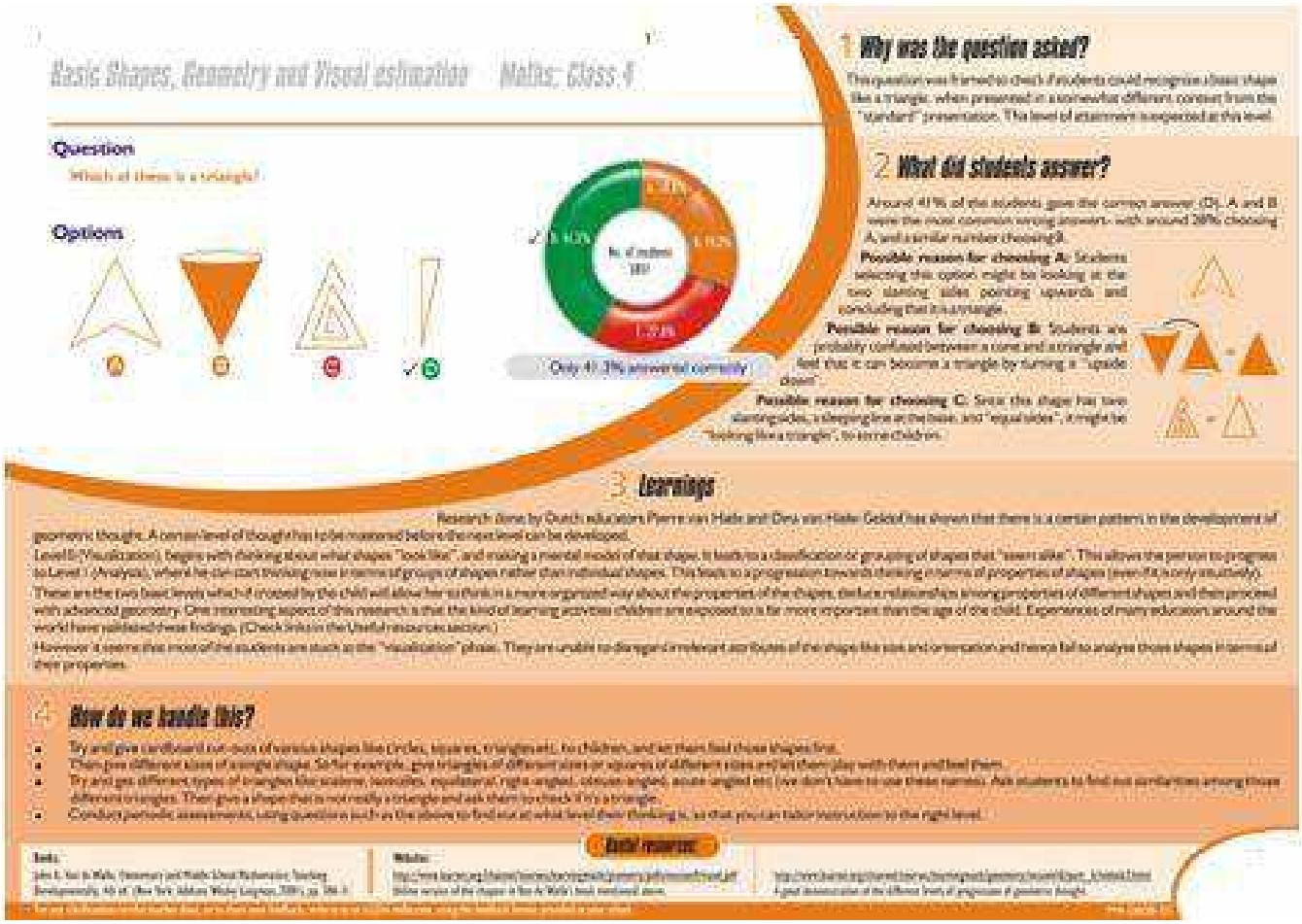
The figure A has 3 sides; each side is straight. Is it is a triangle. Why?
The figure C has 3 sides, is closed, but is still not a triangle. Why?
The figure F has one side too small. Is it a triangle?

While **teaching about solids, do so with actual models, and not just diagrams on the board.**

Collect objects like balls, bangles, cubes, square sheets of paper, cardboard cartons, ice cream cones, and rectangles, triangles etc. and **encourage children to talk about the similarities and differences amongst them**. Help them see the additional dimension in solids, as opposed to the flat shapes.

Step 5: Training provided based on this knowledge

A one-pager discussing the concept, misconceptions students have learnings from that and ways to handle it in the classroom, shared every month with all the schools.



This should be accessible to all the teachers in their schools and can be used by them while teaching specific concepts. Teachers should be trained on how to use them.

5.6 BUILD A CULTURE OF LEARNING

As a long term goal, the state needs to build a culture of learning that encourages principals, teachers, students and parents to take part in activities that ensure that proper attention is given to learning, especially learning with understanding. We recommend various activities that can be part of this larger agenda.

5.6.1 Build the habit of reading through targeted programme and reading campaigns

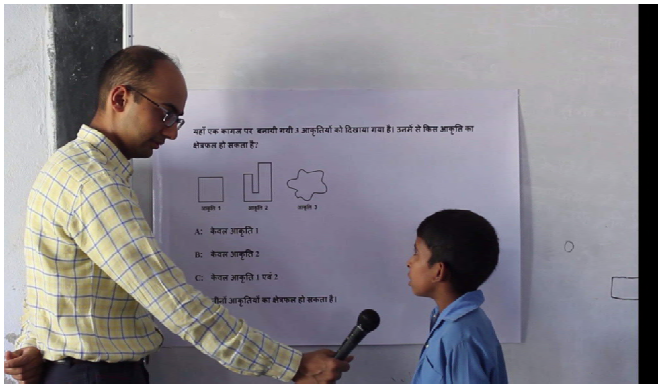
- Organise state-wide campaign that promotes and rewards reading
- Promote and implement reading programmes, reading activities at school level
    - Such as 'Narrate the story in your own words', 'Book exhibitions', 'Reading clubs', 'My favourite book' competition, library visits, debates, elocutions etc.
    - Implement regular monitoring of the programme through the cluster and block resource people
- Have a reading test every quarter to evaluate the effect of reading

5.6.2 Encourage students to think by sharing one assessment question with them everyday

Put up ***a question a day*** on the notice board and encourage students to answer the question. Let them write down their answer and share.

This can even be implemented at the state level where SCERT sends one question everyday by Email/ SMS/ Whatsapp to principals/teachers/parents and they in turn submit answer along with their reason.

