



প্রাথমিক শিক্ষার দীপ্তি
উন্নত জীবনের ভিত্তি

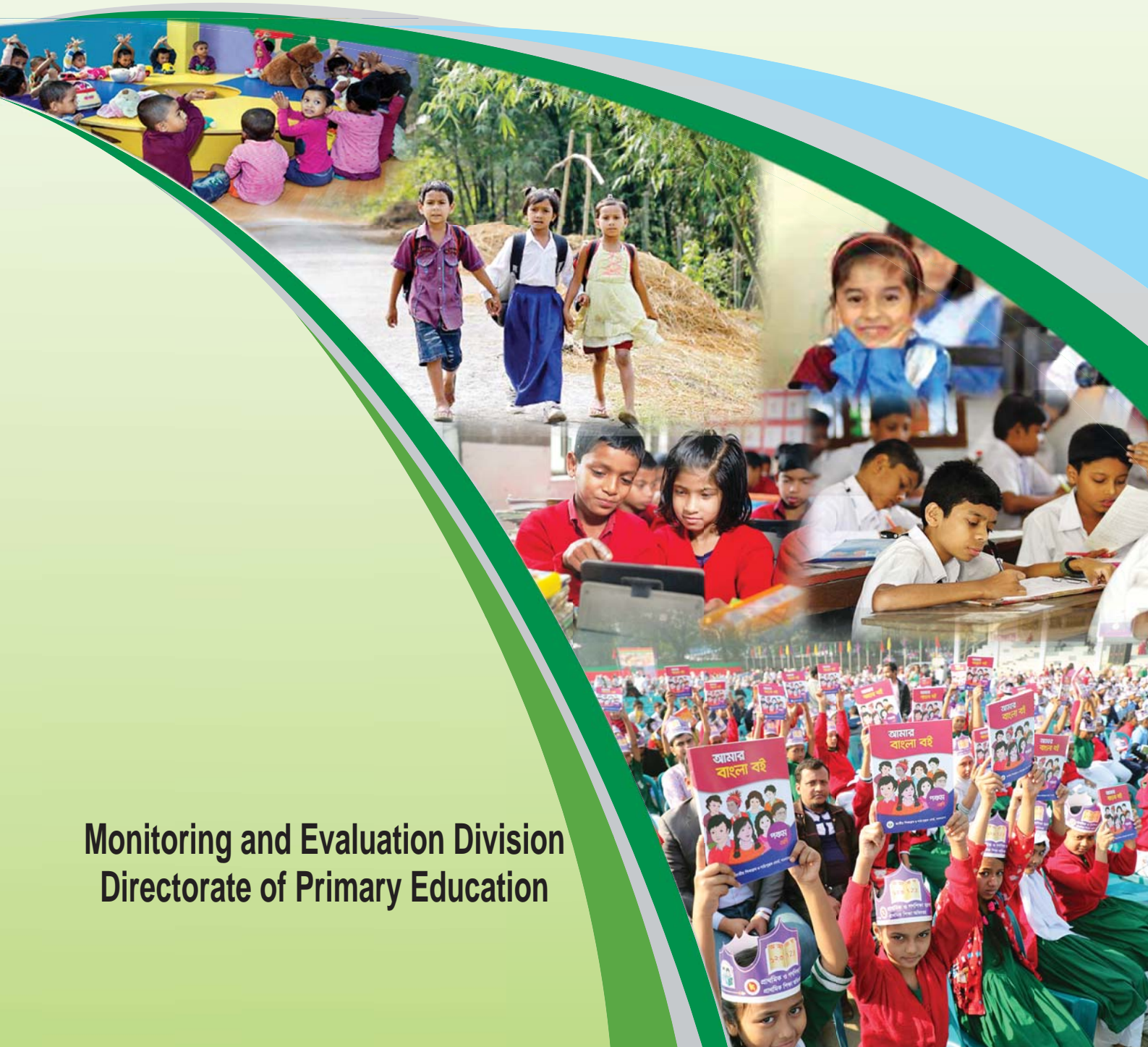


Government of the People's Republic of Bangladesh
Ministry of Primary and Mass Education

The National Student Assessment 2017

Grades 3 and 5

Monitoring and Evaluation Division
Directorate of Primary Education





Government of People's Republic of Bangladesh
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List of Acronyms

Acronyms

AIR	American Institutes for Research
ACER	Australian Council for Educational Research
AUEO	Assistant Upazila Education Officer
BRAC	Building Resources Across Communities
BSS	Bangla Scale Score
CELS	Child Education and Literacy Survey
CPE	Compulsory Primary Education
CRQ	Constructed Response Question
DPE	Directorate of Primary Education
ECCD	Early Childhood Care and Development
EFA	Education for All
GOB	Government of Bangladesh
GPS	Government Primary Schools
HSA	High School Attached
IRT	Item Response Theory
KG	Kindergarten
LASI	Learning Assessment in SEQAEP Institutions
MCQ	Multiple Choice Question
MoPME	Ministry of Primary and Mass Education
MSS	Mathematics Scale Score
NAC	National Assessment Cell
NAPE	National Academy for Primary Education
NNPS	Newly Nationalized Primary School
NCTB	National Curriculum and Textbook Board
NSA	National Student Assessment
PECE	Primary Education Completion Examination
PEDP	Primary Education Development Program
PIRLS	Progress in International Reading Literacy Study
PISA	Program for International Student Assessment
RNGPS	Registered Non-Government Primary School
ROSC	Reaching Out of School Children
SRQ	Selected Response Question
TIMSS	Trends in International Mathematics and Science Study
URC	Upazila Resource Centre

EXECUTIVE SUMMARY

The National Student Assessment (NSA) program in the People's Republic of Bangladesh was initiated in 2006 by the Ministry of Primary and Mass Education (MoPME) to assess achievement in primary education. A key purpose of the NSA is to provide accurate and timely data-driven information to support policy and planning, enhance teacher education programs, and improve classroom instruction to increase student learning. This report presents the results of the 2017NSA – the 6th administration of the NSA conducted since 2006 – for Bangla Language and Mathematics in Grades 3 and 5. In addition to assessing student learning outcomes as prescribed by curricula and content standards, the NSA program investigates differences in pupil achievement by key system, school, and student factors. As a monitoring program, the NSA provides an independent and objective source of information for those seeking a clear view on the state of primary education in Bangladesh. Moreover, it would be treated as the baseline of PEDP4, as well as the baseline of SDG4 that will sustain until 2030 with the revision of indicators in 2019 and 2024 respectively by the world education forum led by UNESCO.

Beyond the results obtained in the NSA 2017, highlights of which are briefly summarized below, 3 major achievements of the current administration of the NSA and the assessment development work that led up to the administration must be emphasized:

- 1 The NSA has taken important steps to continue to improve quality and meet international standards in sample-based assessment design, development, analysis and reporting;
- 2 The government institutions involved in the multiple phases of the assessment continue to make important gains in the levels of technical and management expertise, responsibility, and ownership of many of the key assessment procedures;
- 3 Greater focus is being placed on the formative, informative, and pedagogical value of the NSA results through reporting procedures and dissemination of results, emphasizing the understanding of factors associated with student performance, increasing the relevance and impact of the program;

Assessment results of a program like the NSA, which attempt to capture learning outcomes of students who represent national and sub-national achievement, must always be understood in the context from which they are derived. In the case of the NSA 2017, it is important to point out the following contextual characteristics which, to a greater or lesser degree, may have had some impact on the results obtained:

- Bangladesh initiated curriculum revision efforts in 2012 with a staggered distribution program of curriculum materials that were still in progress in the 2017 school year. As was noted in the NSA 2013, minimal changes or even declines in measured student performance are reflective of the time it takes to have an impact on instruction and see improvements in student learning when curricular and instructional reforms are taking place;
- Improvements in access to the education system and its resources, typically targeting traditionally marginalized groups of students who represent the lower performance levels in the system, may have lowered averages on the NSA;
- Motivation among schools, teachers, and students to participate on a low-stakes assessment such as the NSA has been noted to be somewhat low, especially in Grade 5 where there is a greater need for more rigorous attention to the high-stakes national primary education completion examinations (PECE);

- The administration of NSA 2017 happened over two months after closing the school year, thus, after the period of typical student inactivity, which may have undesirable impact on the results.

This report highlights NSA 2017 results as well as key performance trends between the 2013, 2015 and 2017 assessments which must be understood considering the contextual constraints described above. Because the NSA tests across 2011, 2013, 2015, and 2017 were equated and placed on a common measurement scale, changes in performance across grade levels can be compared.

Table 1 below summarizes the participation rates by divisions, indicating the number of districts, schools, and students as observed in Grades 3 and 5 (note that the number of schools for each grade may not be the same in all divisions because in some cases data were obtained only in one grade). More detailed evidence of participation per each district is given in Appendix 1.

Table 1 : Participation of Districts, Schools, and Students in the NSA 2017

Division	# District	Grade 3		Grade 5	
		# Schools	# Students	# Schools	# Students
Rajshahi	8	186	3799	183	3154
Khulna	10	177	3599	196	3378
Dhaka	13	308	6391	311	5442
Mymensing	4	107	2212	124	2012
Chittagong	11	252	5023	266	4405
Barisal	6	127	2170	109	1514
Sylhet	4	100	1873	100	1555
Rangpur	8	160	3335	157	2685
Total	64	1417	28402	1446	24145

All 4 administration cycles of the NSA have shown good test reliability (see Table 2 below) with a significant increase in reliability shown in the NSA 2015 and 2017 cycles, in other words demonstrating that test items have consistently measured the targeted constructs. It can be observed that test quality has substantially increased in 2017, most likely owing to the intensive training of item writers and to the embedded pilot design, which typically enables selection of higher item quality.

Table 2 : Test Reliability Coefficients (Cronbach Alphas) for NSA 2011, 2013, 2015, and 2017

Test	2011	2013	2015	2017
Bangla Grade 3	0.84	0.83	0.91	0.96
Bangla Grade 5	0.82	0.81	0.87	0.95
Mathematics Grade 3	0.87	0.85	0.89	0.95
Mathematics Grade 5	0.88	0.86	0.89	0.95

Table 3 below presents mean scale scores for NSA tests across four administration years. The differences between student performance in 2017 and 2015 NSA administrations appeared statistically significant in all but Math Grade 3 test. However, when differences across administrations are evaluated in terms of effect sizes (using Cohen's *d*), Bangla Grade 3 and Math Grade 5 are evaluated as showing negligible to small increase, while decline in Bangla Grade 5 is considered as a small effect size.

The relative stagnation across administration years within grade (by horizontal comparisons) are contrasted with substantial gains from Grade 3 to Grade 5 across 2 consecutive administration years (vertical learning gains evaluated on the same generation of students). In Bangla Language, there is a vertical gain of 15 scale score points from Grade 3 in 2011 to Grade 5 in 2013, also 10 points of vertical gain from Grade 3 in 2013 to Grade 5 in 2015, as well as 8 points of vertical gain from Grade 3 in 2015

to Grade 5 in 2017. In Mathematics, a similar pattern of vertical gain is observed from Grade 3 to Grade 5: 15 scale score points from 2011 to 2013, 7 points from 2013 to 2015, and 13 points from 2015 to 2017. Vertical gains across grades are to be expected and worthwhile evaluating as an evidence of student learning progress, especially considering that most of them fall in the category of strong effect sizes as the gains are as large as one standard deviation or more.

Table 3 : Overall Scale Score Means for the NSA 2011, 2013, 2015, and 2017

Test	2011	2013	2015	2017
Bangla Grade 5	116.2	115.2	114.1	108.6
Bangla Grade 3	100.2	104.2	100.8	102.7
Mathematics Grade 5	118.6	115.8	110.2	111.5
Mathematics Grade 3	100.8	103.7	98.4	98.4

Viewed from the perspective of performance bands – using the bands developed by ACER and described in the 2011 technical report (henceforth referred to as “legacy bands”) – results provide a dramatically different picture between grade levels (see Table 4 below). In Grade 3 Bangla, the results are relatively stable across the administration cycles 2013, 2015, and 2017, with about three quarters of students achieving AT or ABOVE grade expectations (i.e., scored in Bands 3-5). In Grade 3 Mathematics, the percentage of students who reach grade level expectations was 41% in both 2015 and 2017 and 57% in 2013. However, Grade 5 results expressed on the “legacy bands” are showing dramatically different picture. In Bangla Language Grade 5, according to the “legacy bands”, only 12%-25% of students across the last 3 NSA cycles achieved at grade level (i.e., scored at Band 5). In Mathematics Grade 5, the figures range from 11%-25% of students who achieve on grade level in the last three NSA cycles. In other words, according to the “legacy bands”, there is a dramatic drop in percentage of students achieving at grade level in both Math and Bangla as students move from Grade 3 to Grade 5, which evidence represents a challenge to its validity.

Table 4 : Percentage of Students in “Legacy Bands” for NSA 2013, 2015, and 2017

Administration year	2013		2015		2017	
Bands→	Below Grade 3	On/Above Grade 3	Below Grade 3	On/Above Grade 3	Below Grade 3	On/Above Grade 3
Bangla Grade 3	25%	75%	32%	68%	26%	74%
Mathematics Grade 3	43%	57%	59%	41%	59%	41%
Bands→	Below Grade 5	On Grade 5	Below Grade 5	On Grade 5	Below Grade 5	On Grade 5
Bangla Grade 5	75%	25%	77%	23%	88%	12%
Mathematics Grade 5	75%	25%	90%	10%	83%	17%

Note: Green shading denotes desirable grade level performance and orange shading denotes performance that is below desirable for the grade level.

As explained in Chapters 2 and 3, the “legacy bands” do not seem to provide a convincing methodology to accurately capture learning progress. A large drop in achieving grade level targets suggests that

the methodology used for determining performance levels is not yielding the results that meet reasonableness criteria. For this reason, DPE carried out the workshops for setting **on-grade performance standards that are horizontally and vertically aligned**. More information about the process for setting new performance standards, as well as elaborated results of NSA 2017 and NSA 2015 are presented in Chapter 4 of this document. The percentages of students achieving at the newly established performance levels in NSA 2017 and NSA 2015 are presented in Table 5 below.

Table 5 : Percentage of Students in Grade-Specific Performance Levels for NSA 2015 and 2017

Test	AdministrationYear	Below Basic	Basic	Proficient	Advanced
Bangla Grade 3	2015	25%	34%	35%	6%
	2017	20%	33%	38%	9%
Bangla Grade 5	2015	11%	43%	37%	8%
	2017	16%	40%	36%	8%
Mathematics Grade 3	2015	27%	45%	22%	6%
	2017	28%	38%	25%	9%
Mathematics Grade 5	2015	34%	42%	20%	5%
	2017	26%	41%	24%	8%

Note: Green shading denotes desirable grade level performance and orange shading denotes performance that is below desirable for the grade level.

Chapters 2 and 3 provide further details regarding Bangla and Mathematics achievement results across the 3 NSA test administrations (2013, 2015, and 2017). Some of the additional noteworthy contextual observations that can help interpretation of the Bangla Language test results discussed in Chapter 2 are summarized here:

- The Bangla Language tests for the NSA 2017 were developed based on a revised test blueprint aligned with the 2012 modified national curriculum. While the development of this curriculum was initiated prior to the 2013 NSA, the pedagogical materials based on the new curriculum have only started to influence instruction in the targeted grades in 2015;
- There are no significant differences in performance by gender in either grade across all 3 NSA administrations. The NSA 2017 scores, as with 2013 and 2015, show clear evidence of gender parity— this is not typical of gender-differentiated performance in many other countries in this region and represents an important achievement of the Primary Education Development 3 program (PEDP3);
- In terms of Bangla Language scores by school type on the NSA 2017, Government Public Schools (GPS) and Newly Nationalized Primary Schools (NNPS), which represent about two thirds of the total school sample for Grade 3 and Grade 5, are inevitably close to the total national average. KG schools have consistently outperformed all other school types in both grades in the 2015 and 2017 administrations of the NSA;
- All test items, for both Bangla Language and Mathematics, are designed to measure specific curriculum content at different cognitive processing levels (“knowledge”, “understanding”, and “application & above”). In the NSA 2017 Bangla Language Grade 3, the average percentage score on “application & above” was about 60% while on “knowledge” it was over 70%. In Grade 5, the average percentage score is less than 50% on “application and above”, where as it stay

sat about 75% on “knowledge”. This indicates that students still perform better on the items that require rote learning rather than on those that involve critical and higher cognitive skills.

Chapter 3 presents the details of results and analysis of student performance in Mathematics. In addition to the information provided above related to test reliability, scale scores in Grades 3 and 5 as well as “legacy band” performance scores in Mathematics, the following key points should be made:

- The Mathematics framework used as the basis for the design of the NSA 2017 tests underwent far fewer changes than those seen in Bangla Language. The framework focuses on the 4 domains of: 1) Number properties and operations; 2) Measurements and units of measurement; 3) Shape and space; and 4) Data (only in Grade 5);
- Results also show gender parity in Grade 3 and Grade 5 on each of the 2013, 2015, and 2017 iterations of the NSA; this represents a significant achievement for Bangladesh;
- In terms of student performance relative to the different cognitive processing levels assessed, scores on the less complex level (knowledge) were approximately 60% in both grades; at the more complex levels (application and above) average scores were about 50%. There clearly is a higher performance on factual recall versus application in both grades;
- With respect to school type in Mathematics performance we see a similar pattern as with Bangla Language – KG schools outperform all other school types in both 2015 and 2017. Schools of the Reaching-Out-of-School Program fell significantly from high performing in 2013 to low performing in 2015 and 2017.
- By division, Rajshahi scored highest in Math in 2013 and 2015 in both grades, but in 2017 Barisal scores the highest in both grades. Sylhet consistently performs the lowest across all 3 iterations of the NSA. Dhaka made significant improvements in 2017 and 2015 from 2013, although has shown erratic performance across the different NSA cycles.

Chapter 4 is based on the newly established framework of grade specific performance standards and the new reporting scale anchored to performance levels developed using the Item Response Theory 2-parameter model. After the NSA 2017 reporting framework was established, it was set as a reference and by means of equating the results of NSA 2015 are also converted to the same reported framework.

Chapter 5 presents a comparative analysis of the NSA 2015 and NSA 2017 results. The newly established reporting framework, with simplified psychometrics, and more transparent performance standards, provides optimistic insights into trends of results in the last two NSA administration years.

- It is very encouraging that using the newly established reporting metrics it became clearly visible that there was a significant learning gain from NSA 2015 to NSA 2017. Significant differences were found between scale score means indicating increased results in three tests (Bangla 3, Math 3, and Math 5), and only decrease was found in Bangla 5. However, when using new performance standards, it appears that there was a gain in all tests but Bangla 5, where performance stays about the same.

- Based on the comparisons between percentages of student's attaining performance levels, it can be concluded that there was an overall progress in student learning between years 2015 and 2017. The percent of students achieving the top two performance levels (proficient and advanced) has increased from 34.9% to 39.4%, which means that the percentage of Bangladeshi students who reached the targeted performance level "Proficient and above" has increased for 4.5%. This is a very encouraging finding because this level of growth can be considered as a significant improvement of student learning in Bangladesh. This finding has even higher relevance considering that data collection for NSA 2017 was carried out two months after school closing.

Chapter 6 Presents a comprehensive analysis of background factors associated with student performance. The background factors were assessed by means of three questionnaires: Student, Teacher, and Head Teacher responses from their respective questionnaires were analyzed in relation to student performance on NSA 2017 tests. The chapter presents these associations grouped by respondents (head-teacher, teacher, students) and category of the contextual variable analyzed (e.g., teacher characteristics, teacher activities, and school resources and environment reported by teachers). Many significant associations were identified yielding a valuable and actionable information for policy makers and instructional support teams.

And finally, Chapter 7 provides discussion on the implications of the results of the NSA 2017. It also provides concluding remarks geared toward offering suggestions for improvements for the NSA to be conducted under post-PEDP3.

INTRODUCTION

Over the last decade Bangladesh has made significant progress in increasing access to primary education. Improving educational quality, and not just access, however, has recently become a top strategic priority. Quality education provides students the opportunity to acquire the knowledge and skills needed to participate productively in the growth of their country; improving the educational performance of primary grade students is critical for both economic progress and for the development of active and well-educated citizens.