5.7 Build a library of videos for specific misconceptions students have, on how to teach specific concepts and use them during pre-service and in-service trainings



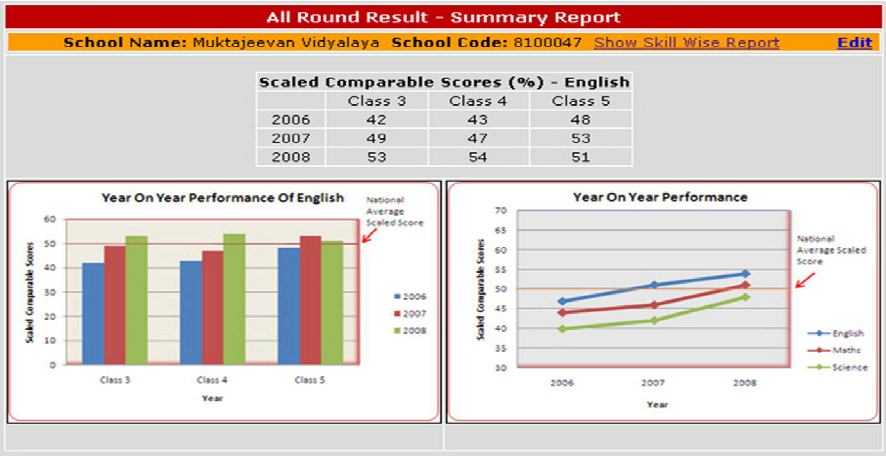
Student misconceptions

How to teach a specific concept

5.8 TRACK LEARNING PROGRESS, AND NOT JUST ENROLMENT DETAILS, OF EACH STUDENT EVERY YEAR BY INTEGRATING THE LEARNING TRACKING SYSTEM WITH THE STUDENT ENROLMENT SYSTEM

Student Progress Tracking System (SPTS) - will be a computerised system to *track student progress in both the scholastic and non-scholastic domains across years.*

The system will be built on a *comprehensive database of students, teachers, schools with information on performance.*



Student Progress Tracking Systems developed by EI allow learning progress to be tracked across years while maintaining student and question-level details which can also be consolidated and seen at a school, block, district or even state level.

APPENDIX

6 APPENDIX

APPENDIX A: DISTRICT LEVEL STATISTICS FOR ALL SUBJECTS

District Name	Class 3 English				Class 3 Maths				Class 3 Hindi			
	N	Avg	SD	SE	N	Avg	SD	SE	N	Avg	SD	SE
PANCHKULA	2,631	41.7	18.4	0.36	2,656	36.5	17.4	0.34	2,691	52.4	23.3	0.45
AMBALA	2,445	39.4	18.3	0.37	2,431	34.0	16.9	0.34	2,472	50.8	23.0	0.46
YAMUNANAGAR	2,235	33.8	19.1	0.40	2,457	30.5	19.0	0.38	2,408	44.6	25.2	0.51
KURUKSHETRA	2,846	41.9	19.0	0.36	2,926	36.5	17.9	0.33	2,894	54.4	22.5	0.42
KAITHAL	1,899	48.9	18.2	0.42	1,974	45.0	20.0	0.45	2,047	59.7	21.2	0.47
KARNAL	2,676	44.4	18.8	0.36	2,734	42.8	20.3	0.39	2,764	55.2	24.8	0.47
PANIPAT	1,707	46.3	23.9	0.58	1,806	44.2	24.2	0.57	2,014	55.7	27.4	0.61
SONIPAT	2,055	46.5	21.0	0.46	2,267	44.1	21.7	0.46	2,272	60.2	23.2	0.49
JIND	2,032	52.5	18.0	0.40	2,035	53.4	21.6	0.48	1,934	62.0	21.5	0.49
FATEHABAD	1,833	47.6	19.6	0.46	2,004	46.0	22.4	0.50	2,058	57.0	24.7	0.55
SIRSA	2,278	53.5	19.8	0.42	2,422	53.8	19.9	0.41	2,467	64.0	21.7	0.44
HISAR	2,029	48.6	20.0	0.45	2,149	50.5	23.6	0.51	2,348	61.7	25.8	0.53
BHIWANI	2,298	48.4	21.3	0.44	2,382	43.2	21.0	0.43	2,361	58.7	24.9	0.51
ROHTAK	2,424	41.2	16.4	0.33	2,248	37.3	16.4	0.35	2,345	53.1	22.0	0.45
JHAJJAR	1,900	56.4	21.5	0.49	1,941	52.1	22.6	0.51	2,209	64.9	25.8	0.55
MAHENDRAGARH	1,594	56.5	18.2	0.46	1,779	55.4	20.6	0.49	1,759	66.8	21.0	0.50
REWARI	1,471	49.9	20.5	0.54	1,599	49.3	20.2	0.51	1,561	60.0	22.9	0.58
GURGAON	2,203	51.6	16.7	0.36	2,560	47.1	18.1	0.36	2,658	66.7	20.4	0.40
FARIDABAD	2,222	52.3	17.5	0.37	2,440	47.4	16.9	0.34	2,716	63.4	20.9	0.40
MEWAT	504	53.6	20.2	0.90	438	57.6	23.7	1.13	479	62.3	23.0	1.05
PALWAL	2,076	43.0	19.8	0.43	2,163	43.4	23.0	0.49	2,226	49.9	23.7	0.50

District Name	Class 5 English				Class 5 Maths				Class 5 Hindi			
	N	Avg	SD	SE	N	Avg	SD	SE	N	Avg	SD	SE
PANCHKULA	2,745	32.2	16.8	0.32	2,907	32.3	15.2	0.28	2,846	49.6	22.0	0.41
AMBALA	2,725	29.7	16.6	0.32	2,795	27.6	15.2	0.29	2,759	44.6	21.8	0.42
YAMUNANAGAR	2,748	28.9	18.2	0.35	2,851	27.8	16.3	0.31	2,858	42.7	23.0	0.43
KURUKSHETRA	2,892	31.7	17.5	0.33	2,986	30.4	16.4	0.30	3,016	45.7	22.5	0.41
KAITHAL	2,051	40.2	18.0	0.40	2,235	37.1	17.0	0.36	2,195	53.9	21.3	0.45
KARNAL	2,742	39.6	19.8	0.38	3,042	38.0	17.3	0.31	2,962	50.4	21.9	0.40
PANIPAT	1,763	40.2	21.0	0.50	2,362	43.6	19.4	0.40	2,220	57.7	23.3	0.49
SONIPAT	2,061	37.9	19.5	0.43	2,751	41.7	20.1	0.38	2,463	55.7	23.2	0.47
JIND	2,105	43.9	20.2	0.44	2,560	44.1	20.2	0.40	2,292	57.0	22.7	0.47
FATEHABAD	2,218	42.8	18.6	0.39	2,508	45.4	19.3	0.39	2,592	57.8	23.0	0.45
SIRSA	2,093	36.6	18.2	0.40	2,402	36.9	16.4	0.33	2,380	46.1	22.1	0.45
HISAR	2,091	46.4	20.7	0.45	2,576	43.8	19.6	0.39	2,432	58.7	22.6	0.46
BHIWANI	2,766	38.0	19.2	0.36	2,835	31.7	17.5	0.33	2,865	47.6	24.4	0.46
ROHTAK	2,570	34.5	16.8	0.33	2,627	31.9	14.6	0.28	2,642	47.9	20.7	0.40
JHAJJAR	1,567	45.7	21.3	0.54	2,247	40.2	19.9	0.42	2,030	55.5	26.4	0.59
MAHENDRAGARH	1,724	50.9	20.4	0.49	2,208	50.3	19.1	0.41	2,041	62.0	21.4	0.47
REWARI	1,516	46.2	19.7	0.51	1,947	47.1	20.4	0.46	1,813	59.5	23.6	0.55
GURGAON	2,593	40.0	17.3	0.34	2,909	40.1	15.9	0.29	2,798	56.8	22.3	0.42
FARIDABAD	2,426	38.4	18.5	0.38	3,010	37.8	17.0	0.31	2,974	52.9	22.3	0.41
MEWAT	806	39.5	21.7	0.76	1,039	46.7	21.0	0.65	938	52.4	24.4	0.80
PALWAL	2,225	37.3	21.7	0.46	2,530	40.8	20.1	0.40	2,361	47.3	23.5	0.48

District Name	Class 8 English				Class 8 Maths				Class 8 Hindi				Class 8 Science			
	N	Avg	SD	SE	N	Avg	SD	SE	N	Avg	SD	SE	N	Avg	SD	SE
PANCHKULA	2,302	45.0	13.3	0.28	2,543	26.9	10.2	0.20	2,532	57.0	19.2	0.38	2,420	35.6	11.0	0.22
AMBALA	2,693	42.6	12.9	0.25	2,846	26.1	10.5	0.20	2,838	54.7	17.8	0.33	2,943	34.0	10.0	0.18
YAMUNANAGAR	2,856	41.3	14.6	0.27	3,059	27.8	12.1	0.22	2,994	51.6	18.7	0.34	3,003	33.3	11.2	0.20
KURUKSHETRA	2,790	43.8	13.5	0.26	2,924	29.5	12.4	0.23	2,914	57.4	18.4	0.34	2,936	35.4	11.0	0.20
KAITHAL	2,168	44.8	15.4	0.33	2,400	33.7	13.2	0.27	2,357	56.7	17.8	0.37	2,333	38.2	12.6	0.26
KARNAL	2,671	41.1	15.4	0.30	2,933	31.0	13.4	0.25	2,853	49.6	18.7	0.35	2,963	33.3	11.9	0.22
PANIPAT	2,005	47.2	16.2	0.36	2,363	35.6	16.8	0.35	2,218	55.7	19.7	0.42	2,347	36.7	12.9	0.27
SONIPAT	2,688	48.3	16.3	0.31	2,852	34.7	14.2	0.27	2,751	59.4	18.3	0.35	2,884	40.9	14.3	0.27
JIND	2,463	51.3	17.5	0.35	2,591	40.5	18.6	0.36	2,750	62.2	18.0	0.34	2,605	43.4	14.7	0.29
FATEHABAD	2,229	46.1	17.5	0.37	2,664	32.9	16.2	0.31	2,571	54.9	19.8	0.39	2,497	34.4	12.7	0.25
SIRSA	2,143	39.4	19.3	0.42	2,448	35.4	15.8	0.32	2,332	53.0	22.8	0.47	2,496	34.2	13.9	0.28
HISAR	2,434	50.3	16.6	0.34	2,636	36.8	15.1	0.29	2,730	60.5	18.6	0.36	2,707	40.8	13.8	0.27
BHIWANI	2,587	47.6	15.4	0.30	2,989	36.3	16.0	0.29	2,677	61.5	18.4	0.36	3,062	41.5	13.1	0.24
ROHTAK	2,745	49.9	15.0	0.29	3,077	31.9	13.6	0.25	3,061	61.3	17.5	0.32	2,918	37.2	10.1	0.19
JHAJJAR	2,392	48.0	13.9	0.28	2,773	34.3	15.3	0.29	2,771	59.2	18.6	0.35	2,771	38.5	11.3	0.22
MAHENDRAGARH	2,183	53.4	15.9	0.34	2,649	41.6	17.9	0.35	2,315	62.2	17.0	0.35	2,764	42.6	13.2	0.25
REWARI	2,105	50.4	14.8	0.32	2,415	40.1	16.3	0.33	2,289	62.1	17.3	0.36	2,476	42.7	13.2	0.27
GURGAON	2,295	51.7	15.0	0.31	2,558	35.6	14.8	0.29	2,367	65.8	17.4	0.36	2,454	39.7	11.5	0.23
FARIDABAD	2,007	47.7	15.2	0.34	2,323	30.0	10.5	0.22	2,268	57.3	17.7	0.37	2,074	36.5	12.6	0.28
MEWAT	1,286	46.4	18.2	0.51	1,559	34.9	15.3	0.39	1,500	51.6	20.9	0.54	1,442	35.9	16.2	0.43
PALWAL	1,526	51.0	15.5	0.40	2,288	44.3	17.7	0.37	2,190	62.1	18.2	0.39	2,065	44.0	14.4	0.32