The National Student Assessment (NSA) program is an initiative of the Ministry of Primary and Mass Education (MoPME) to evaluate achievement in primary education. A key purpose of the NSA is to provide accurate data and information to inform policy planning, enhance teacher education, and improve instruction in order to improve student achievement. The NSA for Grades 3 and 5 was first conducted by the Directorate of Primary Education (DPE) of the MoPME in November of 2006. This was followed by a second administration in November 2008 and two more cycles in 2011 and 2013. A key difference exists between the first two cycles of the NSA (2006 and 2008) and the next three (2011, 2013, 2015, and 2017); in the latter set of cycles, a commonly used equating methodology was employed to link assessments in consecutive years so that valid comparisons across the administrations could be made. This methodology was not used in the first two years of the NSA and therefore the 2006 and 2008 assessments stand as independent administrations and are not validly comparable between them or with any ensuing assessment. The 2011 NSA served as a baseline for the PEDP3 and was designed with its linking methodology to be able to offer comparative data with 2013, 2017 and beyond to monitor student progress over time and relative to PEDP3 indicators.

However, the NSA itself is not designed to capture data relative to any specific program implementation conducted under the PEDP3 and therefore does not provide sufficient evidence for the effects of the PEDP3 program. It would be good to have data on the degree of exposure of NSA students to any PEDP3 program activities in order to measure its impact.

NSA Objectives and Use of Results

The objective of the NSA program is to provide high quality, reliable assessments from which valid inferences can be drawn about the state of two essential primary school subjects in Bangladesh: Bangla Language and Mathematics in Grades 3 and 5. The results of the NSA provide the government, researchers, educators, and parents with information that, if acted upon in a timely fashion, can lead to improvements in policy making, resource allocation, instruction, and pedagogical program design, just to name a few areas. Foundational questions that can be answered with NSA results include: How well are students learning the various content domains (numbers and operations vs. geometry vs. measurement in Mathematics for example)? Is there evidence of strengths and weaknesses in particular knowledge and skills? How are the various sub-groups performing in the system? What home or school factors are associated with student achievement? What higher cognitive skills are students developing as opposed to merely demonstrating recall or memorization of factual information?

If NSA results are analyzed and reported at the content domain (as well as at finer levels of the domain such as at the strand or student learning outcome levels), and also at the cognitive processing level, the NSA can also provide useful diagnostic and formative information to teachers and school administrators. At the same time, while the NSA 2017 measured national, regional and sub-group achievement in the specified subjects, it was not designed to report on individual student performance or to evaluate individual teachers.

What Institutions are Responsible for Developing and Administering the NSA?

The body responsible for managing and conducting the NSA at the Ministry of Primary and Mass Education (MoPME) is the Monitoring and Evaluation Division of the Directorate of Primary Education (DPE). Directly responsible for technical development of the NSA is the National Assessment Cell (NAC) in close collaboration with the National Curriculum and Textbook Board (NCTB), and the National Academy for Primary Education (NAPE).

The content of the tests is determined by specifications provided in assessment frameworks for each subject that describe the specific knowledge and skills to be assessed. The frameworks prescribe curriculum balance and the range and type of test questions that are to be used. They are aligned with the most recent version of the National Curriculum, initiated in 2012. The 2017 NSA design was governed by a recently created document entitled NSA 2017 Assessment Frameworks, created in partnership between the DPE and American Institutes for Research (AIR).

How is Quality of the NSA Ensured?

The design, administration, and analysis of the NSA is led by Bangladeshi assessment experts and content specialists. In the summer and fall of 2017, a rigorous review of NSA curricula expectations, alignment of assessment frameworks with content expectations, and procedures for ensuring assessment quality were all carried out. The focus on the alignment of assessments to the curriculum was particularly important in the NSA 2017 because the national curriculum underwent a major revision beginning in 2012. Particular investment was made to ensure that valid comparative inferences could be made based on NSA results across assessment years. In addition to involving a broad range of experts in the test and item development process, external technical assistance from international specialists from AIR (responsible for the NSA 2015 and 2017) together with the Australian Council for Educational Research (ACER, who were responsible for the 2011 and 2013 iterations¹) also assisted with the statistical analysis of pilot and operational test data, scoring and scaling procedures.

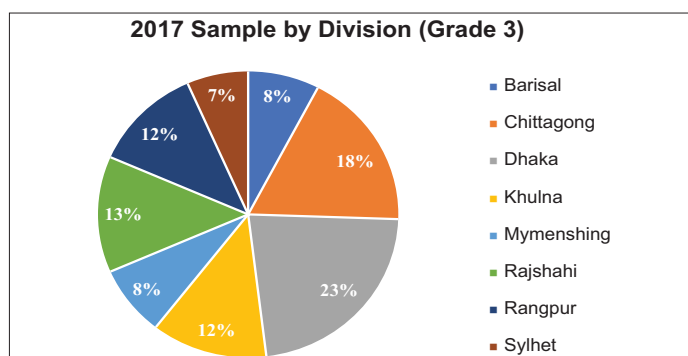
How was the 2017 NSA Sample of Students Selected?

The NSA is a learning assessment program that gauges the performance of students in grades 3 and 5 in a nationally representative sample schools selected using a stratified random method. In 2017, samples of over 28,000 of Grade 3 students and over 24,000 of Grade 5 students were drawn from a sample of over 1600 schools and educational centers to take part in the NSA program. Students from the eight geographic divisions of Bangladesh and seven main types of primary schools from rural and urban regions were chosen to participate in the assessment. Unlike to the previous cycles when proportionate sampling was used, in 2017 sampling was based on a non-proportionate design covering 88 upazilas from all 64 districts. The number of students in each grade sampled from each district was not proportional to the total enrolment for that grade in those districts. Therefore, sampling weights were applied to ensure that any disproportionate representation of districts did not unduly impact NSA results.

Almost half of the sample is composed of students from the Dhaka and Chittagong Divisions, the most populous divisions in Bangladesh. Figure 1 below presents the breakdown in proportion of students by division based on Grade 3 participation.

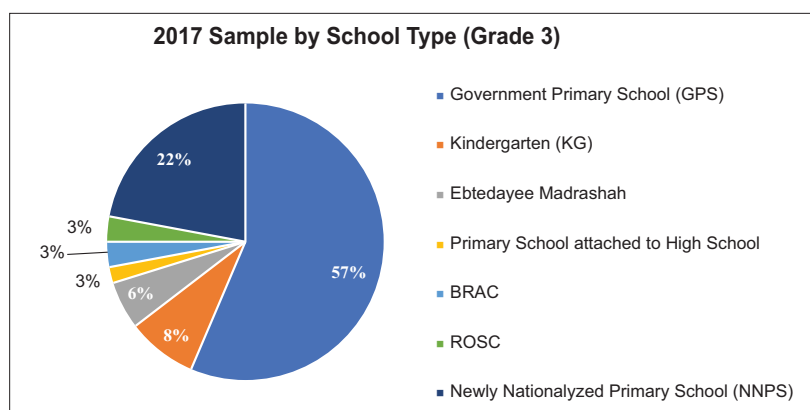
¹ The 2006 and 2008 iterations of the NSA, the first to be conducted, were led by the DPE.

Figure 1 : Sample of Participating NSA Students by Division (2017 Grade 3)



Approximately 57% of all students come from either Government Primary Schools (GPS) or Newly Nationalized Primary Schools (NNPS).² Figure 2 below presents the breakdown of the sample by school type for Grade 3.

Figure 2 : Sample of Students by School Type (2017 Grade 3)



How was the 2017 NSA Administered and Monitored?

The NSA was administered on January 27th, 2018 throughout Bangladesh. The NAC was responsible for all aspects of administration and data collection. As in 2015, the students who were selected in the sample at each grade level were expected to sit for both the Bangla Language and Mathematics tests, plus a brief survey to collect background information about their home environment. Test administrators were trained to ensure high levels of consistency of administration across the country. Teams of quality monitors also visited selected schools during the assessment administration to ensure fair conditions of administration and the highest levels of quality.

How were the NSA Tests Scored?

Most of the 2017 NSA test items (questions) were selected response questions (SRQ), i.e., items that required the selection of one correct answer from several options (often called 'multiple choice' or MCQ). However, there were also items that required short written responses from students ('constructed response'). The constructed response items were scored by human markers manually. To ensure consistency of marking, constructed response questions were marked by teachers specifically trained for the marking task.

² Prior to 2015, Newly Nationalized Primary Schools (NNPS) were referred to as Registered Non-Government Primary Schools (RNGPS).

How can NSA Results Be Compared from Year to Year?

For the NSA 2017, a methodology based on linking test items was used for horizontal equating across grades. NSA tests are equated and placed on a common scale so that the 2017 results can be validly compared with those of 2011, 2013, and 2015 as well as with administrations beyond 2017. This enables valid inferences on trends in performance across years and grades.

Comparability of NSA 2017 may be affected by the fact that the test administration was carried out in January 2018 instead in November 2017. Assessing students two months after school closing, at the time when forgetting might have affected their ability to answer the questions, could have had disadvantageous effect on student's test performance.

How Was the NSA 2017 Different from Previous NSAs?

While the 2017 NSA is similar in appearance to previous NSA iterations, back in 2015 new blueprints for the design of the tests were developed and approved for Mathematics and Bangla Language. Blueprints provide a detailed description of the content and cognitive skills to be measured in a test, and the types of items that can be used to measure knowledge and skills. The standards framework from NSA 2013 was further improved for the NSA 2017 in terms of content coverage and the articulation of that content, reflecting changes that were prescribed in the reformed national curriculum.

Another change in years 2015 and 2017 relates to how test items were piloted. Since 2006, the NAC has piloted test items separately on an annual basis for selecting the final items for operational administration. For the NSA 2015 and 2017, an embedded pilot items design was employed, which represents the industry standard in most developed assessment programs. This design assumes that a test is composed of operational items that are used to derive student scores together with a small number of pilot items (4-6) that are embedded in positions among the operational items. This method is more cost efficient and increases the quality of items by having them piloted on students of the targeted grade and at the end of the grade when instruction of the content has been completed and operational tests are administered.

How Were the NSA Results Analyzed and Presented?

This national report presents the results of initial analyses carried out on the NSA 2017 data. Scores and sub-scores are presented by total and sub-score means and by five performance levels or "performance bands" (1, 2, 3, 4, and 5). These performance bands were developed by the Australian Council for Educational Research (ACER) in early iterations of the NSA. Performance bands are reported in order to provide a more meaningful interpretation of what students know and can do at each grade level in each subject. NSA scores are further broken down by content domains and cognitive processing levels. Results are also analyzed by gender, administrative divisions, and by school types.

Primary NSA Analysis Methods

NSA results for Grades 3 and 5 are presented in this report. General descriptions are provided that enable comparisons across multiple NSA cycles in terms of proportion of students in the various performance categories or "band levels," overall mean scores and sub scores, as well as scores disaggregated by gender, division, and school type. Analyses of results by content domain, cognitive processing level, and item type are also presented. Reliability coefficients for Bangla Language and Mathematics in both grades were estimated using Cronbach's alpha, a coefficient of internal consistency, and the Spearman-Brown, split half estimation method.

After mean scores were calculated, any differences between student groups were tested for statistical significance by conducting independent sample t-tests using SPSS software (significance level set to 0.05). The t-test assumes a null hypothesis of equality of means between the groups under study, such as boys and girls. When comparing means across more than two groups, it was necessary to employ analysis of variance, which enables comparison across three or more groups.

Because tests for statistical significance frequently result in the rejection of the null hypothesis when sample sizes are large, an effect size was also estimated to determine the practical significance of the differences between means (Cohen, 1992). Effect size values can be interpreted as small (0.2), moderate (0.5 and above), or large (0.8 and above).

In 2017, three surveys were conducted as part of the NSA to collect contextual information about students, teachers, and head teachers, their backgrounds and demographic status. This information was used to analyze what factors that were associated with student achievement.

Structure of the Report

Following the Executive Summary and the Introduction to the report, we begin the body of the report with a focus on highlights in the results of the NSA 2017 (Chapter 1), first of a general nature and then highlights that are specific to each of the two subject areas evaluated, Bangla Language and Mathematics. For those readers who wish to obtain a brief understanding of the NSA 2017 results, without going into the details and more technical explanations, we recommend this first chapter. Chapter 2 focuses on the details of the results on the Bangla Language assessment, first examining the curriculum objectives and expectations measured on the test, followed by the results. Chapter 3 follows the same format for the Mathematics assessment.

Chapter 4 presents the results of NSA 2017 in terms of newly established performance standards and corresponding scale scores, whereas Chapter 5 presents comparison between NSA 2017 and NSA 2015 results using this new reporting framework.

Chapter 6 looks at the contextual factors that are measured through the student survey and how are they associated with student achievement, as well it examines data derived from the head teacher and teacher surveys correlated with student achievement.

Chapter 7 provides a discussion of the implication of the NSA 2017 results for policy makers. As this report will be considered the quality baseline of PEDP4, so the readers who are looking for a more detailed technical explanation of the assessment development process, data analysis methodology and results, we recommend that they obtain the NSA 2017 Technical Report.

CHAPTER 1

HIGHLIGHTS OF RESULTS ON NSA 2017 STUDY

It is increasingly recognized that measuring student learning outcomes can play an important role in monitoring the progress of an educational system. This is seen in greater participation in international testing programs such as the Trends in International Mathematics and Science Study (TIMSS), the Progress in International Reading Literacy Study (PIRLS), and the Program for International Student Assessment (PISA), as well as the increase in national sample-based testing programs such as the NSA. Assessment results can reveal the degree of progress made by a specific grade of students, and by targeted sub-groups of those students, compared with the performance of students of the same grade in previous administrations of the same test, psychometrically shown to be of the same content and difficulty level as the current test. Similarly, results may indicate the degree of success of teachers to instruct the assessed content and the degree of success that head teachers and teacher-parent committees have in supporting school progress. Test results, however, must be understood in the broader context from which they are derived. This is no less true of the NSA 2017 in Bangladesh and the entire structure set up to ensure that high quality assessments are developed and administered to deliver test results that are reliable, valid and can be used to improve the educational system at all levels.

Broad-level Milestones of the NSA 2017

Before examining the broader context for the interpretation of the NSA 2017 results, it is worth highlighting 4 major achievements of the NSA 2017:

- Firstly, and in keeping with goals established in 2006 and observed in successive administrations in 2008, 2011, 2013, and 2015 the NSA has made important strides in continuing to improve the quality of its work. Progress includes greater alignment between content standards (which are also more accurately defined) and test items; the inclusion of test items that measure higher order cognitive thinking skills; the adoption of a methodology that allows for pilot-testing of new test items within the operational test forms; greater control over the quality of test item development, among other improvements. The NSA 2017 is well on the way to being considered on a par with international standards in many of its aspects. These continued improvements have led to the foundations for a quality national assessment system and while there are still important areas to continue to improve upon (for example test administration, reporting by reference to on-grade performance standards, and scaling using methodologies based on item response theory), the NSA and all of the teams associated with test development and administration have the structures in place to be able to analyze their strengths and weaknesses and plan for continued growth.
- The second milestone of the NSA 2017 relates to the increased capacity of the team members to assume responsibility and acquire technical expertise to carry out the diverse activities that a program like the NSA implies: alignment of test frameworks and blueprints to content standards and curriculum; the design of high quality test items that not only measure lower cognitive thinking skills but also the more demanding cognitive skills of analysis, synthesis, and problem solving; the assembly of tests that are balanced for content coverage and difficulty level and permit discrimination of a range of student abilities; analysis of test data using methodologies based on both classical test theories (CTT) and item response theories (IRT); and reporting of test results, disaggregated by targeted sub-domains of the content measured, to diverse stakeholders.
- A third important milestone of the NSA 2017 has to do with the recognition that assessments

of this type must underscore the formative, informative, and pedagogical value of assessment results. This certainly became significantly richer when the NSA program has conducted a **standard-setting process** establishing performance standards for 4 levels of achievement, each level defined by the content measured on a test and represented in the curriculum and activity of teachers in the classroom. Such a performance scale permits the reporting of test results by reference to achievement levels that provides information about what students can and can't do at each level. This is a very useful pedagogical tool for teachers, head teachers, school committees, and district supervisors to be able to make data-informed decisions about how to improve learning outcomes and how to set targets for improvement for the following academic school year.

- Finally, the NSA 2017 has strengthened the foundations of the government assessment-related institutions, both technically and from a management perspective, toward becoming a full-service assessment unit. The goal of this unit must be to ensure its longer-term sustainability through continued building of technical and management expertise.

General Highlights in the Results of the NSA 2017

The following highlights in the results of the NSA 2017 demonstrate the continued achievements made in student learning outcomes. As it suggested and would be expected to see more significant gains in the coming years as implementation efforts related to the revised national curriculum take hold and their impact begins to be felt in the instructional behavior of teachers and learning outcomes of students.

- The NSA 2017 scores show that Grade 5 achievement was significantly higher than Grade 3 – this is consistent with growth shown in previous NSA cycles, and indicates sustained and consistent growth in achievement from Grade 3 to Grade 5 in both Bangla Language and Mathematics. However, it will be more important to evaluate how students achieved in relation to the performance objectives and expectations of their respective grade. From that perspective, the process of setting grade level performance standards was implemented as a step in defining an evaluation framework for educational attainment in Bangladesh. The results based on the new performance standards are reported in a separate section of this document.
- In all subjects and at both grades, KG schools have consistently been top performers in both 2015 and 2017. KG schools in Bangladesh are privately owned and run and offer resources that may account for the sustained successful performance of these schools.
- The NSA 2017 scores show clear evidence of gender parity in both Grades 3 and 5 in Bangla and Mathematics – this is not typical of gender-differentiated performance in many other countries in this region and represents an important achievement of the Third Primary Education Development program (PEDP3), in addition to a goal that has already been achieved in terms of primary education enrolment (i.e., access).
- The NSA 2017 scores of Grade 3 students are largely within the range of Bands 3 and above (as defined in the ACER technical report of the NSA 2011 and which we refer to as the “legacy bands”). A low percentage of Grade 5 student scores, however, fall within legacy Band 5. (Although legacy Bands 1-5 bear serious limitations, we are using the bands in this report for descriptive purposes and to provide a link with the 2013 and 2015 data which were interpreted in terms of the same bands. To overcome the limitations of the legacy bands, in-grade standard-setting was carried out on NSA 2017 and reported in a separate section of this document.)
- The Rajshahi division was the highest performing region of all regions in Bangladesh, in both Bangla and Mathematics and at both grades, whereas the Sylhet division was consistently the

lowest performing region in Bangladesh in both subjects and grades.

Highlights in the Bangla Language Results of the NSA 2017

Based on the evidence presented in Table 6 below and Figure 3, the following results in student scores on the Bangla Language assessment stand out as important highlights:

- 74% of Grade 3 students scored at Band 3, 4, and 5 combined.
- 89% of Grade 5 students scored in the same band combination, which would suggest considerable growth across Grades 3 – 5.
- By contrast, only 12% of Grade 5 students scored at Band 5, which is expected performance level for Grade 5.

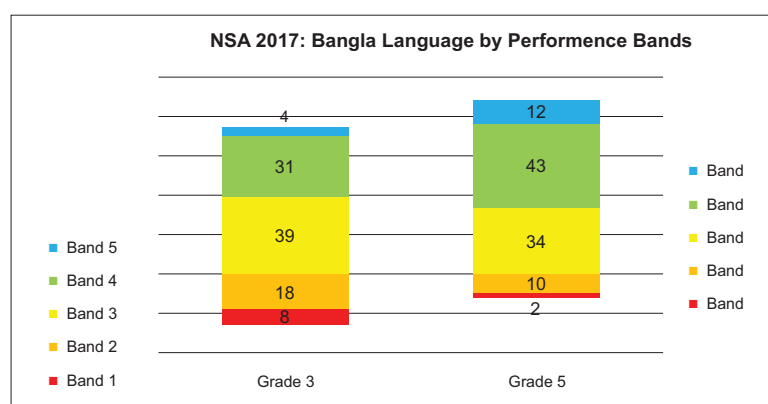
According to these results, 74% of Grade 3 students are reaching or exceeding expectations for Grade 3, whereas only 12% of Grade 5 students achieve the expectations for Grade 5. These results suggest that the legacy bands may not be suitable for the evaluation of student achievement relative to grade level expectations.