APPENDIX B: DISTRICT PERFORMANCE COMPARISON ACROSS CLASSES AND SUBJECTS

Class 3 English	Class 3 Hindi	Class 3 Maths	Class 5 English	Class 5 Hindi	Class 5 Maths	Class 8 English	Class 8 Hindi	Class 8 Maths	Class 8 Science
Mahendragarh	Mahendragarh	Mahendragarh	Mahendragarh	Mahendragarh	Mahendragarh	Mahendragarh	Gurgaon	Palwal	Palwal
Jhajjar	Gurgaon	Sirsa	Hisar	Rewari	Rewari	Gurgaon	Mahendragarh	Mahendragarh	Jind
Sirsa	Jhajjar	Jind	Rewari	Hisar	Fatehabad	Jind	Jind	Jind	Rewari
Jind	Sirsa	Jhajjar	Jhajjar	Fatehabad	Jind	Palwal	Rewari	Rewari	Mahendragarh
Faridabad	Faridabad	Hisar	Jind	Panipat	Hisar	Rewari	Palwal	Hisar	Bhiwani
Gurgaon	Jind	Rewari	Fatehabad	Jind	Panipat	Hisar	Bhiwani	Bhiwani	Sonipat
Rewari	Hisar	Faridabad	Panipat	Gurgaon	Sonipat	Rohtak	Rohtak	Panipat	Hisar
Kaithal	Sonipat	Gurgaon	Kaithal	Sonipat	Palwal	Sonipat	Hisar	Gurgaon	Gurgaon
Hisar	Rewari	Fatehabad	Gurgaon	Jhajjar	Jhajjar	Jhajjar	Sonipat	Sirsa	Jhajjar
Bhiwani	Kaithal	Kaithal	Karnal	Kaithal	Gurgaon	Faridabad	Jhajjar	Sonipat	Kaithal
Fatehabad	Bhiwani	Panipat	Faridabad	Faridabad	Karnal	Bhiwani	Kurukshetra	Jhajjar	Rohtak
Sonipat	Fatehabad	Sonipat	Bhiwani	Karnal	Faridabad	Panipat	Faridabad	Kaithal	Panipat
Panipat	Panipat	Palwal	Sonipat	Panchkula	Kaithal	Fatehabad	Panchkula	Fatehabad	Faridabad
Karnal	Karnal	Bhiwani	Palwal	Rohtak	Sirsa	Panchkula	Kaithal	Rohtak	Panchkula
Palwal	Kurukshetra	Karnal	Sirsa	Bhiwani	Panchkula	Kaithal	Panipat	Karnal	Kurukshetra
Kurukshetra	Rohtak	Rohtak	Rohtak	Palwal	Rohtak	Kurukshetra	Fatehabad	Faridabad	Fatehabad
Panchkula	Panchkula	Kurukshetra	Panchkula	Sirsa	Bhiwani	Ambala	Ambala	Kurukshetra	Sirsa
Rohtak	Ambala	Panchkula	Kurukshetra	Kurukshetra	Kurukshetra	Yamunanagar	Sirsa	Yamunanagar	Ambala
Ambala	Palwal	Ambala	Ambala	Ambala	Yamunanagar	Karnal	Yamunanagar	Panchkula	Yamunanagar
Yamunanagar	Yamunanagar	Yamunanagar	Yamunanagar	Yamunanagar	Ambala	Sirsa	Karnal	Ambala	Karnal

	Performance above state average with medium effect size		Performance below state average with medium effect size
	Performance above state average with small effect size		Performance below state average with small effect size
	Performance similar to state average		

APPENDIX C: COMPETENCY BREAKUP

English Class 3

Sr. No	Skill	Questions Tested
1	Identifies letters and sounds	5
2	Identifies words for everyday objects, animals, etc.	8
3	Uses grammar concepts correctly	7
4	Identifies explicit and implicit details and ideas from an unseen passage	4

English Class 5

Sr. No	Skill	Questions Tested
1	Identifies letters and sounds	3
2	Identifies words for everyday objects and animals	7
3	Uses grammar concepts correctly	12
4	Identifies explicit and implicit details and ideas from an unseen passage	4
5	Identifies explicit and implicit details and ideas from the given authentic information in form of posters, tables, covers etc.	4

English Class 8

Sr. No	Skill	Questions Tested
1	Knows names of animals, birds, objects and people	4
2	Understands grammar concepts	7
3	Uses words appropriate to the context based on their meanings, opposites gender, number	6
4	Reads, understands and constructs simple sentences	4
5	Reads descriptive and narrative texts of 10 -12 sentences and comprehends stated information	10
6	Understands and infers from written information presented in various forms as Tables, Notices, Tickets, Posters, Labels, etc seen in real life	4

Science Class 8

Sr. No	Skill	Questions Tested
1	Knowledge of facts and instruments	21
2	Understanding and application of concepts	20
3	Reasoning and analysis	12
4	Experimentation and hypothesis formulation	7

Hindi Class 3

Sr. No	Skill	Questions Tested
1	Recognizes letters and words of 3-4 letters, by their sound and form, writes them, and knows the starting sound as well as letter of familiar words	5
2	Knows names of objects, birds and animals seen in daily life	4
3	Uses words appropriate to the context based on their meanings and gender endings	4
4	Reads, understands, writes and constructs simple and short sentences that have less than 5 words in a sentence	3
5	Understands simple, short stories of 8-10 sentences when told and comprehends beyond the stated facts	6
6	Reads short text of 5-6 sentences that describes daily activity, routine context, simple description, simple story independently and comprehends state	5

Hindi Class 5

Sr. No	Skill	Questions Tested
1	Knows a wider range of names of objects, birds and animals not seen in daily life and words denoting actions and feelings	6
2	Uses words appropriate to the context based on their meaning, time, number, gender and description	7
3	Reads, understands, constructs and punctuates simple sentences that have 5-6 words in a sentence	6
4	Reads descriptive text, short stories of 8-10 sentences independently and comprehends beyond stated facts	13
5	Understands written information presented in various forms as Tables, Notices, Tickets, Posters, Labels, etc seen in real life	3

Hindi Class 8

Sr. No	Skill	Questions Tested
1	Reads and writes simple words (that are class level appropriate) and knows names of objects, birds, animals, etc seen in daily life	7
2	Reads and writes sentences using grammar concepts	8
3	Knows synonyms, antonyms and deduces word meanings from clues in context	7
4	Reads descriptive text and comprehends explicit and implicit details for class level	11
5	Understands written information presented in various forms as Tables, Notices, Tickets, Posters, Labels, etc seen in real life for class level	11

Maths Class 3

Sr. No	Skill	Questions Tested
1	Number sense	6
2	Four basic arithmetic operations	6
3	Fractions	3
4	Geometry: Basic Shapes	4
5	Measurement and its applications	5
6	Applications in daily life	5

Maths Class 5

Sr. No	Skill	Questions Tested
1	Number sense and basic number competency	3
2	Factors and Multiples	3
3	Four arithmetic operations	6
4	Fractions and Decimals, Percentages: concepts, use and conversion	5
5	Geometry	2
6	Area and Perimeter	4
7	Data interpretation and analysis	2
8	Application in daily life and word/visual problems	6
9	Measurement and its applications	5
10	Problem Solving	4

Sr. No	Skill	Questions Tested
1	Number sense, related competency and computation skills	4
2	Integers, rational and irrational numbers	6
3	Powers and bases: concepts and applications	5
4	Fractions , Decimals, Ratios & Percentages: concepts, use and conversion	6
5	Area and Perimeter, Volume and Surface Area	6
6	Geometry: concepts and applications	5
7	Algebra: concepts and applications	9
8	Applications in daily life	6
9	Data interpretation and analysis	6
10	Problem Solving	7

Note: The skill names for a subject can be the same across classes but the questions tested under these are age appropriate and tested students on concepts that they were expected to know at the respective class level.

Note: 2 items were dropped due to errors. The above table lists the total number of unique items remaining after these drops in each class. Only these items were used for the purpose of analysis.

APPENDIX D: EFFECT SIZE

Effect size is a standard metric of expressing the difference in performance between two groups. It indicates the standardised difference between means of two different groups. It is used internationally & well accepted in research and literature. Key points-

1. A way to quantify the performance gaps on a standard scale so that it can be interpreted and understood easily
2. Expressed in terms of Standard Deviation (SD) unit
3. SD should be calculated from the sample which is representative of the entire population
4. Applicable for normal distribution curves only
5. Measuring relative gain:

   $d = (\text{Mean}_{\text{Treatment}} - \text{Mean}_{\text{Control}}) / SD$

6. Measuring absolute gain:

   $d = (\text{Mean}_{\text{End of Treatment}} - \text{Mean}_{\text{Beginning of Treatment}}) / SD$

The other reason for using the effect size metric is that most research studies and literature in education use this metric to express differences in learning levels or impact of different interventions - this allows us to compare the effect sizes we observe in MSDF supported interventions with numbers we see in other research studies.

What is a significant effect size?

In our analysis, we are using **Cohen's d Convention** for small, medium and large effects which is used when comparing averages of two different groups. Cohen's d is calculated by the dividing the difference of means of the two groups by the standard deviation of the reference group. The divisor could also be a combined standard deviation of the two groups together. In that case it will be known as the pooled standard deviation. Since we are

always comparing where a group stands in relation to the reference group we decided to use the standard deviation of the reference group. In general we use the standard table below to interpret effect sizes.

Cohen's d	Effect Size
0.2 - 0.5	Small
0.5 - 0.8	Medium
> 0.8	Large

APPENDIX E: METHODOLOGY OF SCALE ANCHORING

Scale anchoring method has been used to summarize and describe student achievement. This meant that several points along a scale were selected as anchor points. The items that students scoring at each anchor point could answer correctly (with a specified probability) were then identified and grouped together. Subject-matter experts reviewed the items that "anchored" at each point and delineated the content knowledge and conceptual understandings each item represented. The item descriptions were then summarized to yield descriptions of what students scoring at the anchor points are likely to know and be able to do.

In order to conduct the data analysis for the scale anchoring, the following steps were used:

1. Anchor points were selected as the 25th, 50th, 75th, 90th percentiles.

2. Group of examinees at each anchor point was formed. For each group, students whose total scores were in between a range of 5 percentile on either side of the target percentile were selected. For example, for the lower quartile group, students who were between the 23rd and 27th percentiles were selected. Similarly the 4 percentile groups were formed.

3. The proportion of students at each anchor points answering the items correctly was calculated.

4. A question was said to have "Anchored" in a specific percentile group if the students at that level got it right with a high rate (i.e., if 65% of students got it correct) and the students at the immediate lower percentile group level got it correct at a comparatively lower rate (i.e., less than 50% students got it correct). For the 25th percentile, as this is the lowest point, items were checked for 65% of students answering the item correctly.

5. A question was said to have "Almost anchored" in a specific percentile group if the students at that level got it right with a high rate (i.e., if 60% of students got it correct) and the students at the immediate lower percentile group level got it correct at a comparatively lower rate (i.e., less than 50% students got it correct). For the 25th percentile, as this is the lowest point, items were checked for 60% of students answering the item correctly.

6. The questions which anchored at the 25th percentile are the questions which even the weakest students can answer. Questions which anchored at the 50th percentile are difficult for the weaker students but are grasped by the students slightly better. Questions that anchored at the 75th percentile are understood by students who have comparatively better ability and Questions that anchored at 90th percentile can be answered only by the best students.

Development of Anchor Level Descriptions

Once the items for each of the anchor points were identified based on the above process, the anchor level descriptions of what students know and do at each anchor point was developed in the following manner by a team of subject experts:

1. Each item that 'anchored' was examined and short descriptions of knowledge, understanding and /or skills demonstrated by the student was arrived at.

2. Based on all the items that anchored at each anchor point, description of what the students know and are able to do at each anchor point was arrived at.

Example items were then selected to support and illustrate the anchor point descriptions.

APPENDIX F: SKILL WISE RECOMMENDATION

Class 3 Maths Skills and Recommendations

1. **Number sense:** Number sense is fundamental to the understanding of arithmetic operations. A good understanding of place value, grouping, regrouping etc. would ensure less errors in arithmetic operations. Decimal cubes can be used to aid understanding of place value as in the Montessori Method. Operations can be introduced after a firm understanding of place value is attained.

2. **Four basic arithmetic operations:** Initially expose students to known factors like 1/2 or 1/4 etc. And build their concept on understanding from practical examples like share an apple amongst 4 persons and make them understand fraction, ratio and percentage for the share one has got.

3. **Geometry: Basic Shapes:** Understanding of basic shapes is the key to understanding geometrical concepts. Try to build activity based identification of the shapes with games, fun learning. Show them chess board, football, black board, chalk stick, pencil etc to explain shapes. News paper with advertisements can be used for identification of plane shapes.

4. **Measurement and its applications:** To strengthen the measurement skill, students should be allowed to use actual instruments like ruler, weighing scale etc. to measure different quantities. They should also be taught measurement using non-standard units (hand spans, footsteps, arm length etc.) and standard units. Help them appreciate the need for standard units.

5. **Applications in daily life:** We encounter fractions, decimals, percentages, graphs, measurement concepts etc. in day-to-day life activities. Students can be involved in a group project where they need to do hands-on math. E.g. They can be taken to a trip to zoo. Ask them to budget their expense, manage spending and distribute costs equally among students. Ask them to represent numbers of different kinds of animals they saw.

Class 5 Maths Skills and Recommendations

1. **Number sense and basic number competency:** Give students enough practice on number line. Teach them number patterns using flash cards, worksheets etc. Build the concept of place value by using real life problems. For example, (1) A student requires 33 marks to pass and scores 50 marks, what is his additional score at test? (2) I have 1 2 pencils. I gave 3 to my sister, 5 to my brother and 2 to my friend. How many pencils do I have now?

2. **Factors and Multiples:** Initially expose students to known factors like 1/2 or 1/4 etc. And build their concept on understanding from practical examples like share an apple amongst 4 persons and make them understand fraction, ratio and percentage for the share one has got.

3. **Four arithmetic operations:** Teaching strategy should focus on building the concepts. Explain the students the logic behind algorithms that are used in arithmetic operations. A very important skill with respect to arithmetic operations is the skill of estimation. Students' skill of estimation improves as they come across various problems and are encouraged to estimate.

4. **Fractions and Decimals: concepts, use and conversion:** Initially expose students to known factors like 1/2 or 1/4 etc. And build their concept on understanding from practical examples like share an apple amongst 4 persons and make them understand fraction, ratio and percentage for the share one has got.

5. **Geometry:** Understanding of basic shapes is vital for learning geometry as subject. Children should be given real life examples of shapes like Railway track for parallel lines, Marry go round for circle, marbles for sphere etc. They already know the shapes but not learnt the geometrical identities of the shapes and that should be emphasize to make learning process easier.