Table 6 : Percentage of Students in Bangla Language Performance Bands on the NSA 2017

NSA 2017 Bangla Language Performance Bands					
Students Attaining (in %):	Band 1	Band 2	Band 3	Band 4	Band 5
Overall Grade 3 Bangla	8	18	39	31	4
Overall Grade 5 Bangla	1	10	34	43	12

Note: The Band range 1-5 describes skills and knowledge measured on both Grade 3 and 5 tests. According to the initial interpretation, Bands 3-5 indicate that students are working at Grade 3, above Grade 3 level, and at Grade 5 level, respectively, while at Bands 1 and 2 students are working below Grade 3 level.

Figure 3 : NSA 2017 Bangla Percentage of Students in Performance Bands



Other highlights for results on the Bangla Language assessment disaggregated by content domains, cognitive levels, school type, and geographical division are the following:

- For Grades 3, the vocabulary tasks were the easiest while the Reading Comprehension tasks were the most challenging, whereas for Grade 5 difficulty of those domains appears even.

- Students answered larger proportions of Knowledge and Understanding questions correctly than Application and above questions for both grades.
- Regarding mean scores by school type, for Grade 3 in both 2015 and 2017, KG schools had the highest mean scores, about 8 points higher than the lowest performing category of school type in 2017.
- High Schools Attached Primary Schools (HSAPS) scored in the top three school types in both 2015 and 2017.
- For Grade 5, KG and HSAPS schools were high scoring in both 2015 and 2017.
- Madrasah and Reaching Out-of-School Children (ROSC) schools were the lowest scoring in both assessment years.
- There is more differentiation by school type on Grade 5 than for Grade 3.
- Regarding geographical division, for Grade 3, the Rajshahi mean score was the highest in 2015 and second highest in 2013 but dropped to the 4th in 2017.
- The lowest scoring division, Sylhet, was 8 points below Rangpur in 2017, almost one standard deviation in score difference.

Highlights of the Mathematics Results of the NSA 2017

Based on the evidence presented in Table 7 below, the following results in student scores on the Mathematics assessment stand out as important highlights:

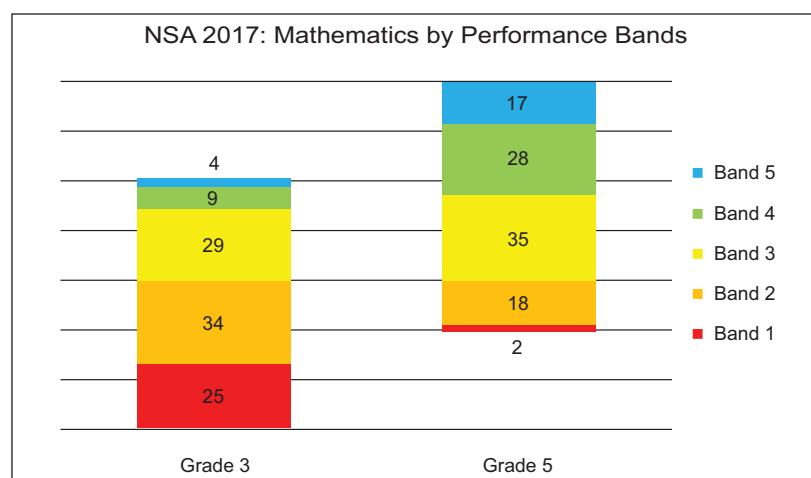
- 41% of Grade 3 students scored at Band 3, 4, and 5 combined
- 80% of Grade 5 students scored at Band 3, 4, and 5 combined, which suggests considerable growth across the grades 3 to 5.
- By contrast, only 17% of Grade 5 students scored at Band 5 level, which is expected level for Grade 5.

According to these results, 41% of Grade 3 students are reaching or exceeding grade level expectations, whereas only 17% of Grade 5 students achieve the level expectations, which can be challenged by common sense scrutiny. This suggests that the legacy bands may not be an accurate framework for the evaluation of student achievement relative to grade level expectations.

Table 7 : Mathematics Performance Bands on the NSA 2017

NSA 2017 Mathematics Performance Bands					
Students Attaining (in %):	Band 1	Band 2	Band 3	Band 4	Band 5
Overall Grade 3 Mathematics	25	34	29	9	3
Overall Grade 5 Mathematics	2	18	35	28	17

Note: The Band range 1-5 describes skills and knowledge measured on both Grade 3 and 5 tests. According to the initial interpretation, Bands 3-5 indicate that students are working at Grade 3, above Grade 3 level, and at Grade 5 level, while at Bands 1 and 2 students are working below Grade 3 level.

Figure 4 : NSA 2017 Mathematics Percentage of Students in Performance Bands

Other highlights for results on the Mathematics assessment disaggregated by content domains, cognitive levels, school type, and geographical division are the following:

- For both Mathematics Grade 3 and Grade 5, students scored highest on Shape and Space and the lowest on Measurement.
- For both grades, students scored higher on items assessing Understanding and Knowledge than Application and above.
- For Grade 3 by school type, KG schools scored the highest, at a statistically significant difference level from most of other school types. The lowest scoring school mean in 2017 were Madrasah and ROSC schools, about 5 points less than the top mean score.
- For Grade 5, the same two school types (KG schools and GPS) were the top performers in three recent cycles.
- In 2017, Madrasah schools were the lowest scoring school type in both grade levels. ROSC schools were at or near the bottom in both 2015 and 2017.
- The Barisal division scored the highest in both grades, at a statistically significant level above the rest of the group in 2017, recovering from drop in 2015.
- The lowest scoring division mean, Sylhet, was 10 points below Barisal in Grade 3 and 7 points below in Grade 5.

CHAPTER 2

THE NSA 2017 BANGLA LANGUAGE ASSESSMENT

The NSA 2017 Bangla Language assessment for Grades 3 and 5 was designed based on a 2015 revision of the Bangla assessment framework. An assessment framework defines the organizing structure for the construction of tests. It defines the content to be assessed and guides the development of the assessment instrument. Frameworks capture a range of subject and grade-specific content and cognitive skills and are defined by curriculum documents and professional best practice. The framework prescribes curriculum balance and the range and type of test items that are to be used.

Curriculum Objectives and Content Expectations

As the mother tongue for most citizens of Bangladesh, Bangla should enable students to develop creative thinking, imagination, and artistic awareness. It is also the medium to understand other subjects on the curriculum, and to attain knowledge and progress in life. So that students may use the language effectively for these purposes the curriculum aims to enable them to read, write and speak creatively as well as correctly.

The content standards for both Grades 3 and 5 Bangla Language are in many respects the same; however, the content differs in terms of text appropriateness for grade and age, as well as grammatical and lexical complexity. While Bangla Language content measured in earlier iterations of the NSA compared with NSA 2015 was, in respect of reading comprehension, essentially the same (i.e., the measurement of ideas communicated in a text) and aligned to the curriculum, the content for NSA 2015 was organized to facilitate more logical sub-score analyses.

Bangla Assessment and Content Expectations

In the Grade 3 and Grade 5 reading assessments, students were required to identify, interpret, infer and synthesize information focusing on:

- reading for meaning in literary texts
- reading for meaning in factual texts
- textual devices (e.g. spelling, punctuation, word construction)
- syntax
- vocabulary

The Bangla assessment included three broad categories of texts: Imaginative texts, information texts and argumentative (or persuasive) texts. Texts were between 50 – 150 words in Grade 3 and 80 – 200 words in Grade 5.

- Imaginative texts: texts that involve the use of language to represent, recreate, shape and explore human experiences in real and imagined worlds. They include, for example, fables, short stories, novels and plays. Included in imaginative texts are narrative and descriptive fictional text types.
- Informative/descriptive texts: non-fictional texts that involve the use of language to represent ideas and information related to people, places, events, things, concepts and issues. They include, for example, reports, descriptions, biographies, explanations, news articles.
- Argumentative/persuasive texts: texts that systematically present a point of view and seek to persuade or change the behavior or attitude of the reader. They include, for example, formal essays, letters, advertisements, interviews and reviews.

The assessment provided a measure of reading performance that reflected students' typical reading experiences. Contexts were relevant to students and grade/age appropriate. Texts were self-contained and did not depend on prior knowledge or knowledge of other texts. Table 8 shows the key administration features of the Bangla Language tests:

Table 8 : General Features of the Bangla Language Tests

Feature	Detail
Grades	3 and 5
Number of test sessions	N = 1, January 27, 2018
Test time	60 minutes + 15 minutes (excluding preliminary organization time)
Number of test forms (booklets)	2 pseudo forms, each in 6 field-test versions (A1-A6, B1-B6)
Number of texts per form	6 operational (1 of them anchor), 1 field-test
Length of texts	Grade 3: maximum 150 words Grade 5: maximum 200 words
Balance of texts by text type (both grades)	Imaginative texts: 1-3 of varying difficulty Information texts: 1-2 of varying difficulty Persuasive texts: 1-2 of varying difficulty
Number of scored items	Grade 3: 36 Grade 5: 40
Item types	Multiple choice: Grade 3: 32 items; Grade 5: 36 items Constructed response: Grade 3: 4 items; Grade 5: 4 items

Bangla Reliability Estimations

Reliability measures for Bangla Language in both grades were estimated using Cronbach's alpha, a coefficient of scale reliability, and the Spearman-Brown Split half method. A reliability coefficient is an estimation of the internal consistency of test items. Internal consistency refers to the extent to which the items in the test are consistently measuring the same construct. As the alpha coefficient increases, the portion of a score that can be attributed to error will decrease; hence, higher values are desirable (generally above 0.80). A first analysis of the Bangla data for both grades revealed a very high reliability for both grade levels (Table 9 below).

Table 9 : Bangla Language Reliability Coefficients

Test	N of items	Cronbach-alpha	S-B Split-half
Bangla Grade 3	36	0.96	0.97
Bangla Grade 5	40	0.95	0.96

Bangla Performance Bands

One meaningful way to report NSA scores is to present results in terms of percentages of students attaining specific performance bands or levels. To report performance bands, it is essential to have clear definitions of student achievement at each performance band for each subject.

The descriptors of current performance bands (referred to as “legacy bands” in further text) for Bangla language are presented in Table 10 below. They originate from the NSA 2011 (ACER, 2012) and were intended to capture achievement of students across grades 1 through 5 in Bangla Language.

Table 10 : Performance Band Descriptors and Cut Scores for Bangla Language (ACER, 2012)

Bangla Scale Score	BAND DESCRIPTORS FOR BANGLA LANGUAGE
122 and above	Pupils working in Band 5 <ul style="list-style-type: none"> • Read a range of short, more challenging texts, including poems • Interpret figurative language • Identify literal and implied meaning • Connect ideas in different parts of a text • Show detailed knowledge of the rules of punctuation
108 - 121	Pupils working in Band 4 <ul style="list-style-type: none"> • Read a range of short texts with more complex ideas • Identify main ideas, literal meaning • Make inferences • Understand the sequence of events in imaginative texts • Identify text types based on format • Identify meanings of familiar words in new contexts • Know how to punctuate direct speech
96 - 107	Pupils working in Band 3 <ul style="list-style-type: none"> • Read short, simple texts of different types with some unfamiliar vocabulary • Make use of simple clues to make simple inferences and identify main ideas • Deduce simple word meanings • Show knowledge of word formation
85 - 95	Pupils working in Band 2 <ul style="list-style-type: none"> • Read short, simple, mostly imaginative texts • Locate and interpret directly stated information • Identify correct word orders of simple sentences • Identify the meaning and correct spelling of high frequency words • Recognise correct use of some punctuation
below 85	Pupils working in Band 1 <ul style="list-style-type: none"> • Read simple, highly familiar texts, such as signs that contain strong visual support to interpret and locate information

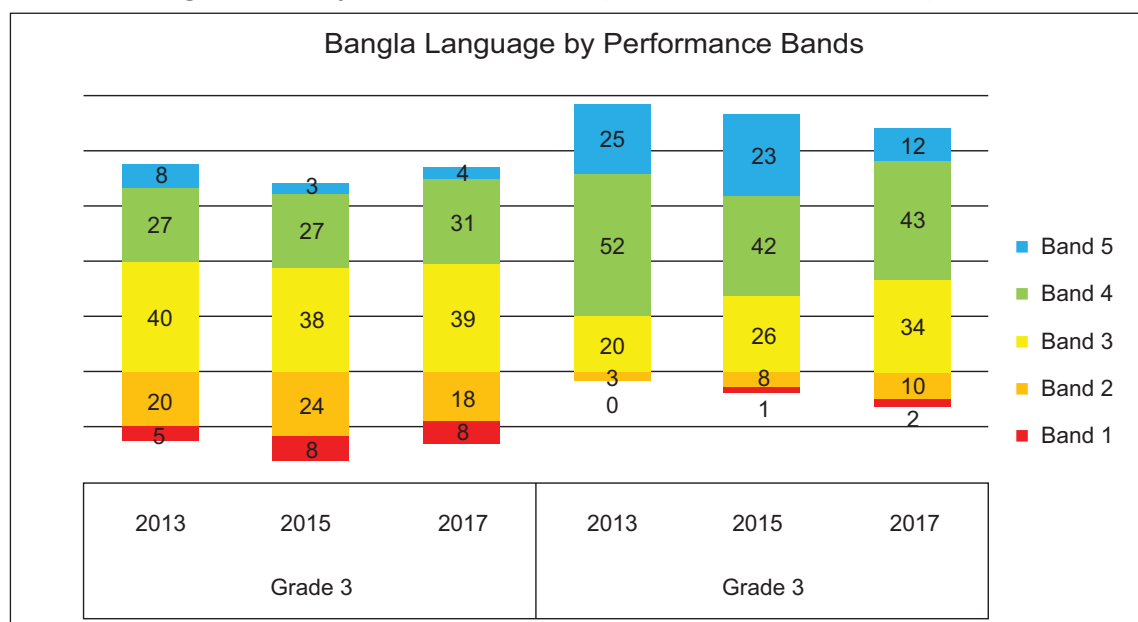
The bands were developed based on the empirical analysis of assessment data and mapping item difficulties across the scale. The authors (ACER, 2012) indicate they were aligned with the Aims and Objectives of Primary Education as a guide. The NSA 2011 report explains the following:

“Using the Aims and Objectives of Primary Education as a guide, five bands of achievement have been identified from the assessment data. The bands are broad descriptions of skills

summarized from the detail of all the questions used to test pupils at both grades. They provide a more generalized picture of development in each subject and are useful as a frame of reference for monitoring growth over the grades of schooling.” (ACER, 2012).

The NSA 2013, 2015 and 2017 results are presented in Figure 5 showing percentages of students whose achievement falls in the legacy bands based on cut scores developed in 2011.¹ For comparison purposes, Bands 3 and above are presented above the reference line, and Bands 1 and 2 below the reference line.

Figure 5 : Overall Bangla Results by Performance Bands (NSA 2013, 2015, and 2017)



Comparability between the NSA cycles in terms of performance bands is enabled through the application of IRT-based horizontal equating procedures. As can be seen in Figure 5 above, there is growth in the proportion of students scoring in the three highest bands from Grade 3 to Grade 5; this holds true for the three NSA administrations in 2013, 2015 and 2017. In the period between 2013 and 2017, the percentage of Grade 3 students scoring at Band 3 and above was 68%-74%, which suggests that over 2/3 of Grade 3 students perform at or above the grade level expectations set by the legacy bands. In the same period the percentage of Grade 5 students scoring at the same bands (3 and above) was 93%-99%, which shows a considerable learning growth from Grade 3 to Grade 5. However, considering that the percentage of Grade 5 students scoring at Band 5 (i.e., achieving at Grade 5 level expectation) is only 12%-23%, the viability of interpretations of legacy bands in terms of grade level expectations is dubious since approximately 75% of Grade 5 students are only achieving at below Grade 5 level. It would not be reasonable to say that over 2/3 of students in Grade 3 perform at or above grade expectations, while less than 1/3 of students in Grade 5 perform at grade expectations. Considering this evidence, the time is demanding a suitable framework for the evaluation of student performance against the newly reformed grade specific curriculum expectations.

As can be seen from Figure 6 below, the results of Bangla Language in Grade 3 disaggregated by gender indicate that approximately equal percentages of boys and girls are achieving at Bands 3 and above in all three administration years. In NSA 2013 the percentage of girls in Grade 3 achieving at Band 3 and

¹ Based on the AIR-proposed plan for setting **grade-specific performance standards**, DPE, with assistance of AIR, conducted the standard setting workshops, which are described in Chapter 4 of this document.

above is virtually the same as the percentage of boys, whereas in NSA 2015 and 2017 the percentage of girls achieving at Band 3 and above is just 3-4% better than for boys. Although these differences are statistically significant, their size falls in the category qualified as practically negligible.

Figure 6 : Bangla Performance Bands by Gender (Grade 3)

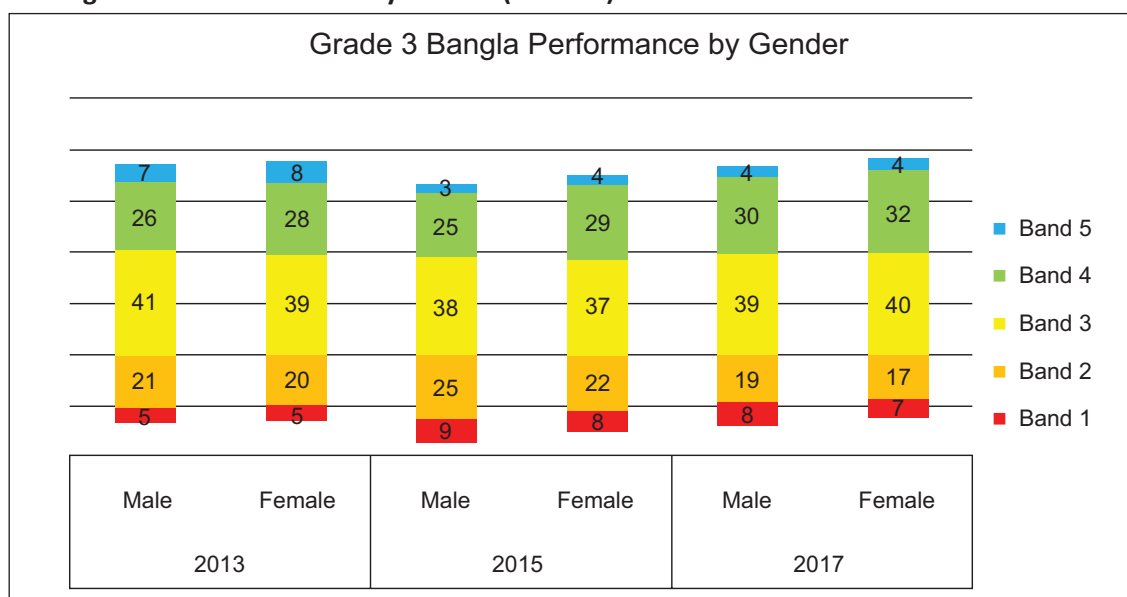
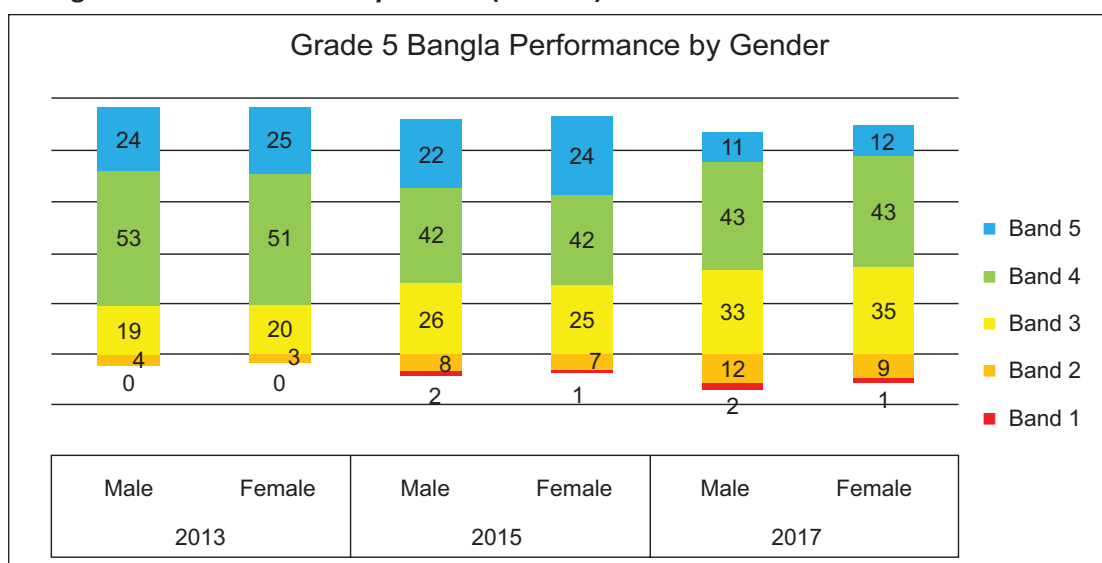


Figure 7 : Bangla Performance Bands by Gender (Grade 5)



The results of Bangla Language in Grade 5 disaggregated by gender (Figure 7 above) are congruent with the general trend between grade levels in all three NSA administration years; the percentage of boys and girls achieving at Band levels 3, 4, and 5 rises significantly at Grade 5 compared to Grade 3. However, the difference between genders in Grade 5 remains negligible. These results speak in favor of gender equity in Bangladesh.