6. **Area and Perimeter:** The teacher should work towards helping students deal with the confusion about area and perimeter. This can be done with showing them shapes which have same area but different perimeter or vice-versa. Make the problems relevant to them, through questions like "Atul breaks his rectangular ruler. What happens to the area, perimeter?" help the students come out with their thoughts and address the misconceptions.

7. **Application in daily life and word/visual problems:** The student should be exposed to questions where s/he would need to apply the knowledge of multiple skills/content areas. Students should be encouraged to identify patterns in nature and surroundings.

8. **Measurement and its applications:** The most challenging part of teaching measurement is making the student appreciate length as an attribute. The emphasis on scales should be removed. Even in measurement the skill of estimation is absolutely essential. To strengthen the measurement skill, students should be made to use actual instruments like ruler, weighing scale etc. to measure different quantities.

9. **Problem Solving:** Teacher should ask the children to first explain how they have understood the problem and also what needs to be done in the problem etc. Once this is done, teacher should identify where exactly are the children making mistakes. By interspersing real-life examples in teaching, they can be shown that what is learnt is for application with real problems only, and not for a different purpose.

Class 8 Maths Skills and Recommendations

1. **Number sense, related competency and computation skills:** Link school math to real-world experiences: Students need to recognize that numbers are useful for solving problems which they encounter in day-to-day life. Focus on what methods make sense for different situations. We need our students to be flexible thinkers. Teachers should ensure a good understanding of place value, grouping, regrouping etc. in arithmetic operations.

2. **Powers and bases: concepts and applications:** Introduce exponents through the fact that they are convenient to use when some number is multiplied a lot of times. The cumbersomeness of 2 x 2 x ...x 2 10 times as compared to the shortness of 210. There is a big danger of teachers getting caught with the idea of encouraging students to memorize the rules of exponents. Hence the teachers should deal with a lot of numbers and calculations till the students come up with the rule on their own.

3. **Fractions, Decimals, Ratios & Percentages: concepts, use and conversion:** While teaching fractions the teacher should remember that the students have encountered fraction before in their daily lives and hence should deal with fraction aligning to their cultural knowledge of fractions. Use questions with which students can relate, think and understand and have a class discussion on the same. Use pictures to support your answer if necessary.

4. **Area and Perimeter, Volume and Surface Area:** The teacher could talk in terms of "boundary of the figure" and "space enclosed inside the boundary" first, and introduce the terms "perimeter" and "area" only after students have understood the concepts. Always use paper or cardboard cut-outs and take care to highlight the concept taught. Support with diagrams, and help the students come out with their thoughts.

5. **Geometry: concepts and applications:** Playing a simple game as follows, can help children to connect properties to visual images, and internalize which properties are most important in a shape. The picture of a shape is given to a child and she has to give clues to another child who cannot see the picture, without using the name of the shape. The other child has to guess the name of the shape. As children get familiar with this, the game could be made more complex, by involving shapes in different orientations.

6. **Algebra: concepts and applications:** The one thing that proves to be a hurdle in a student understanding algebra is the concept of variables. Try using shapes instead of letters while using variables. Once the students accept shape as a variable then move to alphabets. Discuss the ways in which algebra concepts relate to everyday problems as well as other school subjects.

7. **Applications in Daily life:** Students should be encouraged to identify patterns in nature and surroundings. The student should be exposed to questions where s/he would need to apply the knowledge of multiple skills/content areas.

8. **Problem Solving:** Teacher should ask the children to first explain how they have understood the problem and also what needs to be done in the problem etc. Once this is done, teacher should identify where exactly are the children making mistakes. By interspersing real-life examples in teaching, they can be shown that what is learnt is for application with real problems only, and not for a different purpose.

Class 3 Language Skills and Recommendations

1. **Recognises letters and words of 3-4 letters, by their sound and form, writes them, and knows the starting sound as well as letter of familiar words:**
    1. Facilitate students with Whole Language Approach
    2. Provide contexts from day to day life.
    3. Provide sufficient activities and exercises where they get enough exposure towards such skills.

2. **Knows names of objects, birds and animals seen in daily life:**
    1. Facilitate students with Whole Language Approach
    2. Provide contexts from day to day life.
    3. Provide sufficient activities and exercises where they get enough exposure towards such skills.

3. **Uses words appropriate to the context based on their meanings and gender endings:**
    1. Teach language always with context. By this approach student will always read, understand and relate words to their context.
    2. Provide sufficient activities, i.e. fill in the blanks, Match the following, fill the remaining information, etc.
    3. Cloze tests can be very useful to strengthen such skills.

4. **Reads, understands, writes and constructs simple and short sentences that have less than 5 words in a sentence:**
    1. Provide creative and meaningful writing tasks as much as possible.
    2. Give a problem situation or activities that require observations and writing based on the observations, etc.
5. **Understands simple, short stories of 8-10 sentences when told and comprehends beyond the stated facts:**
    1. Give sufficient exposure with variety of questions based on the textbook lessons. These questions have to be different than questions given at the end of each lessons.
    2. Increase library based work and projects as a part of your daily classroom teaching. Discuss stories with the help of questions which require creativity and critical thinking.
    3. Allow students to read and present new stories to the class. Let them create questions based on such stories on their own.
6. **Reads short text of 5-6 sentences that describes daily activity, routine context, simple description, simple story independently and comprehends state:**
    1. Create and provide Reading comprehensions which are based on the day to day life of students.
    2. Allow students to share their own daily activities and routines; make questions based on that to provide first hand experiences.
    3. Use content like, advertisements, posters, notices, etc. available in our day to day life. Create questions based on that and give students sufficient exercise.

Class 5 Language Skills and Recommendations

1. **Knows a wider range of names of objects, birds and animals not seen in daily life and words denoting actions and feelings:**
    1. Give exposure of various themes based and activity based vocabulary which contains action words, adjectives, etc.
    2. Conduct activities like 'Name that object and tell its usage/action/characteristic'. Such activities can be done in groups and pairs also.
2. **Uses words appropriate to the context based on their meaning, time, number, gender and description:**
    1. Teach language always with context. By this approach student will always read, understand and relate words to their context.
    2. Provide sufficient activities, i.e. fill in the blanks, Match the following, fill the remaining information, etc.
    3. Cloze tests can be very useful to strengthen such skills.
3. **Reads, understands, constructs and punctuates simple sentences that have 5-6 words in a sentence:**
    1. Provide creative and meaningful writing tasks as much as possible.
    2. Give a problem situation or activities that require observations and writing based on the observations, etc.
    3. Give sentences or passages with or without punctuations in such a way that to make clear meaning one has to make correct changes in the punctuations.

4. **Reads descriptive text, short stories of 8-10 sentences independently and comprehends beyond stated facts:**
    1. Give sufficient exposure with variety of questions based on the textbook lessons. These questions have to be different than questions given at the end of each lessons.
    2. Increase library based work and projects as a part of your daily classroom teaching. Discuss stories with the help of questions which require creativity and critical thinking.
    3. Allow students to read and present new stories to the class. Let them create questions based on such stories on their own.