Bangla Scale Scores

NSA 2017 mean Bangla Scale Scores (BSS) were 102.7 for Grade 3 and 108.6 for Grade 5. As Figure 8 demonstrates, in the period between NSA 2013 and 2015 there was a small variation in NSA mean BSS for both grades.

For Grade 3 the average BSS increased from 100.8 in NSA 2015 to 102.7 in NSA 2017, but the effect size for this difference was small, at Cohen's D of 0.29.

For Grade 5 Bangla, the difference between average scale scores in NSA 2013 and 2015 was almost non-existent (115.2 vs. 114.1), but the average performance decreased to 108.6 points in 2017.

Figure 8 : Overall Bangla Scale Scores (2013, 2015, and 2017)

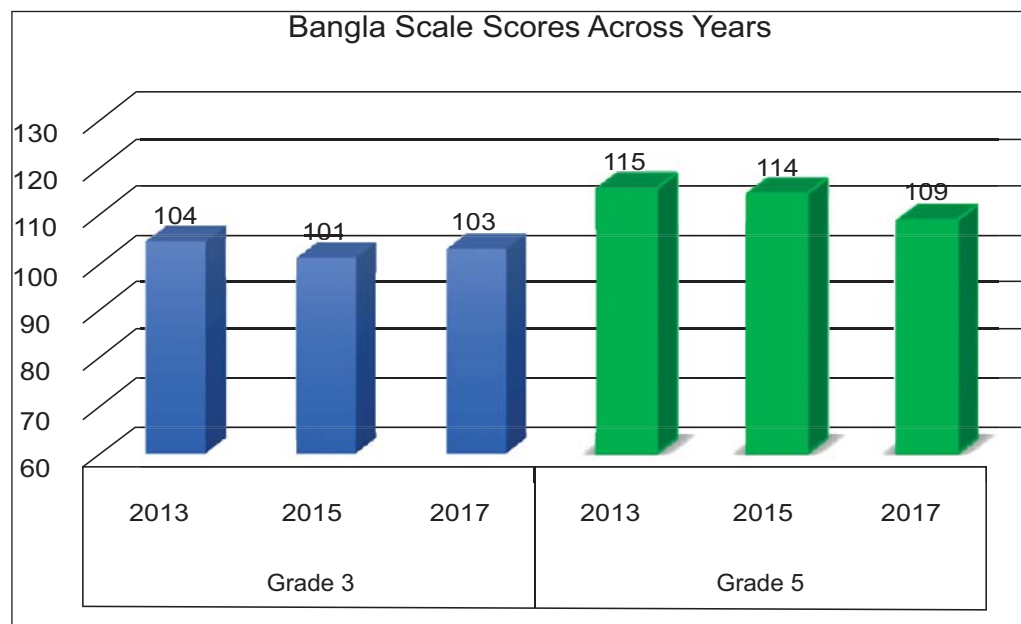


Figure 9 and Figure 10 present Bangla mean scores for Grades 3 and 5 by the two most prominent school types, Government Primary Schools (GPS) and Newly Nationalized Primary Schools (NNPS) for the period of the three NSA administrations (2013, 2015, and 2017). Although the variation between administration years is relatively small for Grade 3, it should be noted that for Grade 5 in both school types Bangla average scale scores dropped about 5 points from 2015 to 2017. We provide more detailed information regarding performance of all school types in a section toward the end of this chapter.

Figure 9 : Bangla Mean Scale Scores for GPS and NNPS (Grade 3)

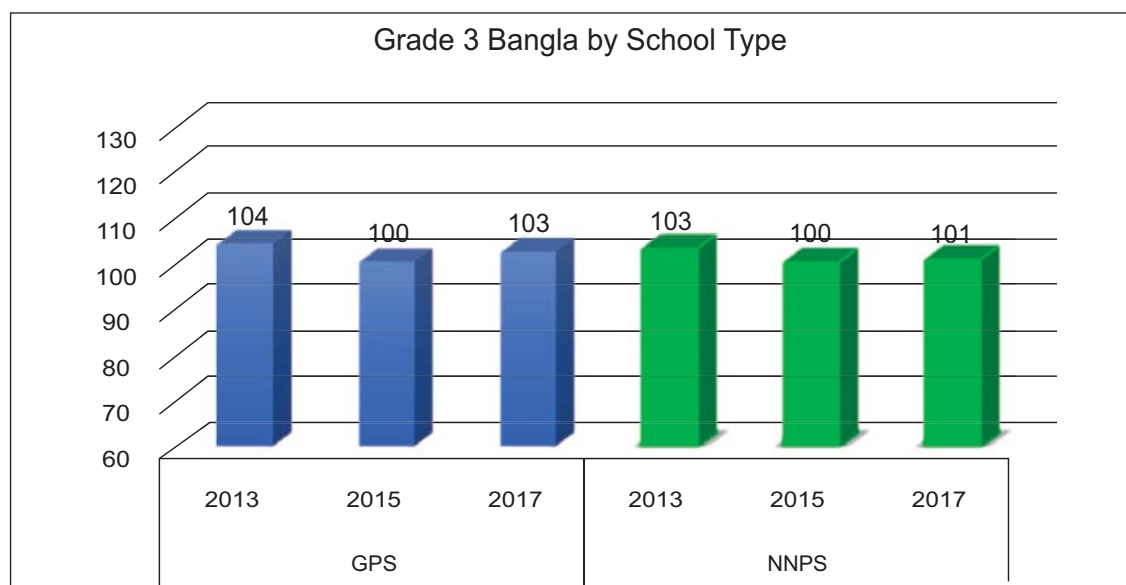
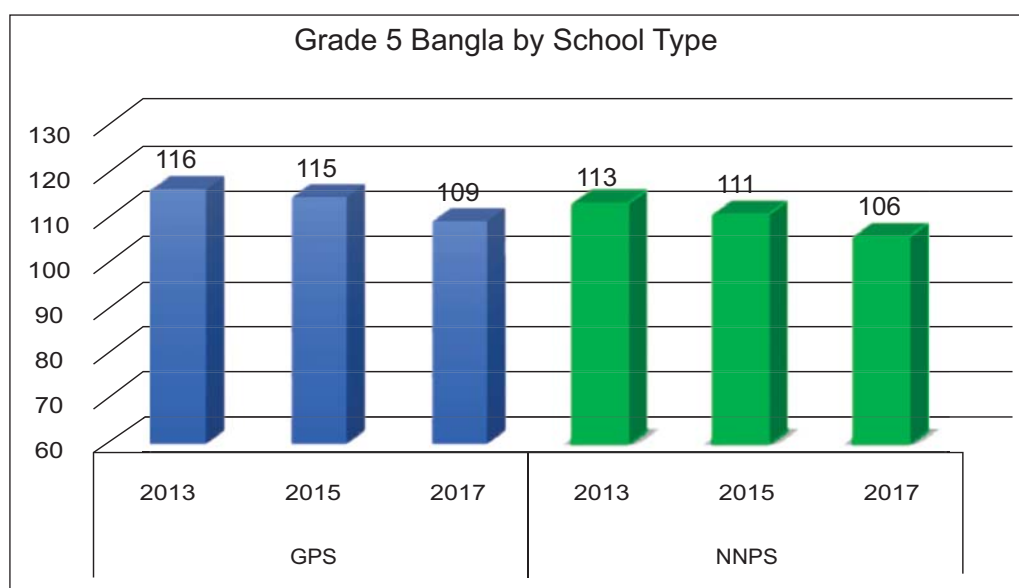
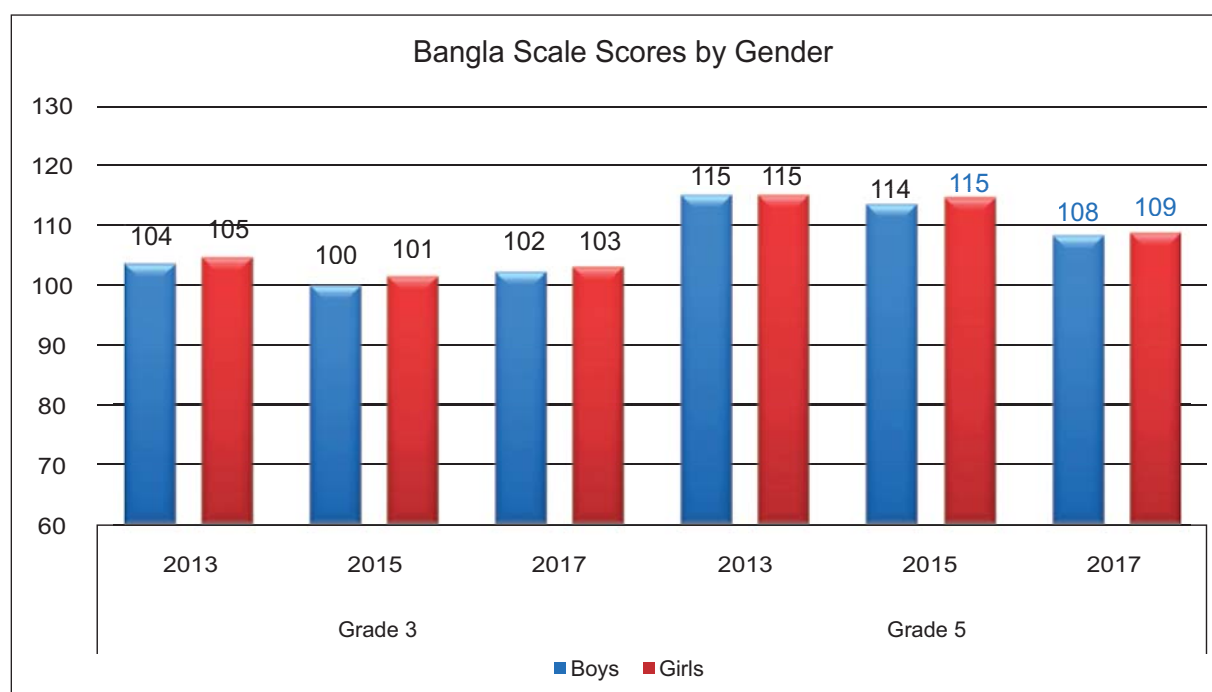


Figure 10 : Bangla Mean Scale Scores for GPS and NNPS (Grade 5)

In terms of scale scores, the differences between girls and boys are within one point on Bangla Language at both grades in 2017 (see Figure 11 below). These differences were also of negligible effect sizes. Considering all the NSA administration years, the differences between boys and girls are very small, which all together strongly suggests that a relative gender parity exists in Bangladesh in terms of Bangla Language achievement and is consistent across grades and administration years.

Figure 11 : Bangla Mean Scale Scores by Gender

Bangla Results by Content Domain

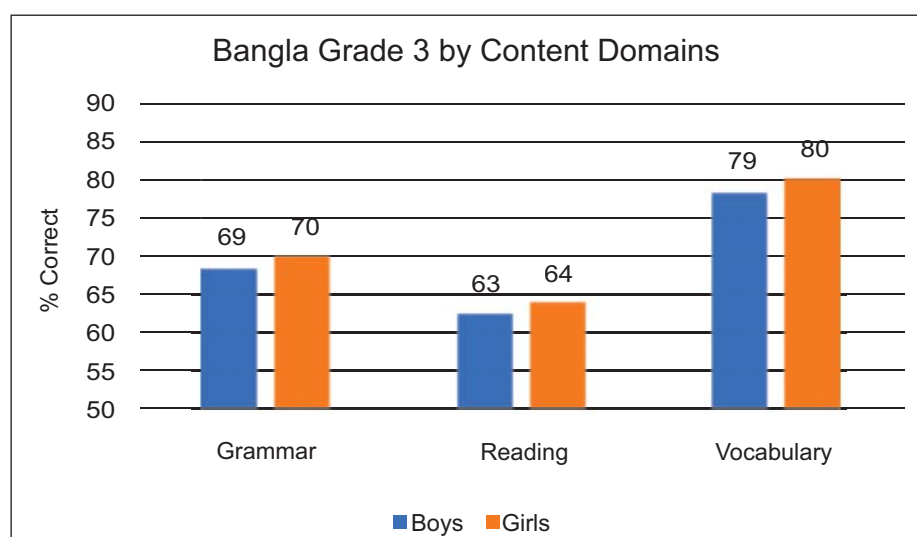
The major domain of interest on the Bangla Language assessment was Reading Comprehension. Two additional domains—Grammar and Vocabulary—closely connect to and support the acquisition of Reading Comprehension.² The 2017 results for these content areas are presented below. As can be seen from Figure 12, for Grade 3 the Vocabulary tasks were the easiest while the Reading Comprehension tasks (presented here as % correct scores) were more challenging, however, in Grade 5 (Figure 13) all the content domain tasks represented relatively similar challenge levels.

For Grade 3, girls scored numerically slightly higher than boys in each of the three content domains, however, based on the effect size measure (Cohen's D), all the gender differences are falling in the category qualified as zero or negligible effect size.

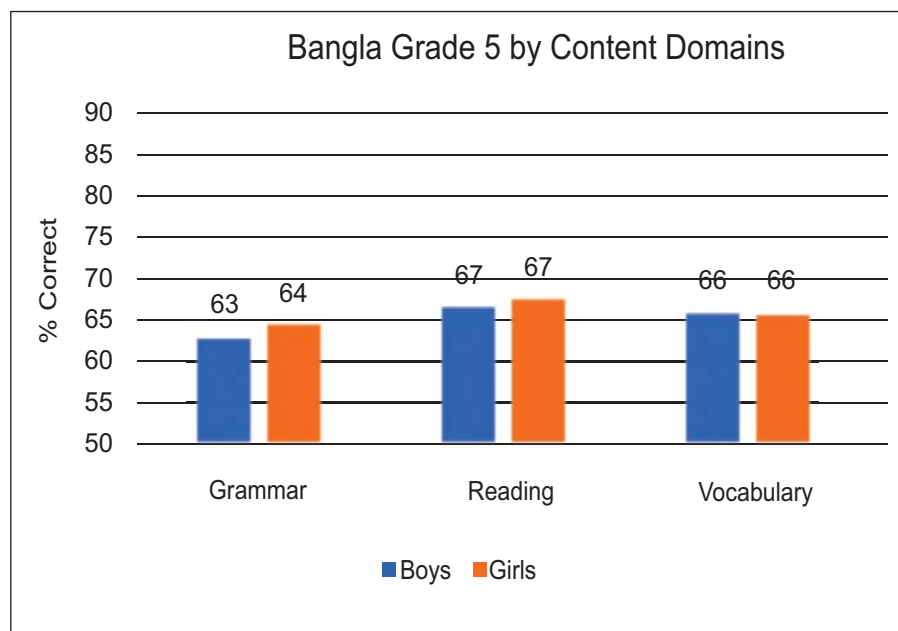
For Grade 5, the size of difference for each comparison was either zero or negligible in all cases. Note that the overall trend is different for Grade 5 than for Grade 3. Students in Grade 5 scored higher on the Reading Comprehension section than on Grammar.

More importantly, it could be said that the language (Bangla) literacy should be assessed by measuring the listening, speaking, reading and writing skills instead of only reading comprehension as the reform curriculum introduced listening and speaking tests. NAC, DPE can think on it for NSA 2020 since the teachers and learners are practicing it following the Government order.

Figure 12 : Bangla Results by Content Domains (Grade 3)



² The 2017 NSA did not measure oral skills (listening and speaking) because of the time and costs associated with this type of assessment. In 2017 it was also agreed that writing would not be measured given the limited amount of testing time available.

Figure 13 : Bangla Results by Content Domains (Grade 5)**Bangla Results by Cognitive Processing Level**

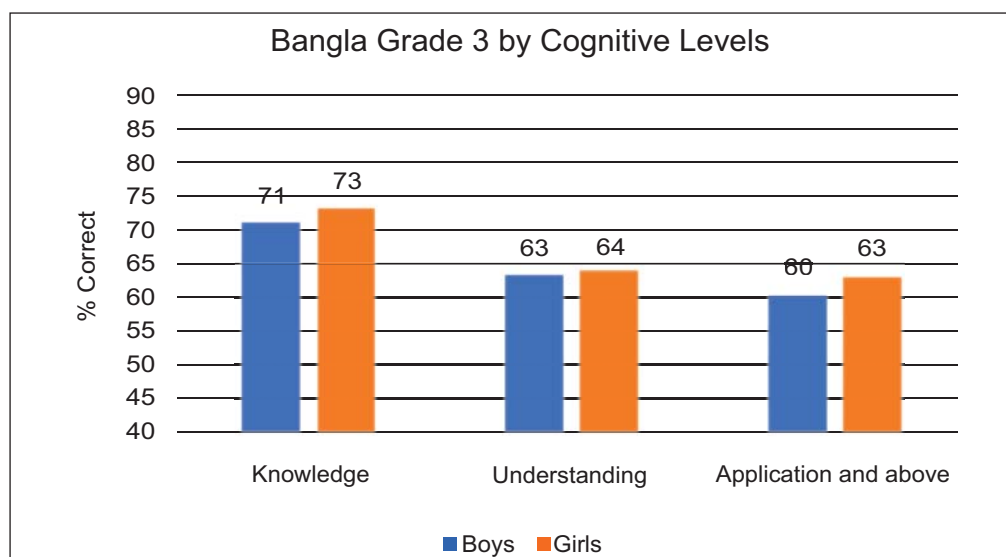
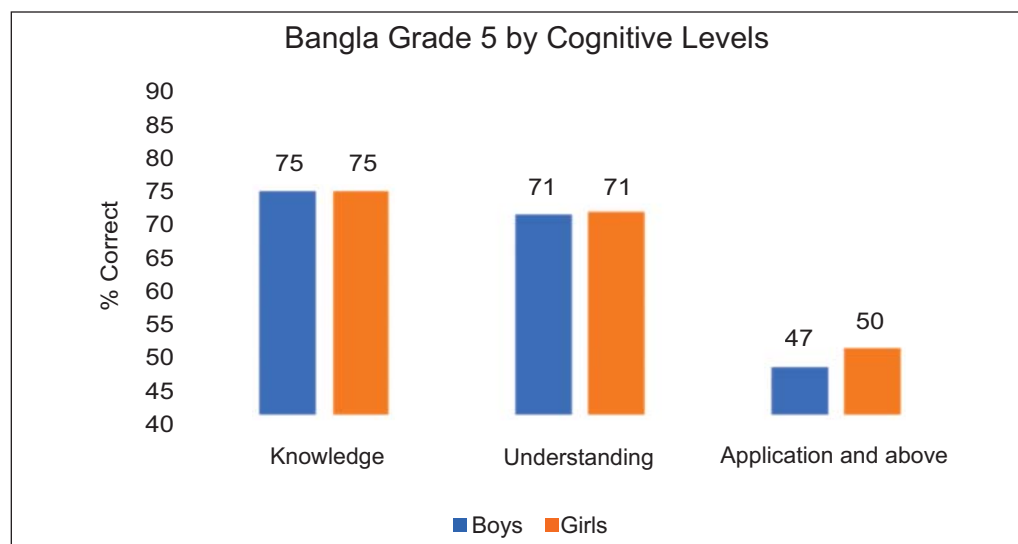
In the Bangla test design, items were arranged within the test in a logical order, presenting to students a cognitive flow logically related to the curriculum. Regarding difficulty, items were sequenced within the test from easiest to more difficult, with a peak of difficulty somewhere around the middle of the second half of the test. Items were classified into 1 of 4 categories defined by the cognitive level measured by the item and in the following approximate proportions (Table 11):

Table 11 : Cognitive Processing Levels for Bangla Language Tests

Cognitive processing level	Grade 3 % weight	Grade 5 % weight
Knowledge	42%	34%
Understanding	39%	39%
Application and above	19%	27%

The methodology used for assigning cognitive processing level to the design of a test item was based on Bloom's Taxonomy. For the purposes of item development for the NSA 2017, the first 2 levels of Bloom's taxonomy were preserved: 1. Knowledge (recall or location of information); 2. Comprehension (understanding of concepts). The third level used on the NSA 2017 was a combination of the top four levels of Bloom's taxonomy, combining Application, Analysis, Synthesis, and Evaluation into a single level defined as Application and above.