5. **Understands written information presented in various forms as Tables, Notices, Tickets, Posters, Labels, etc seen in real life:**
    1. Create and provide Reading comprehensions which are based on Tables, Notices, Tickets, Posters, Labels, etc. from the day to day life of students.
    2. Allow students to bring posters, tickets, advertisements, etc.; allow them to make questions based on that to provide first hand experiences.
    3. Use content like, advertisements, posters, notices, etc. available in our day to day life. Create questions based on that and give students sufficient exercise.

Class 8 Language Skills and Recommendations

1. **Reads and writes simple words (that are class level appropriate) and knows names of objects, birds, animals, etc seen in daily life:**
    1. Give exposure of various themes based and activity based vocabulary which contains action words, adjectives, etc.
    2. Conduct activities like 'Name that object and tell its usage/action/characteristic'. Such activities can be done in groups and pairs also.

2. **Reads and writes sentences using grammar concepts:**
    1. Conduct variety of activities on vocabulary. Create a word-bank based on the various difficulty levels and introduce such words by knitting them in an activity or a game.
    2. Encourage students to create theme based vocabulary under project work.
    3. Allow students to do peer assessment on vocabulary related tasks.

3. **Knows synonyms, antonyms and deduces word meanings from clues in context:**
    1. Teach language always with context. By this approach student will always read, understand and relate words to their context.
    2. Provide sufficient activities, i.e. fill in the blanks, Match the following, fill the remaining information, etc.
    3. Cloze tests can be very useful to strengthen such skills.

4. **Reads descriptive text and comprehends explicit and implicit details for class level:**
    1. Give sufficient exposure with variety of questions based on the textbook lessons. These questions have to be different than questions given at the end of each lessons.
    2. Increase library based work and projects as a part of your daily classroom teaching. Discuss stories with the help of questions which require creativity and critical thinking.
    3. Allow students to read and present new stories to the class. Let them create questions based on such stories on their own.

5. **Understands written information presented in various forms as Tables, Notices, Tickets, Posters, Labels, etc seen in real life for class level:**
    1. Create and provide Reading comprehensions which are based on Tables, Notices, Tickets, Posters, Labels, etc. from the day to day life of students.
    2. Allow students to bring posters, tickets, advertisements, etc.; allow them to make questions based on that to provide first hand experiences.
    3. Use content like, advertisements, posters, notices, etc. available in our day to day life. Create questions based on that and give students sufficient exercise.

Class 3 English Skills and Recommendations

1. **Recognises letters and words of 3-4 letters, by their sound and form, writes them, and knows the starting sound as well as letter of familiar words:** Make children undergo an activity where they understand the starting sound and letters for various objects, birds and animals. Make flash cards of various letters and make sure that students can identify the letters well. Some cards can be given to students and they can be asked to make words having similar sounds.

2. **Knows names of objects, birds and animals seen in daily life:** Ask teachers to make cards of birds, animals which are seen in the daily life. First ask the student to identify the card and after that show them the back of the card which carries the actual name. It can be compared whether they have identified correctly or not.

3. **Uses words appropriate to the context based on their meanings and gender endings:** Make students read the text with context. By doing that children will always understand words and will be able to relate it to the existing context. If students are made to undergo enough activities like filling the blanks, matching the pairs and filling in the cloze, it can help them understand the context very well.

4. **Reads, understands, writes and constructs simple and short sentences that have less than 5 words in a sentence:** Give students writing work which includes more meaningful and creative writing. Give them an issue, an event or observations and ask them to narrate it in their words.

5. **Understands simple, short stories of 8-10 sentences when told and comprehends beyond the stated facts:** Give students passages related to daily life and allow them to comprehend them. Give them more activities related to using library and include more project work in their routine studies. Discuss stories by discussing questions related to that and encourage students to think creatively and analytically. Make them answer as many questions as possible related to textbook lessons. But make sure that these questions are different from those given in the textbook. Ask students to read new stories and narrate them.

6. **Reads short text of 5-6 sentences that describes daily activity, routine context, simple description, simple story independently and comprehends state:** Give students passages related to daily life and allow them to comprehend them. Give them more activities related to using library and include more project work in their routine studies. Discuss stories by discussing questions related to that and encourage students to think creatively and analytically. Make them answer as many questions as possible related to textbook lessons. But make sure that these questions are different from those given in the textbook. Ask students to read new stories and narrate them.

Class 5 English Skills and Recommendations

1. **Knows a wider range of names of objects, birds and animals not seen in daily life and words denoting actions and feelings:** Take cards in the classroom which have various objects, birds and animals drawn. Teach the names of these to students. Ask them to then identify the names by showing them the cards. Also include certain pictures of animals or birds which they do not see in their surroundings. Make them know and remember these words. This will only strengthen their vocabulary.

2. **Uses words appropriate to the context based on their meaning, time, number, gender and description:** Make students read the text with context. By doing that children will always understand words and will be able to relate it to the existing context. If students are made to undergo enough activities like filling the blanks, matching the pairs and filling in the cloze, it can help them understand the context very well.

3. **Reads, understands, constructs and punctuates simple sentences that have 5-6 words in a sentence:** Ask students to write various sentences. Explain them how to use punctuations and their meanings. Explain to them the importance of punctuations by giving them the examples of sentences where changing the punctuations can change the meaning of the sentence.

4. **Reads descriptive text, short stories of 8-10 sentences independently and comprehends beyond stated facts:** Give students passages related to daily life and allow them to comprehend them. Give them more activities related to using library and include more project work in their routine studies. Discuss stories by discussing questions related to that and encourage students to think creatively and analytically. Make them answer as many questions as possible related to textbook lessons. But make sure that these questions are different from those given in the textbook. Ask students to read new stories and narrate them.

5. **Understands written information presented in various forms as Tables, Notices, Tickets, Posters, Labels, etc seen in real life:** Explain the significance of information found in various sources like newspaper, books and other sources. Explain to them that information is also printed on poster, advertisement, tickets and other wrappers as well. Encourage them to notice and read such information. Encourage them to read important information like Date of production, price and the date of expiry and other details. Ask them questions related to that.

6. **Reads and writes simple words (that are class level appropriate) and knows names of objects, birds, animals, etc seen in daily life:**

    1. Teach one new word in the first two weeks. After that teach them two words each week. These words should be such words which are nouns, verbs and/or pronouns. Ask students to read the words aloud. Ask them to practice writing of the words and explain the meanings to them as well.

    2. To ensure that students build their vocabulary, make them play activities in which they can relate the pictures showing certain activities with specific words. Give them passages with a fewer words and ask them to explain the context and meaning of the words in the classroom. Give them riddles to solve the questions. Ask them to identify words having spelling mistakes.