As shown in Figure 14 below, students in Grade 3 answered a larger percentage of Knowledge questions correctly than questions at Understanding and Application and above cognitive processing levels. In Grade 5 (Figure 15) the percentage of Knowledge and Understanding questions answered correctly was similar, whereas the percentage of correctly answered questions at Application and above cognitive level was much lower.

Figure 14 : Bangla by Cognitive Processing Levels (Grade 3)**Figure 15 : Bangla Cognitive Processing Levels (Grade 5)**

For Grades 3 and 5, girls again scored at statistically significant higher levels in all three of the cognitive processing categories as can be seen in Figure 14 and Figure 15 above. As in the content domain scores, however, effect sizes were in most cases negligible. Only for Grade 3, girls over performed boys on Application & above with a small effect size of around 0.20.

Bangla Scale Scores by School Type

Table 12 below presents Bangla mean scores, standard deviations, and numbers of students sampled for Grade 3 by school type, listed from highest to lowest scoring school types. The orange shaded area represents school types that were above the national average of 102.7 in 2017. In all three presented cycles, Kindergarten Schools had the highest mean scores, 7-10 points higher than the lowest performing category of school type. High Schools Attached Primary Schools (HSAPS) scored in the top three in all three cycles.

Table 12 : Bangla Scale Scores by School Type (Grade 3)

2017				2015				2013			
School Type	Mean BSS	Std. Dev	N	School Type	Mean BSS	Std. Dev	N	School Type	Mean BSS	Std. Dev	N
KG	107.5	10.5	2,592	KG	106.8	10.4	1,723	KG	107.1	10.5	1,485
BRAC	106.8	10.8	470	HSAPS	103.4	11.8	632	ROSC	105.5	12.7	1,082
HSAPS	105.2	12.0	909	BRAC	102.2	10.1	588	HSAPS	105.2	9.8	869
GPS	102.5	12.4	17,585	GPS	100.4	12.2	13,531	GPS	104.3	12.5	13,322
ROSC	100.8	11.2	502	NNPS	100.2	11.7	4,042	Madrasah	103.5	12.2	1,078
NNPS	100.8	12.5	4,706	Madrasah	99.8	13.3	1,018	RNGPS	103.2	11.5	4,619
Madrasah	99.9	12.6	1,334	ROSC	97.3	12.0	1,355	BRAC	98.7	7.8	414
TOTAL			28,098				22,889				22,869

Key: KG = Kindergarten; HSAPS = High School Attached Primary School; BRAC = Building Resources across Communities; GPS = Government Primary School; ROSC = Reaching Out-of-School Children; RNGPS = Registered Non-Government Primary Schools; NNPS = Newly Nationalized Primary Schools

Table 13 : Bangla Score Differences Grouped by Statistical Significance (Grade 3)

School Type	N	Homogeneous Groups			
		1	2	3	4
Madrasah	1,333	99.9			
NNPS	4,706	100.8			
ROSC	502	100.8			
GPS	17,584		102.5		
HSAPS	909			105.2	
BRAC	470				106.8
KG	2,592				107.5
TOTAL	28,096				

Table 13 above illuminates how the mean score differences relate to each other in terms of whether group differences were statistically significant. The way to interpret the data in Table 13 (and similar tables that follow) is that groups that fall under the same homogeneous group do not have mean score differences that are statistically significant. For example, the differences in mean scores between all three school types in group 1 (Madrasah, NNPS, and ROSC) were not statistically significant. The mean score difference between ROSC and KG was statistically significant and the large effect size (Cohen's D) indicates a practical difference. By comparison, the difference between HSAPS and KG was also statistically significant, but the effect size was relatively small.

Bangla Grade 5 mean scores are presented by school type in Table 14 below. The table contains the same basic data for Bangla Grade 5 as presented above in Table 11 for Bangla Grade 3. The orange shaded area represents mean scores that were above the Bangla Grade 5 national average of 108.6 in 2017. KG schools and HSAPS were again consistently high scoring school types in 2013, 2015, and 2017. The difference between top scoring and low scoring was over ten points in 2017. Madrasahs and ROSC were the lowest scoring in last three assessment cycles.

Table 14 : Bangla Scale Scores by School Type (Grade 5)

2017				2015				2013			
School Type	Mean BSS	Std. Dev	N	School Type	Mean BSS	Std. Dev	N	School Type	Mean BSS	Std. Dev	N
KG	113.3	9.8	2,189	KG	121.6	16.7	1,491	KG	118.2	10.2	1187
HSAPS	111.1	11.4	922	HSAPS	118.3	16.7	560	GPS	116.3	11.1	10,633
GPS	109.3	10.6	14,501	BRAC	115.5	13.8	1,060	HSAPS	114.1	11.8	710
BRAC	108.8	8.9	699	GPS	114.6	13.8	11,526	RNGPS	113.1	10.3	3,419
NNPS	105.8	9.9	3,756	NNPS	110.7	13.1	3,359	BRAC	112.4	8.2	994
ROSC	104.4	10.4	527	ROSC	108.1	13.8	447	Madrasah	110.4	12.0	935
Madrasah	102.6	10.9	1,515	Madrasah	108.0	14.7	945	ROSC	--	--	--
TOTAL			24,109				19,388				17,878
Key: KG = Kindergarten; HSAPS = High School Attached Primary School; BRAC = Building Resources across Communities; GPS = Government Primary School; ROSC = Reaching Out-of-School Children; RNGPS = Registered Non-Government Primary Schools; NNPS = Newly Nationalized Primary Schools											

Table 15 : Bangla Score Differences Grouped by Statistical Significance (Grade 5)

School type	N	Homogeneous Groups					
		1	2	3	4	5	6
Madrasah	1,515	102.6					
ROSC	527		104.4				
NNPS	3,756			105.8			
BRAC	698				108.8		
GPS	14,501				109.3		
HSAPS	921					111.1	
KG	2,189						113.3
TOTAL	24,107						

As for Grade 3, Table 15 above presents the school type data for Grade 5 by homogeneous groups according to statistical significance levels. Note there is more differentiation and less bunching by groups for Grade 5 than for Grade 3. The top scoring Kindergarten mean score is again statistically significant from all other scores. The effect size of the difference between low scoring Madrasahs and KG schools is quite large at 0.85, almost one full standard deviation in mean score average.

The mean score difference between GPS and BRAC was the only non-significant difference. The effect size for the difference between NNPS (105.8, group 3) and BRAC (108.8, group 4) is small to moderate. While the effect size values for each possible combination of pairs is not presented in this report, the DPE has this data and it can be made available for further study.

Bangla Scale Scores by Division

Total mean scores for Bangla Grade 3 by geographic division are presented below in Table 16, ordered from highest to lowest scores for both 2013 and 2015. The orange shaded area represents mean scores that were above the national average in 2017. We see that the Rajshahi division mean score was the highest in 2015 and second highest in 2013, but it fell to 4th position in 2017. The lowest scoring division, Sylhet, was 9.4 mean points below Rajshahi in 2015 and 7.6 points below Rangpur in 2017. Rajshahi and Rangpur were both among the top four divisions for both assessment years, but Sylhet was at the bottom in all years. Note that Dhaka's rank order moved from seventh in 2013 to second and third in 2015 and 2017, respectively.

Statistical testing was employed to compare the mean scores across geographic divisions (Table 17 below). The differences in mean scores for all three divisions in group 3 (Dhaka, Rajshahi, and Mymensingh divisions) were not statistically significant. The mean score difference between Khulna and Chittagong divisions was also not statistically significant. Note that the lowest mean score (Sylhet) division scored at statistically significant levels from all other divisions.

Table 16 : Bangla Scale Scores by Division (Grade 3)

2017				2015				2013			
Division	Mean BSS	Std. Dev	N	Division	Mean BSS	Std. Dev	N	Division	Mean BSS	Std. Dev	N
Rangpur	105.2	11.1	2,813	Rajshahi	104.0	11.8	2,901	Barisal	108.5	11.9	1,278
Barisal	104.6	12.9	1,248	Dhaka	101.6	11.6	6,940	Rajshahi	106.9	12.8	2,782
Dhaka	103.8	11.9	6,940	Khulna	101.3	12.9	2,336	Chittagong	105.7	12.1	4,962
Rajshahi	103.5	12.0	2,863	Rangpur	100.8	10.9	2,845	Rangpur	105.5	10.7	2,606
Mymensingh	103.4	12.5	2,586	Chittagong	100.1	12.3	4,474	Khulna	103.7	11.2	2,430
Khulna	101.8	12.0	2,629	Barisal	99.6	11.7	1,425	Dhaka	101.9	11.7	6,883
Chittagong	101.4	12.7	6,945	Sylhet	94.7	12.6	1,968	Sylhet	100.9	12.7	1,928
Sylhet	97.6	12.4	2,077	--	--	--	--	--	--	--	--
TOTAL			28,101				22,889				22,869

Table 17 : Bangla Score Differences Grouped by Statistical Significance (Grade 3)

Division	N	Homogeneous Groups			
		1	2	3	4
Sylhet	2,076	97.6			
Chittagong	6,944		101.4		
Khulna	2,628		101.8		
Mymensingh	2,585			103.4	
Rajshahi	2,863			103.5	
Dhaka	6,939			103.8	
Barisal	1,247				104.6
Rangpur	2,812				105.2
TOTAL	28,094				

It is interesting to observe how differences among divisions in Bangla Language performance vary across the 3 administrations of the NSA. For Bangla Grade 5 (Table 18), the range of differences among divisions in 2013 was 7 points; however, it increased to 10 points in 2015, and came back to 7 points in 2017. Dhaka was the highest scoring division in 2017, while Sylhet was again the lowest scoring

division, with a 7.1 mean score difference between them. The relationship was similar in 2015 but with Rajshahi attaining the highest mean score in 2015. Dhaka was relatively higher in rank order in 2015 and 2017 than it was in 2013. The orange shaded area represents mean scores that were above the national average in 2017.

In terms of statistical significance (Table 19 below), the effect size of the difference between the top (Dhaka) and bottom (Sylhet) divisions was large at 0.72. While the bottom scorer had a mean that was statistically significant from all others, there was much clustering in groups 2 and 3 as can be seen below.

Table 18 : Bangla Scale Scores by Division (Grade 5)

2017				2015				2013			
Division	Mean BSS	Std. Dev	N	Division	Mean BSS	Std. Dev	N	Division	Mean BSS	Std. Dev	N
Dhaka	110.1	10.5	6,192	Rajshahi	117.6	14.8	2,530	Barisal	118.2	10.8	1,115
Rangpur	109.7	11.0	2,087	Dhaka	116.1	15.4	5,727	Rajshahi	117.6	10.8	2,171
Rajshahi	109.6	10.4	2,383	Khulna	115.9	13.8	1,977	Rangpur	116.4	11.0	2,054
Mymensingh	108.5	10.6	1,953	Barisal	112.6	15.1	1,254	Chittagong	115.3	11.5	3,919
Barisal	108.4	11.6	1,101	Rangpur	112.5	13.8	2,138	Dhaka	114.7	10.6	5,145
Chittagong	108.2	10.7	6,305	Chittagong	112.2	12.5	4,177	Khulna	113.9	9.2	2,038
Khulna	108.0	10.4	2,570	Sylhet	107.3	13.4	1,603	Sylhet	111.2	12.2	1,386
Sylhet	103.0	10.1	1,518	--	--	--	--	--	--	--	--
TOTAL			24,109				19,406				17,828

Table 19 : Bangla Score Differences Grouped by Statistical Significance (Grade 5)

Division	N	Homogeneous Groups		
		1	2	3
Sylhet	1518	103.0		
Khulna	2569		108.0	
Chittagong	6305		108.2	
Barisal	1100		108.4	
Mymensingh	1952		108.5	
Rajshahi	2382			109.6
Rangpur	2087			109.7
Dhaka	6192			110.1
TOTAL	24,109			

CHAPTER 3

THE NSA 2017 MATHEMATICS ASSESSMENT

The objective of Mathematics instruction in the targeted grades was to acquaint learners with arithmetical logic, methods, and skills so that students become imaginative, curious, creative and intellectual learners; and to increase students' abilities to apply such knowledge and skills for problem solving in real world contexts and activities. Appendices 3 and 4 provide a complete description of the key Mathematics skills that students were expected to develop in Grades 3 and 5.

The framework for Mathematics was written with a consistent focus on collecting information on student performance in four key areas of mathematical content (Table 20):

- Number Properties and Operations (including computation and understanding of number concepts);
- Measurement and Units of Measurement (scale of measurement; principles of measurement; metric system of measurement; application of processes and concepts of area; differentiate between and carry out operations);
- Shape and Space (understand concepts and use instruments);
- Data (graphical representations, relationships, and central tendency of data).

Table 20 General Features of the Mathematics Tests

Key areas		Grade 3	Grade 5
Number Properties and Operations		60%	60%
Measurement and Units of Measurement		29%	22%
Shape and Space		11%	10%
Data		--	8%
Feature	Detail		
Number of test sessions	1		
Test time	60 minutes + 15 minutes (excluding preliminary organization time)		
Number of scored items	Grade 3: 35 Grade 5: 40		
Item types	Selected Response: Grade 3: 30 items; Grade 5: 35 items Constructed response: Grade 3: 5 items; Grade 5: 5 items		

Mathematics Reliability Estimations

Reliability coefficients for Mathematics in both grades were estimated using Cronbach's alpha, a coefficient of scale reliability, and the Spearman-Brown, Split half method. The reliability coefficient is an estimation of the internal consistency of the items. Internal consistency refers to the extent to which the items in the test are consistently measuring the same construct. As the alpha coefficient increases, the portion of a score that can be attributed to error will decrease: Hence higher values are desirable (generally above 0.80). A first analysis of the Mathematics data for both grades revealed a very high reliability for both grade levels (see Table 21 below).

Table 21 : Reliability Coefficients for Mathematics Assessments

Test	N of items	Cronbach-alpha	S-B Split-half
Mathematics Grade 3	35	0.95	0.96
Mathematics Grade 5	40	0.95	0.96

Mathematics Performance Bands

The current performance levels (“legacy bands”) originate from the NSA 2011 (ACER, 2012) and were intended to capture achievement of students across grades 1 through 5 in Bangla Language and Mathematics content from both Grade 3 and 5. The bands and descriptors for Mathematics are presented in Table 22.

Table 22 : Performance Band Descriptors and Cut Scores for Mathematics

Mathematics Scale Score	BAND DESCRIPTORS FOR MATHEMATICS
124 & above	Pupils working in Band 5 <ul style="list-style-type: none"> • apply strategies to simplify numerical expressions and solve word problems on percentages and unitary method • apply geometric properties and relations in solving simple problems on angles • calculate the perimeter of simple geometric shapes in real context
113 - 123	Pupils working in Band 4 <ul style="list-style-type: none"> • apply strategies to solve word problems including money transactions using skills of addition, subtraction, multiplication and division of whole numbers, add/ subtract and simplify decimals, find the Highest Common Factor of small numbers, identify and represent fractions, multiply and divide whole numbers by fractions, solve word problems related to addition and subtraction • set up a mathematical expression (equation) for a given situation, find the value of an unknown in a given simple mathematical expression • convert different units of length measure(cm/mm to cm/m, kg to gm) and area measure (square metres to hectares), calculate area of a triangle from given dimensions • identify the distinguishing properties of 2D objects • calculate averages from data presented pictorially
101 - 112	Pupils working in Band 3 <ul style="list-style-type: none"> • add and subtract 6-digit numbers (negative numbers excluded) identify the remainder on division by 100, find Lowest Common Multiple of given numbers, uses addition/subtraction and multiplication to solve 2 stage word problems, can convert fractions to mixed fractions, percentages and decimals, add, subtract and multiply like fractions including decimal fractions by whole numbers, identify equivalent mathematical processes from simplification, find the unit price of an item using unitary method • calculate elapsed time and read a 24 hour clock format • measure the volume of a liquid shown in a graduated cylinder and calculate the area of a rectangle • identify 3D shapes and classify triangles • use tally charts and frequency tables

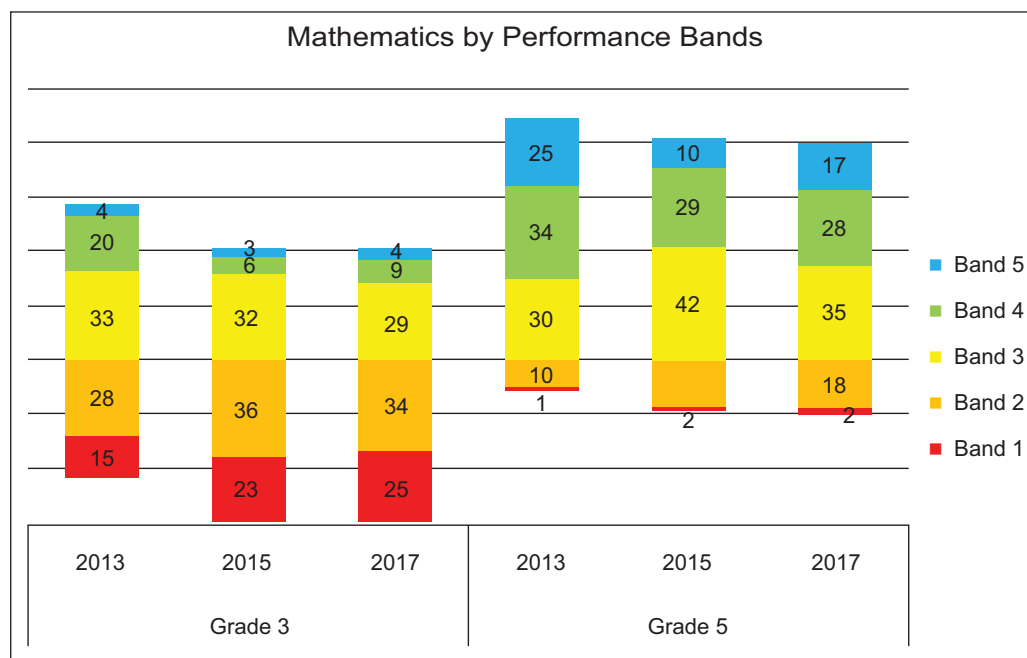
Mathematics Scale Score	BAND DESCRIPTORS FOR MATHEMATICS
90 - 100	Pupils working in Band 2 <ul style="list-style-type: none"> • identify place value in numbers up to 4-digit numbers, orders 2-digit numbers, compare two numerical expressions • add and subtract numbers up to 4-digits (without carry over) divide a 3-digit number by a 1-digit number, use addition, subtraction and multiplication to solve two stage problems, recognise, order and find equivalent simple fractions • recognise and name currency in words and figures • read time an analogue clock to the nearest quarter hour, convert hours to days • identify appropriate unit of measurement, convert metres and centimetres to metres, calculate area of a rectangle
below 90	Pupils working in Band 1 <ul style="list-style-type: none"> • identify, count and compare numbers up to 3-digits, add and subtract numbers up to 4-digits (without carry over), identify even and odd numbers • read date and day on a calendar • read simple graphs • recognise and draw simple 2D shapes and identify types of surfaces(plane surface)

NSA Mathematics results in recent three cycles for Grades 3 and 5 are presented below. Comparability across the NSA years is enabled through the application of IRT-based horizontal equating procedures. By provision of vertical scaling procedures, Grade 3 and Grade 5 NSA scores were placed on the same vertical scale, so that comparison across grade levels is possible.

The results of the three NSA years (2013, 2015, and 2017) expressed in terms of percentages of students achieving in performance bands are presented in Figure 16 below. To facilitate comparisons, the portions of the bars representing the top three bands (3, 4, and 5) are placed above the reference line, and portions representing Bands 1 and 2 are shown below the reference line. It can be noted that there is growth in the percentages of students scoring in the three top bands from Grade 3 to Grade 5; this holds true for all three NSA years. When looking across administration years, Mathematics scores in NSA 2017 are about the same as in 2015, but lower from 2013.

As mentioned in the section about Bangla performance bands, the viability of using legacy bands as an evaluation framework for the performance of students against grade specific standards and expectations is seriously challenged by the reasonableness check – it may not be likely that the percentage of students reaching grade level curriculum objectives is so different between Grade 3 and Grade 5 (42% vs. 17%, respectively). This evidence triggered establishing a system of performance standards that serves as a suitable framework for evaluating students' academic achievement in the context of grade-specific curriculum objectives, which is presented in Chapter 4 of this document.

Figure 16 : Overall Mathematics Results by Performance Bands (NSA 2013, 2017, and 2017)



As can be seen from the data in Figure 17 and Figure 18 below, approximately equal percentages of boys and girls achieve at Bands 3 and higher in all three NSA years (2013, 2015, and 2017). This evidence clearly indicates that there is gender equity in mathematics performance in Bangladesh.

Figure 17 : Mathematics Performance Bands by Gender (Grade 3)

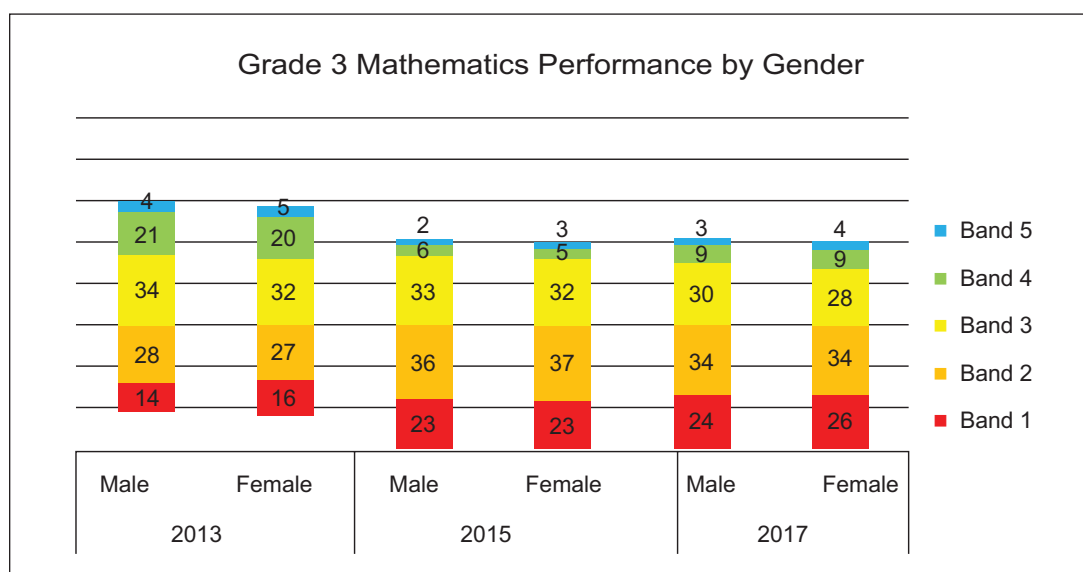
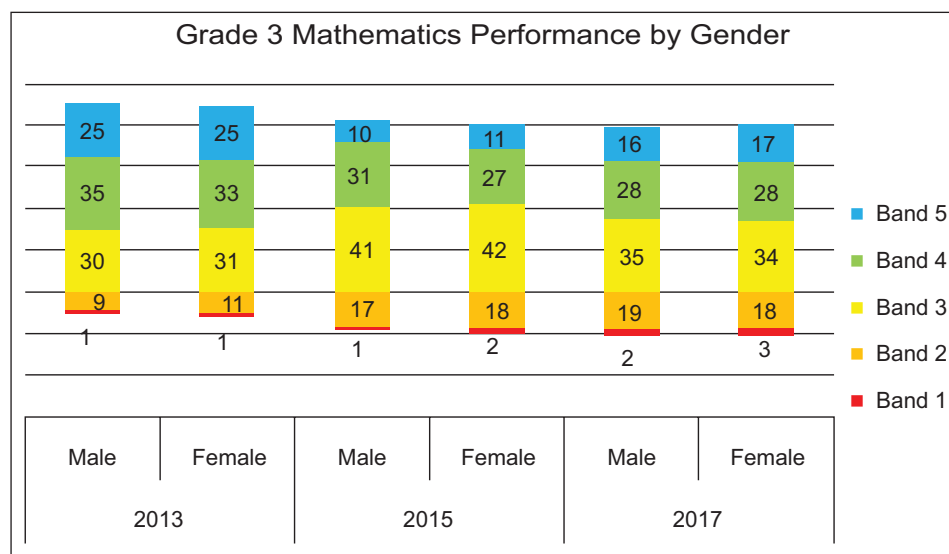


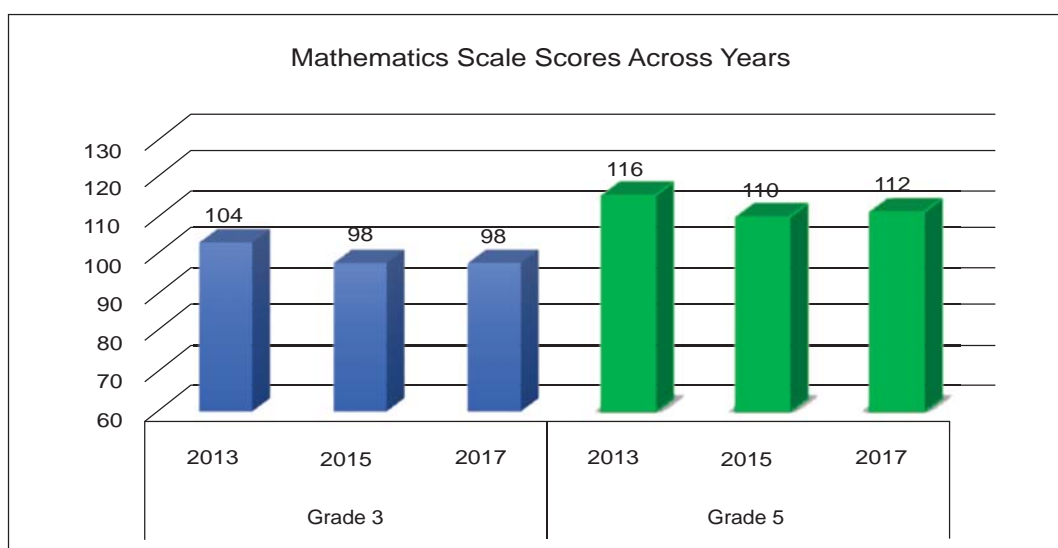
Figure 18 : Mathematics Bands by Gender (Grade 5)



Mathematics Scale Scores

The overall mean scale scores in Mathematics across all three NSA years are presented in Figure 19 below. Looking across the three recent NSA cycles it can be observed that Mathematics scale scores in both grades decreased from 2013 to 2015, but 2017 Mathematics mean scores for Grades 3 and 5 were about the same as in the 2015 NSA.

Figure 19 : Overall Mathematics Mean Scores by Grade and Year (NSA 2013, 2015, and 2017)



NSA Mathematics mean score averages across all three assessment years for the two most prominent school types, GPS and NNPS (RNGPS in 2013), are shown in Figure 20 and Figure 21. Both GPS and NNPS mean scores were significantly down in 2015 from 2013 in both grade levels, but they remained about the same in 2017.

Figure 20 : Mathematics Means by Main School Types (Grade 3)

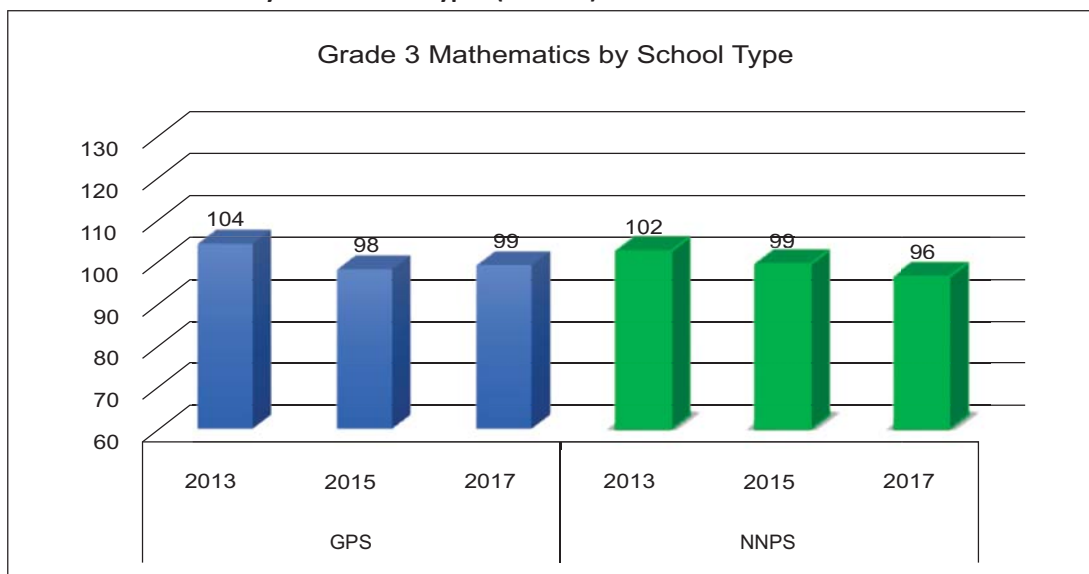
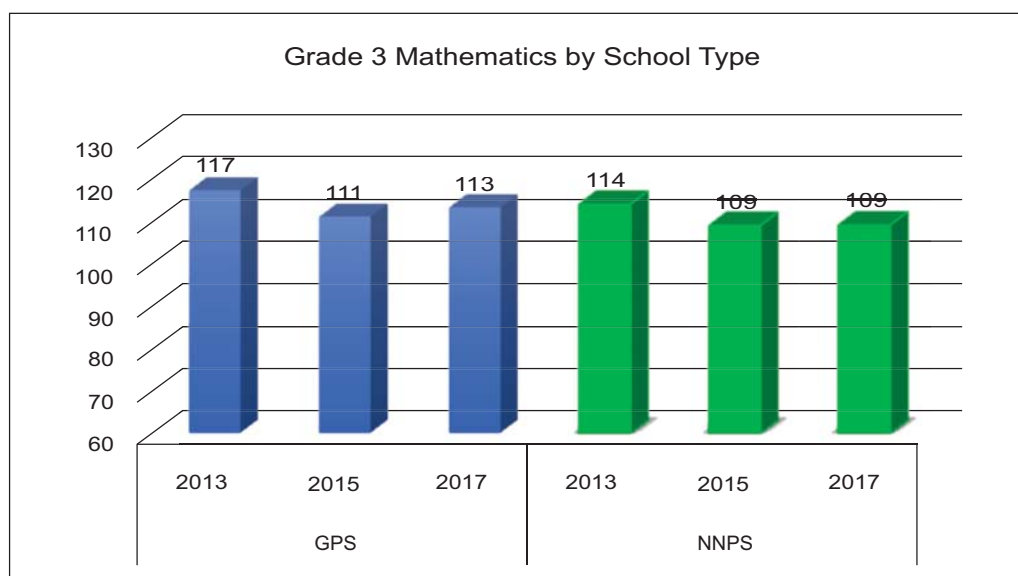
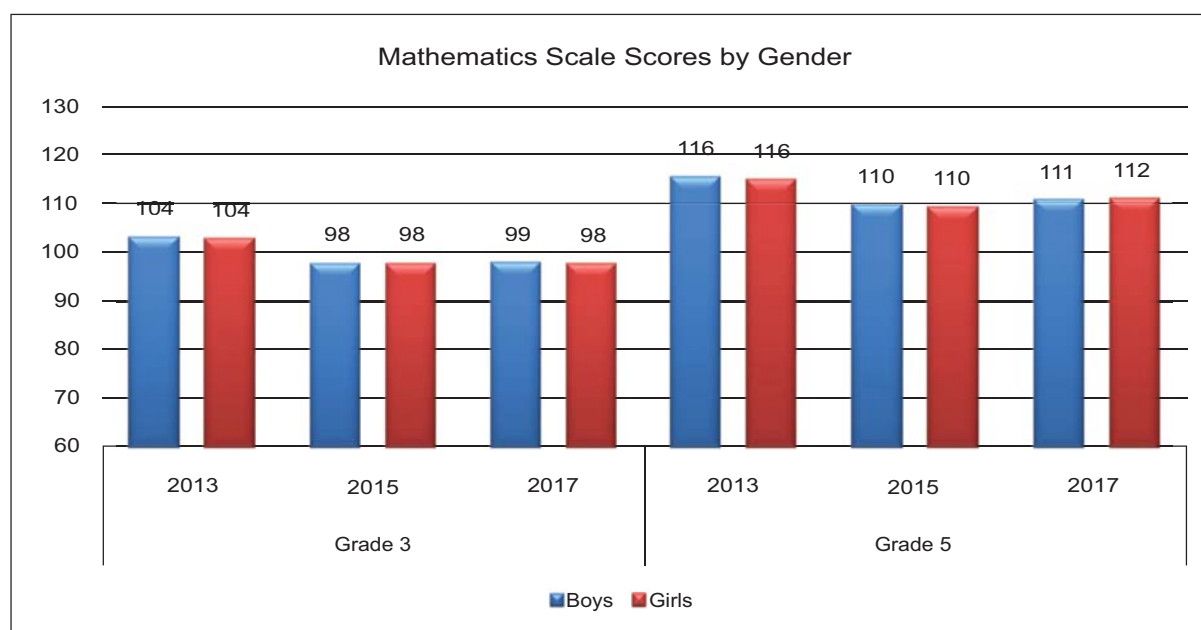


Figure 21 : Mathematics Means by Main School Types (Grade 5)



As can be seen in Figure 22, gender parity in Mathematics achievement is again evident across grade levels and assessment years.

Figure 22 : Mathematics Means by Gender



Mathematics Results by Content Domain

Unlike the Bangla assessments, girls did not score numerically higher across the Mathematics content domains. In Grade 3, on Measurement and Units, boys scored at a statistically significant higher level than girls, but with a negligible effect size of 0.15 (Figure 23). In Grade 5 there was no statistically significant differences between girls and boys (Figure 24).

Figure 23 : Mathematics Achievement by Content Domain (Grade 3)

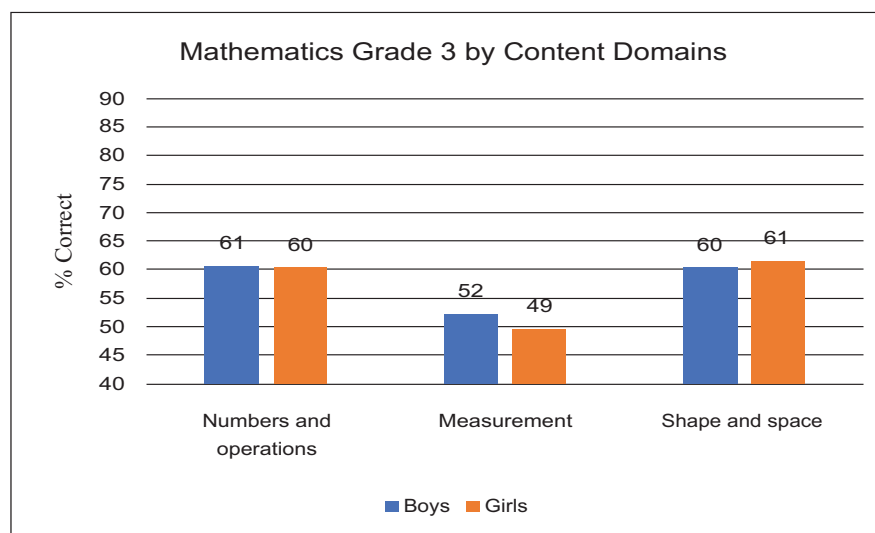
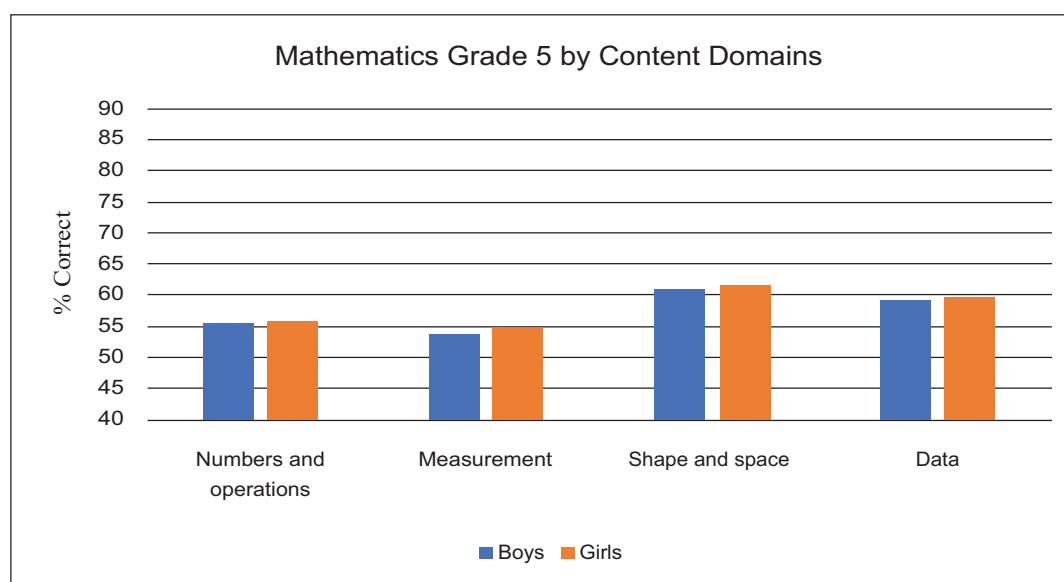


Figure 24 : Mathematics Achievement by Content Domain (Grade 5)



Mathematics Results by Cognitive Processing Level

Items were classified into one of 3 categories defined by the cognitive level measured by the item in the approximate proportions shown in Table 23:

Table 23 : Cognitive Processing Levels for Mathematics Tests

Cognitive processing level	Grade 3 weight %	Grade 5 weight %
Knowledge	31%	25%
Understanding	28%	36%
Application and above	41%	39%

As with the Bangla assessments, a slight downward trend is evident for Mathematics as the cognitive demands increase. Note in Figure 25 and Figure 26 that students answered larger proportions of Knowledge and Understanding questions than those questions requiring Application and above skills.

For Grade 3 there were no significant differences between boys and girls on two of the three levels. On Understanding, however, boys scored at a statistically higher level but the effect size for this difference was negligible.

For Grade 5, there were no statistically significant differences by gender on the Understanding and Application and above processing levels. For the Knowledge level there was a statistically significant difference in favor of girls with the negligible effect size level.