7. **Reads and writes sentences using grammar concepts:**

    1. Give students writing work which includes more meaningful and creative writing. Give them an issue, an event or observations and ask them to narrate it in their words.
    2. Give them sentences of passages with our without punctuations and ask them to explain the meaning of the sentences. They should understand that by putting the punctuation marks at the correct place only the meaning of the sentence can be maintained.

8. **Knows synonyms, antonyms and deduces word meanings from clues in context:**

    1. Make students read the text with context. By doing that children will always understand words and will be able to relate it to the existing context. If students are made to undergo enough activities like filling the blanks, matching the pairs and filling in the cloze, it can help them understand the context very well.
    2. Give students such sentences where the same word is used in different meanings. Explain to the students by discussing with them that even the same word can have two different meanings. Encourage students to find out meanings of such words.

9. **Reads descriptive text and comprehends explicit and implicit details for class level:**

    1. Give a passage or story to students to read. Ask them 'who', 'why', 'when', 'how' related to the story/ passage. Ask them to then infer the facts which are part of the story which they have to understand on the basis of comprehension.

    2. Give students small stories or passages and ask them to narrate them. If there are characters in the story, then ask the students to narrate the actions of each character. Ask them to infer the lesson in the passage.

10. **Understands written information presented in various forms as Tables, Notices, Tickets, Posters, Labels, etc seen in real life for class level:**

    1. Explain the significance of information found in various sources like newspaper, books and other sources. Explain to them that information is also printed on poster, advertisement, tickets and other wrappers as well. Encourage them to notice and read such information. Encourage them to read important information like Date of production, price and the date of expiry and other details. Ask them questions related to that.
    2. Ask students to bring any such information that they find in their home. Ask them to understand that information and explain the important information shared therein. Divides students in groups and ask them to make posters on something specific. Ask them to mark the important information that is important. Ask students to use appropriate words. Let each group share the information of the other group and explain.

11. **Identifies letters and sounds:** Make children undergo an activity where they understand the starting sound and letters for various objects, birds and animals. Make flash cards of various letters and make sure that students can identify the letters well. Some cards can be given to students and they can be asked to make words having similar sounds.

12. **Identifies words for everyday objects, animals, etc.:** Take cards in the classroom which have various objects, birds and animals drawn. Teach the names of these to students. Ask them to then identify the names by showing them the cards. Make them know and remember these words. This will only strengthen their vocabulary.

13. **Uses grammar concepts correctly:** Ask students to read the words aloud. Ask them to identify the nouns, verbs, adverbs and other related words and explain how various words change their forms with changing tense, gender and aspect.

14. **Identifies explicit and implicit details and ideas from an unseen passage:** Make use of tables, posters, information, tickets and labels used in daily life. Ask students to bring such material and ask them only to make questions related to those. Ask them questions related to them and make them practice to understand the related text.

15. **Identifies letters and sounds:** Make children undergo an activity where they understand the starting sound and letters for various objects, birds and animals. Make flash cards of various letters and make sure that students can identify the letters well. Some cards can be given to students and they can be asked to make words having similar sounds.

16. **Identifies words for everyday objects and animals:** Make children undergo an activity where they understand the starting sound and letters for various objects, birds and animals. Make flash cards of various letters and make sure that students can identify the letters well. Some cards can be given to students and they can be asked to make words having similar sounds.

17. **Uses grammar concepts correctly:** Ask students to read the words aloud. Ask them to identify the nouns, verbs, adverbs and other related words and explain how various words change their forms with changing tense, gender and aspect.

18. **Identifies explicit and implicit details and ideas from an unseen passage:** Make use of tables, posters, tickets and labels used in daily life. Ask students to bring such material and ask them only to make questions related to those. Ask them questions related to them and make them practice to understand the related text.

Class 8 English Skills and Recommendations

1. **Knows names of animals, birds, objects and people:** Take cards in the classroom which have various objects, birds and animals drawn. Teach the names of these to students. Ask them to then identify the names by showing them the cards. Make them know and remember these words. This will only strengthen their vocabulary.

2. **Understands grammar concepts:** Teach one new word in the first two weeks. After that teach them two words each week. These words should be such words which are nouns, verbs and/or pronouns. Ask students to read the words aloud. Ask them to practice writing of the words and explain the meanings to them as well.

3. **Uses words appropriate to the context based on their meanings, gender, and number:** Make students read the text with context. By doing that children will always understand words and will be able to relate it to the existing context. If students are made to undergo enough activities like filling the blanks, matching the pairs and filling in the cloze, it can help them understand the context very well.

4. **Reads, understands and constructs simple sentences:** Write a sentence on the blackboard and mention an unknown word on it. Ask students to find out the meaning of the word. Also share with them the words that change forms with changing tense, gender and aspect.

5. **Reads descriptive and narrative texts of 10 -12 sentences and comprehends stated information:**
    1. Give a passage or story to students to read. Ask them ‘who’, ‘why’, ‘when’, ‘how’ related to the story/ passage. Ask them to then infer the facts which are part of the story which they have to understand on the basis of comprehension.
    2. Give students small stories or passages and ask them to narrate them. If there are characters in the story, then ask the students to narrate the actions of each character. Ask them to infer the lesson in the passage.

6. **Understands and infers from written information presented in various forms as Tables, Notices, Tickets, Posters, Labels, etc seen in real life:** Explain the significance of information found in various sources like newspaper, books and other sources. Explain to them that information is also printed on poster, advertisement, tickets and other wrappers as well. Encourage them to notice and read such information. Encourage them to read important information like Date of production, price and the date of expiry and other details. Ask them questions related to that.

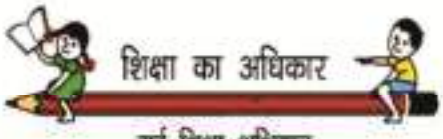
Class 8 EVS Skills and Recommendations

1. **Knowledge of facts and instruments:** While the lesson is being taught, more examples from real life should be discussed. This will help in enhancing their understanding about science in daily life.

2. **Understanding and application of concepts:** Give a situation to the class. Ask children to estimate and hypothesize about the situation. Discuss why they came to those reasons. And explain in detail to them why their inferences/ observations/ estimations are scientifically wrong or right. Help them establish links between various observations to reach to the possible reasons.

3. **Reasoning and analysis:** Schedule group discussions on topics like human body. Provide them with subject related information. Help them understand the topic logically. To add to the recommendations made earlier, encourage them to collect more evidences for the conclusions they have reached. Discuss their conclusions in detail and help them understand why their reasons are scientifically correct or incorrect. Help students establish links between various observations and help them understand why a scientific event happens in a particular way. Children can be explained various processes, various physiological systems through multimedia and internet. By doing so, the students can have better clarity and understanding of concepts.

Diagnostic Assessment of Student Learning in Government Schools of Haryana (2014-2015)



educational initiatives