Figure 25 : Mathematics by Cognitive Processing Levels (Grade 3)

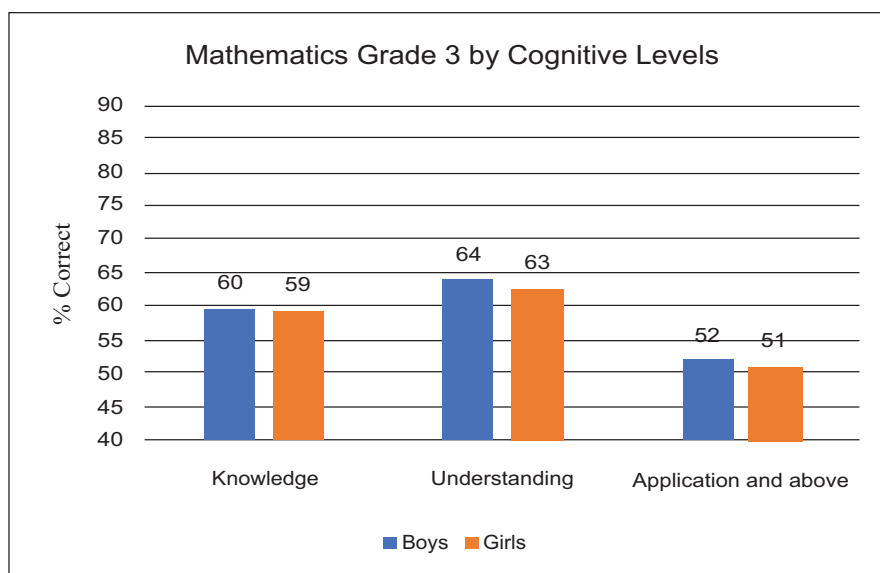
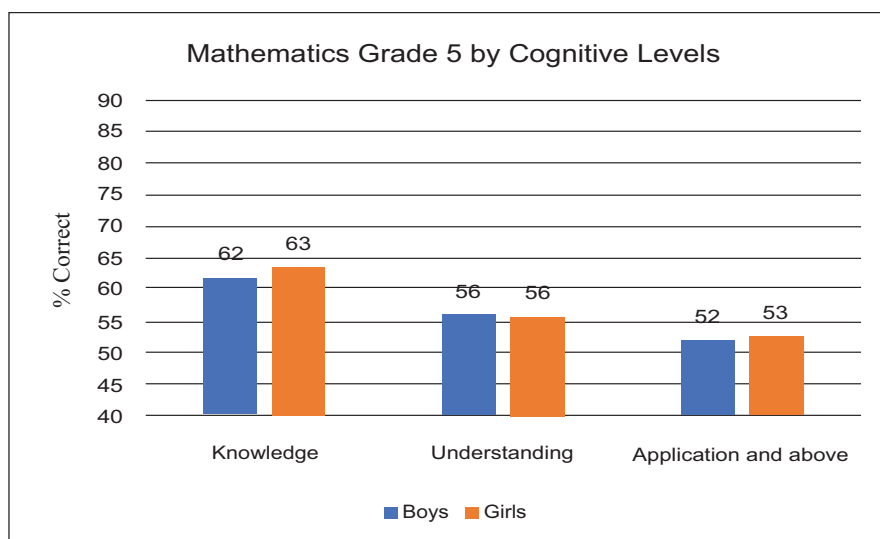


Figure 26 : Mathematics by Cognitive Processing Levels (Grade 5)



Mathematics Results by School Type

Table 24 presents mean scores for Grade 3 Mathematics by school type in all three NSA administration years, listed from highest to lowest scorers. The orange shaded area represents mean scores that were equal or above the national mean score of 98.4 in 2017. Looking at Grade 3 by school type, we see that KG schools scored at a statistically significant higher level than all other school types in the group. The lowest scoring school mean in 2017 was Madrasah, about 5 points less than the top mean score achieved by KG schools. Interestingly, ROSC was the second highest scorer in 2013 but fell in 2015 with an almost ten points mean score decrease.

Table 24 : Mathematics Results by School Type (Grade 3)

2017				2015				2013			
School Type	Mean MSS	Std. Dev	N	School Type	Mean MSS	Std. Dev	N	School Type	Mean MSS	Std. Dev	N
KG	100.4	13.2	2,669	KG	103.3	11.6	1,729	KG	105.0	9.9	1,486
BRAC	100.1	12.4	467	NNPS	99.2	11.2	4,051	ROSC	104.6	12.5	1,079
GPS	99.0	14.0	17,831	BRAC	98.4	9.6	596	Madrasah	104.2	14.5	1,078
HSAPS	98.4	12.0	940	GPS	98.0	11.4	13,575	GPS	104.1	13.6	13,454
NNPS	96.2	13.0	4,803	HSAPS	97.9	9.7	632	HSAPS	103.4	11.4	891
ROSC	96.0	9.6	546	Madrasah	96.0	11.4	1,006	RNGPS	102.3	12.0	4,662
Madrasah	95.2	12.5	1,341	ROSC	95.2	10.3	1,365	BRAC	97.5	8.8	414
Total			28,597	TOTAL			22,889	TOTAL			23,064
Key: KG = Kindergarten; GPS = Government Primary School; HSAPS = High School Attached Primary School; BRAC = Building Resources Across Communities; ROSC = Reaching Out-of-School Children; RNGPS = Registered Non-Government Primary Schools; NNPS = Newly Nationalized Primary Schools											

Table 25 shows which Mathematics mean score differences by school type were statistically significant. As per the Bangla Language school types and divisions (presented in the previous section), for comparisons across groups an ANOVA was used to determine whether the mean score differences under study were statistically significant. Scores that fell under the same homogeneous group number did not have mean score differences that were statistically significant.

The difference between the means of the top and bottom scoring school types (KG and Madrasah) was statistically significant with a large effect size, 0.75. While the differences in scores between the school types in different groups were statistically significant, note that the effect size for Madrasah and HSAPS was small at 0.25 and the effect size for NNPS and KG was small to moderate at 0.36.

Table 25 : Mathematics 2017 Results by School Type Grouped by Statistical Significance (Grade 3)

School Type	Student N	Homogeneous Groups			
		1	2	3	4
Madrasah	1,340	95.2			
ROSC	545	96.0			
NNPS	4,803	96.1			
HSAPS	940		98.4		
GPS	17,830		99.0	99.0	
BRAC	466			100.1	100.1
KG	2,669				100.4
TOTAL	28,593				

Table 26 below presents mean scores for Grade 5 Mathematics by school type in all three NSA administration years, listed from highest to lowest scorers. The orange shaded area represents mean scores that were equal or above the national mean score of 111.5 in NSA 2017. For Mathematics Grade 5, the two school types (KG and GPS) were consistently the top performers in three recent cycles. In 2017, Madrasah schools were the lowest scoring school type, with a mean score almost ten points

below the highest scoring school type. ROSC was at or near the bottom in all three years 2013, 2015, and 2017.

Table 26 : Mathematics Results by School Type (Grade 5)

2017				2015				2013			
School Type	Mean MSS	Std. Dev	Student N	School Type	Mean MSS	Std. Dev	Student N	School Type	Mean MSS	Std. Dev	N
GPS	113.2	12.7	14,632	KG	113.8	11.1	1,490	GPS	117.2	13.1	10,620
HSAPS	112.2	10.9	896	GPS	111.0	11.2	11,513	KG	116.8	11.1	1,187
KG	111.9	12.1	2,138	HSAPS	110.1	10.9	567	RNGPS	113.9	11.3	3,413
BRAC	109.0	8.6	663	NNPS	108.9	10.0	3,363	HSAPS	112.8	11.7	710
NNPS	109.0	11.6	3,770	BRAC	107.6	8.5	1,068	Madrasah	112.7	11.2	932
ROSC	106.6	10.0	499	ROSC	107.3	8.8	443	BRAC	110.2	7.8	944
Madrasah	104.0	11.3	1,501	Madrasah	104.0	10.6	939	ROSC	-	-	-
TOTAL			24,099	TOTAL			19,388	TOTAL			17,806
Key: KG = Kindergarten; GPS = Government Primary School; HSAPS = High School Attached Primary School; BRAC = Building Resources Across Communities; ROSC = Reaching Out-of-School Children; RNGPS = Registered Non-Government Primary School; NNPS = Newly Nationalized Primary School											

For Grade 5, there were five distinct groups with statistically significant differences across mean scores (Table 27 below). High scoring GPS and low scoring Madrasah had the large effect size, at 0.90, mean score difference equal to almost a full standard deviation.

Table 27 : Mathematics 2017 Results by School Type Grouped by Statistical Significance (Grade 5)

School Type	Student N	Homogeneous Groups				
		1	2	3	4	5
Madrasah	1,501	104.0				
ROSC	499		106.6			
NNPS	3,769			109.0		
BRAC	662			109.0		
KG	2,137				111.9	
HSAPS	895				112.2	112.2
GPS	14,632					113.2
TOTAL	24,095					

Mathematics Results by Geographic Division

The divisions that scored above the national average are highlighted in orange in Table 28. Looking at Mathematics Grade 3 by division, we see that Barisal scored the highest, at a statistically significant level above the other divisions. It is interesting that Barisal was a low scorer in 2015 but recovered its performance in 2017. The lowest scoring division, Sylhet, was 10 points below Barisal in 2017. Rangpur was in the upper range for all three years, as well as Rajshahi, while Dhaka moved up in 2015 and stayed at or above national average in 2017.

Table 28 : Mathematics Results by Geographic Division (Grade 3)

2017				2015				2013			
Division	Mean MSS	Std. Dev	Student N	Division	Mean MSS	Std. Dev	Student N	Division	Mean MSS	Std. Dev	Student N
Barisal	103.4	15.7	1,297	Rajshahi	101.3	11.3	2,906	Rajshahi	107.9	14.5	2,791
Rangpur	101.6	13.8	2,811	Rangpur	99.7	10.3	2,866	Barisal	106.4	12.8	1,458
Mymensingh	101.1	14.3	2,620	Dhaka	98.9	11.5	6,919	Rangpur	105.9	11.5	2,607
Rajshahi	99.3	13.4	2,926	Khulna	98.8	11.3	2,336	Chittagong	105.5	12.6	4,968
Dhaka	98.5	13.0	7,047	Chittagong	97.8	11.2	4,525	Khulna	102.7	11.8	2,432
Khulna	97.3	12.7	2,651	Barisal	96.8	10.2	1,433	Dhaka	100.9	12.3	6,881
Chittagong	96.8	13.1	7,096	Sylhet	92.4	11.6	1,969	Sylhet	98.4	13.2	1,927
Sylhet	93.5	13.1	2,148								
TOTAL			28,597	TOTAL			22,954	TOTAL			23,064

However, before making inferences about the meaning of these rank scores, it is important to identify which mean score differences were statistically significant, as presented in Table 29. Score differences for high scoring Barisal and low scoring Sylhet were statistically significant from all other divisions. Note that while there was a numerical difference between Chittagong and Khulna, this difference was not statistically significant. The mean score for Rajshahi was statistically significant from the groups above and below Rajshahi.

Table 29 : Mathematics 2017 Results by Division Grouped by Statistical Significance (Grade 3)

Division	N	Homogeneous Groups					
		1	2	3	4	5	6
Sylhet	2,147	93.5					
Chittagong	7,096		96.8				
Khulna	2,650		97.3				
Dhaka	7,047			98.5			
Rajshahi	2,926				99.3		
Mymensingh	2,620					101.1	
Rangpur	2,810					101.6	
Barisal	1,297						103.4
TOTAL	28,593						

Looking at Mathematics Grade 5 by division across years (Table 30), Barisal scored the highest in 2017 and highest in 2013, however, it was second lowest in 2015. Dhaka moved up in 2015 in relative ranking from second lowest to second highest, and stayed third highest in 2017. Sylhet remained at the bottom in all three NSA years, and Khulna was around middle in all three assessment years. Except for Rajshahi being in the upper rank and Sylhet being in the bottom for both NSA 2015 and 2017, there is considerable changing of places in the rank order of regions.

Table 30 : Mathematics Results by Geographic Division (Grade 5)

2017				2015				2013			
Division	Mean MSS	Std. Dev	Student N	Division	Mean MSS	Std. Dev	Student N	Division	Mean MSS	Std. Dev	Student N
Barisal	114.4	14.0	1,171	Rajshahi	111.9	11.6	2,536	Barisal	119.6	12.6	1,115
Rajshahi	112.9	13.1	2,378	Dhaka	111.6	11.1	5,706	Rajshahi	118.3	12.7	2,171
Dhaka	112.5	12.7	6,107	Khulna	110.8	11.0	1,983	Chittagong	117.2	12.4	3,927
Rangpur	112.5	11.0	2,124	Rangpur	110.5	10.9	2,147	Khulna	115.5	11.3	2,030
Mymensingh	112.4	11.9	1,916	Chittagong	109.5	10.2	4,163	Rangpur	115.4	12.4	2,054
Khulna	110.8	12.4	2,553	Barisal	108.9	10.8	1,253	Dhaka	114.4	11.9	5,123
Chittagong	110.3	12.0	6,348	Sylhet	104.4	9.5	1,595	Sylhet	111.0	13.1	1,386
Sylhet	107.2	11.8	1,502								
TOTAL			24,099	TOTAL			19,383	TOTAL			17,806

As indicated earlier, before making inferences about the meaning of these rank scores, it is important to identify which mean score differences were statistically significant, as presented in Table 31. The mean score difference between Chittagong and Khulna was not statistically significant, as well as the differences between Mymensingh, Rangpur, Dhaka, and Rajshahi stayed within the same homogeneous group. However, the lowest mean score for Sylhet, and the highest for Barisal, were different at a statistically significant level from all other divisions, the difference between them being 7.2 points, which represents a large effect size.

Table 31 : Mathematics 2017 Results by Division Grouped by Statistical Significance (Grade 5)

Division	N	Homogeneous Groups			
		1	2	3	4
Sylhet	1,501	107.2			
Chittagong	6,347		110.3		
Khulna	2,553		110.8		
Mymensingh	1,916			112.4	
Rangpur	2,123			112.5	
Dhaka	6,107			112.5	
Rajshahi	2,377			112.9	
Barisal	1,171				114.4
TOTAL	24,095				

CHAPTER 4

NSA 2017 BYNEW PERFORMANCE STANDARDS

Why Performance Standards are Important for the Bangladesh Education System

The principal reason why Performance Standards are important for a national education system is that they significantly improve the interpretability of test results like those of the Bangladesh NSA, and when there is improved interpretability, there is the potential for a much greater and more effective impact on instruction and achievement. Thus, in addition to reporting a mean percentage score, or dubious vertical scale scores, we can report student performance by reference to test scores that are mapped onto performance levels. The scale is developed to discriminate between 4 different levels of performance and each level is defined in terms of what students have achieved relative to the content standards measured on the test.

Thus, with Performance Standards, one can now report for example that “25% of Grade 3 Mathematics students are performing at the **below basic level**, 24% at the **basic level**, 42% are performing at the **proficient level**, and 9% at the **Advanced level**”. This is significantly richer information, not only because we can now distinguish between different levels of performance (“still one quarter of all students in Grade 3 is unsuccessful in Mathematics, while another quarter are only achieving the minimum”), but also because we know exactly what students know and can do (or don’t know and can’t do) at each level in terms of the content measured. For example, at the **below basic level** students can’t convert taka to paisa; they can’t read the time, and can’t calculate the duration of an activity; they can’t compare equivalent fractions, etc.

Moreover, it will help to report SDG4 indicators as currently there is no common standard validated by the international communities and the above-mentioned proficiency level may be the benchmark of basic knowledge in a domain of reading and mathematics measured through learning assessments.

This type of information provides a script to teachers/HTs/AUEOs/UEOs/URCs/PTIs/DPEOs Assistant Directors/Divisional Deputy Directors for setting targets for schools to reach (“next academic year we need to lower the percentage of students in the **below basic level** by 10%”, which means providing students with more effective instruction in converting currency/identifying the time/calculating duration/comparing fractions, etc., and probably improving teachers’ ability to provide relevant instruction on these topics.)

Through the use of performance standards, comparisons of student performance across different years is far more pertinent and, given the right application of test equating and scaling methodologies, the use of a performance scale can facilitate comparisons between different grades, and even different subject areas, e.g., “25% of Grade 3 Mathematics students are performing at the **below basic level**, while in Bangla Language 37% of Grade 3 students are performing at that level; by Grade 5, the percentage at that level has dropped to 18%”. It is important to note that under the legacy scale score reporting approach (“the mean score on the Grade 3 Mathematics test at the national level was 102.5”) it has been known very little about what 102.5 means and therefore cannot do much to improve the situation.

How DPE Developed Performance Standards with the Assistance of AIR

DPE developed performance standards for each of the following NSA focused subjects/grades: Mathematics and Bangla Language Grades 3 and 5. The DPE requires independent performance standards for each subject/grade tested so that it can interpret the results of the test in the rich and informative way indicated above. Performance standards are set to have 4 levels and each level is defined in 2 ways: 1) with a general description which would be common across all grades and all subject areas; and 2) with a specific description of the expected performance relative to content

standards and cognitive skills measured on the test. The sequence of activities involved in developing performance standards were the following:

1. Decide how many levels the standards will be made up of (this decision will govern all the performance scales for the country);
2. Decide what labels to use to define each level;
3. Develop the general descriptions of each level in such a way that the descriptions are coherent across grades and across subject areas;
4. Develop the specific descriptions of each level using the content standards and cognitive skills expected of students and measured by the test;
5. Using real data from an operational administration of the NSA 2017, as well as the content measured by the test items, map performance levels onto test score scale to determine the score range of each level.

These activities were guided by AIR technical experts working with DPE content and assessment specialists, together with local expert subject teachers by targeted grades. The complete activity was accomplished in 2 intensive workshops. The first workshop, which focused on development of conceptual definitions of performance levels, took place in October 2017, and the second workshop, focusing on setting cut scores, took place in May 2018.

What DPE Can Do with Performance Standards

When the Performance Standards have been established, the DPE can carry out the following:

1. Interpret the results of the NSA test administration in ways described above;
2. Design strategies to help improve instruction and student achievement for the upcoming academic year including setting targets for teachers, schools, upazilas and districts to aim to achieve;
3. Retrospectively re-interpret the test results from the NSA 2011, 2013, and 2015 by reference to the performance standards and plot trends from 2011 to the current administration also by reference to the performance standards;
4. Use the performance standards for all future administrations of the NSA, to look at both horizontal change (from year to year) and vertical change (from grade to grade);
5. Provide the teaching profession/education system with a rich array of formative information that is empirically derived from high quality testing and that involves ensuring that test forms from one administration are appropriately equated and test results can be mapped onto the performance scale;
6. Use the performance standards to hold schools/districts accountable for developing and achieving improvement targets;
7. If the LASI tests become under the Ministry of Primary and Mass Education (MoPME) similarly develop performance standards for their targeted subjects/grades, then comparisons, both horizontal and vertical, can be made for the complete range of grades covering primary and secondary school education in Bangladesh.

Process of Setting Performance Standards

Setting performance standards is a process for defining a framework that allows for better interpretation of test scores in the Bangladesh NSA for a much greater and more effective impact on instruction and achievement. It is a procedure that conceptualizes and operationalizes the performance levels that will be used to evaluate test results. This procedure consists of two stages: Setting Performance Levels and Setting Cut Scores.

During the Setting Performance Levels stage, development of conceptual definitions of performance levels was carried out for grades 1 through 5 in Bangla and Mathematics. It was decided that four performance levels were appropriate, each with its general and specific definitions created for each grade level and subject.

The first part of conceptualization of performance levels focused on the ***general ideas and meaning*** that are conveyed by performance levels. The participants were instructed about general definitions of performance levels as applicable across grades and subjects to serve as a foundation for establishing performance standards for all educational assessments.

In the second part, the participants were instructed that the ***specific definitions*** of performance levels need to be given in terms of main content and skill domains in each grade and subject. It entails developing grade and subject specific elaboration of performance levels in terms of what are students expected to know and be able to do at each performance level.

Table 32 below shows the ***general performance level descriptors***, which are applicable to any grade or subject, whereas grade/subject ***specific performance level descriptors*** for Mathematics are presented in Appendix 2 and for Bangla in Appendix 3.

Table 32 : General Performance Level Descriptors

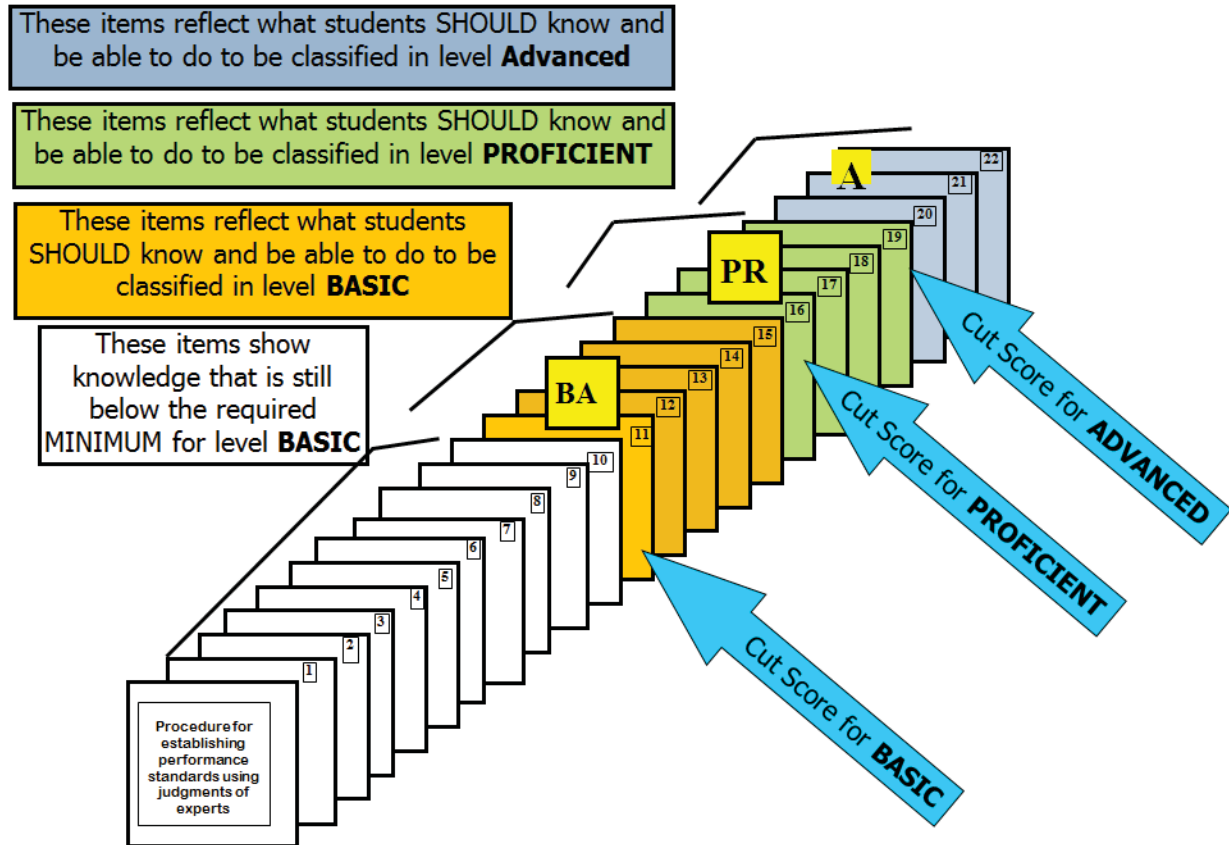
Below basic	Basic	Proficient	Advanced
Learners at this level are at the early stages of development regarding the curriculum standards. They have not achieved sufficient knowledge and skills to be considered minimally successful regarding curriculum demands. They need guidance at every stage of learning. They can make little judgment and need a lot of encouragement and guidance.	Learners at this level demonstrate a minimum level of skills with regard to the curriculum learning outcomes. They are able to follow simple instructions and apply simple rules to achieve expected performance. They have some good ideas which often lack coherence. They need guidance at many stages of learning. They are able to solve problems using simple logic and can also express themselves using simple language.	Learners at this level have acquired most of the learning outcomes and skills required by the curriculum. They can work independently with minimum supervision. They have a systematic methodology to solve problems. They have the ability to communicate their ideas clearly. They can also connect different ideas and create meaning with minimum guidance and supervision. They have the ability to analyze situations and interpret information for application to new situations.	Learners at this level display exceptional mastery of the learning content as prescribed by the curriculum and beyond. They are independent with high analytical, reflective and critical thinking. They are able to connect and integrate concepts and ideas to create new knowledge/meaning and solve complex problems. They communicate information with the highest level of creativity and coherence as well as make sound judgements.

The second stage of the process, Setting Cut Scores, determined score points on the actual tests scales that were used to classify of students' achievement in the performance levels. The procedure was based on subject expert judgements (especially the teachers who are delivering the curriculum in the classroom in the prevailing conditions) taking into consideration the experts' understanding the performance levels definitions, experience solving the tests, and experience evaluation student performance.

The process of setting cut scores is an iterative method that takes typically 3-4 rounds of judgements. After each round feedback is presented to the experts to help them refine each judgement task. The feedback data consists of agreement data, which is represented by the degree to which judgments of different experts are homogeneous, and impact data, which is represented by percentage of students that would be classified in each performance level based on cut scores proposed in a round. After presenting the feedback, the experts have discussions about the reasonableness of their judgements in the light of agreement and impact data.

For the Bangladesh NSA the Bookmark method was used to determine cut scores. This method requires that actual test items are presented to the experts in a booklet ordered based on item difficulties, from the easiest to the most difficult. Then the experts must review all the items and identify the items that need to be answered correctly to demonstrate minimum competency in each performance level, taking into consideration the specific performance level descriptors. Once they identify the last item for each performance level, they must place a bookmark on the item to indicate the cut score. Figure 27 below shows how an ordered booklet looks after the cut scores have been identified.

Figure 27 : Ordered Booklet with Cut Scores.



As mentioned before, agreement data and impact data are presented after each round. Figure 28 and Figure 29 show examples of agreement data and impact data, respectively, that were given after round 3 of setting cut scores for Bangla grade 3.

Figure 28 : Example of Agreement Data for Bangla Grade 3 After Round 3

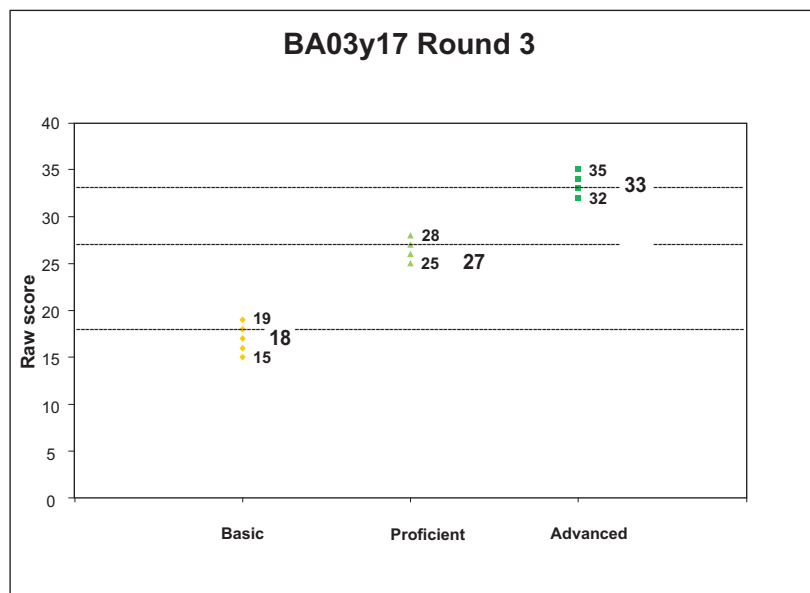
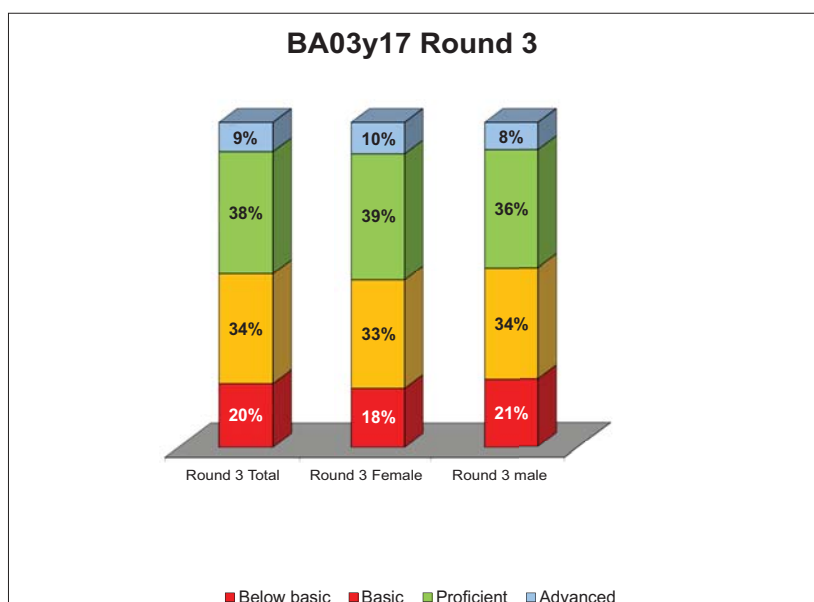


Figure 29 : Example of Impact Data for Bangla Grade 3 After Round 3



It is important to note that both types of feedback, agreement data and impact data, were also presented across grades and subjects to enable vertical and horizontal moderation, respectively. For example, impact data shown across groups were the following:

- To enable vertical moderation: A figure showing percentage of students that would be classified in each performance level comparing the same subject across 2 grade levels (e.g., Bangla for grades 3 and 5).
- To enable horizontal moderation: A figure showing percentage of students that would be classified in each performance level comparing 2 subjects within the same grade level (e.g., Mathematics and Bangla within Grader 5).

After conducting all judgment rounds, discussions, and vertical and horizontal moderations, the experts reached agreement about the final cut scores. Table 33 below shows the cut scores for Basic, Proficient, and Advanced for Bangla and Mathematics in grades 3 and 5.

Table 33 : Final Cut Scores for All NSA 2017Tests

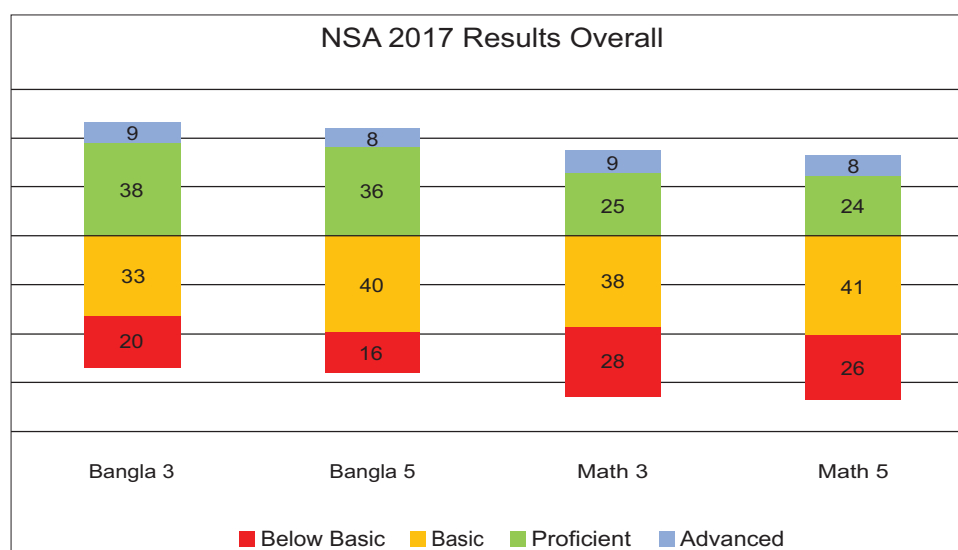
Test	Max. points	Cut Scores		
		Basic	Proficient	Advanced
Bangla grade 3	36	18	27	33
Mathematics grade 3	39	16	28	36
Bangla grade 5	44	22	32	39
Mathematics grade 5	44	17	31	40

Results of NSA 2017 Expressed in Performance Levels

Based on established cut scores, percentage of students whose achievement in NSA 2017 is falling in each performance level was determined.

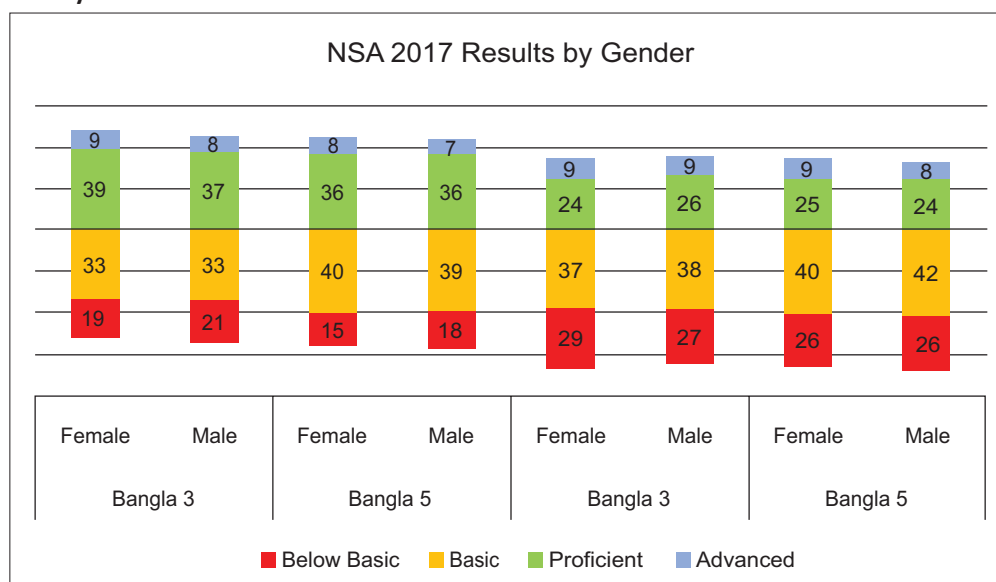
Figure 30 below shows the results expressed as percentage of students falling in each performance level for the four tests administered in the Bangladesh NSA 2017. Since these performance levels are established using general conceptual definitions that are the same across grades and subjects, this enables comparability of student performance between subjects and grades.

Figure 30 : Percentage of Students in Performance Levels

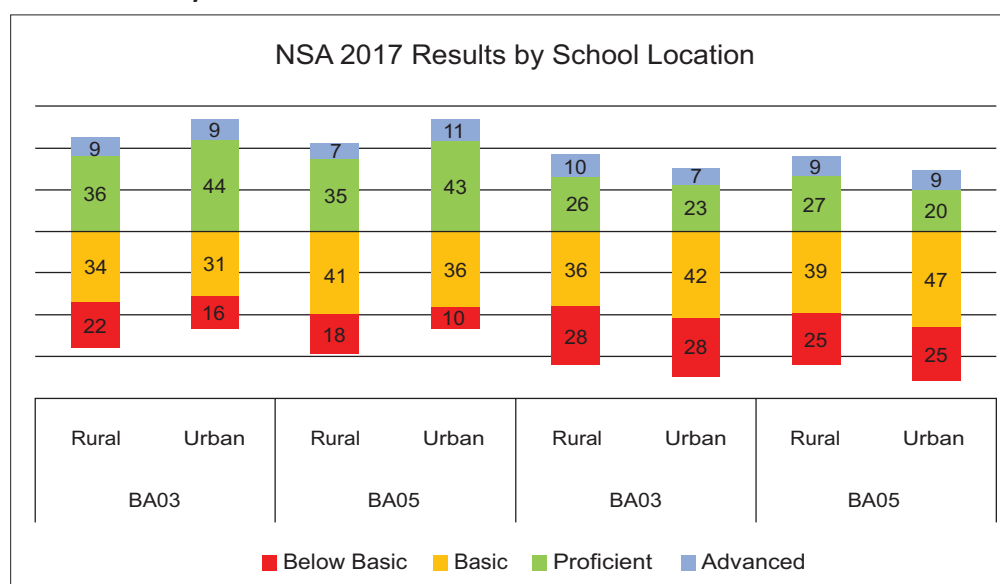


In Figure 30, as well as in all other figures in this section, performance levels “Advanced” and “Proficient” are placed above the reference line. These performance levels are typically defined as targeted achievement at each subject and grade, so the sum of percentages in these two levels is used as an outcome indicator for monitoring of learning progress at national, regional, or institutional (school) levels. Based on the results presented in Figure 30, when comparing the performance in two subjects, it can be observed that in Mathematics it is more challenging to reach the targeted level of performance than Bangla. In Bangla language in average 45% of students perform at the levels Proficient and above, whereas in Mathematics only 33% of students are reaching this targeted level of performance.

When comparing two grade levels, it can be observed that in Grade 3 about 40% of students reach the targeted levels Proficient and above, whereas in Grade 5 the percentage of students reaching targeted levels is 38%, which suggests that reaching learning objectives in Grade 5 is slightly more challenging than in Grade 3. Nevertheless, the difference is relatively small, so it can be concluded that most of students are successfully progressing in their learning from being proficient in Grade 3 to being proficient in Grade 5. Figure 31 shows the NSA 2017 performance by gender and based on the presented results it can be concluded that approximately equal percentage of boys and girls are reaching the targeted performance of “Proficient” and above, which clearly demonstrates gender equality in Bangladesh.

Figure 31 : Results by Gender


On the other hand, student performance disaggregated by school location (see Figure 32) shows substantial differences between rural and urban schools. It is interesting to observe that the differences are not in the same direction for the two assessed subjects. When looking at the percent of students achieving “Proficient” and above, urban schools are outperforming rural school in Bangla language (53% vs. 45% in Grade 3 and 54% vs. 42% in Grade 5), whereas rural schools show higher performance in Mathematics (36% vs. 30% in Grade 3 and 36% vs. 29% in Grade 5).

Figure 32 : NSA 2017 Results by School Location


NSA 2017 results by school type for each test are shown in Figure 33 through Figure 36 below. The percentage of students reaching “Proficient” and above by school type indicate that three school types, namely Government Primary Schools (GPS), schools with Kindergartens (KG), and High School Attached Primary Schools (HSAPS), consistently dominate performance in NSA 2017 for all grades and subjects. However, in Grade 3 BRACs appear to be among the top performing school types.

Figure 33 : Bangla 3 Results by School Type

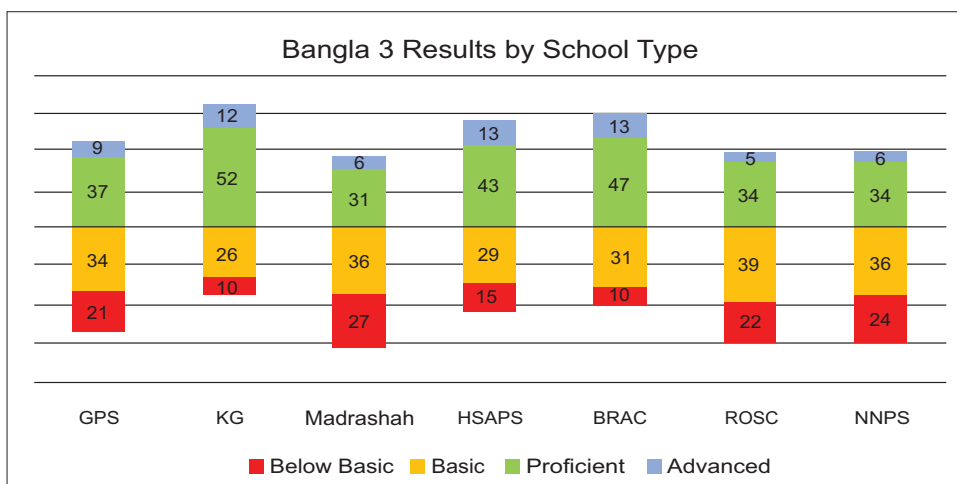


Figure 34 : Bangla 5 Results by School Type

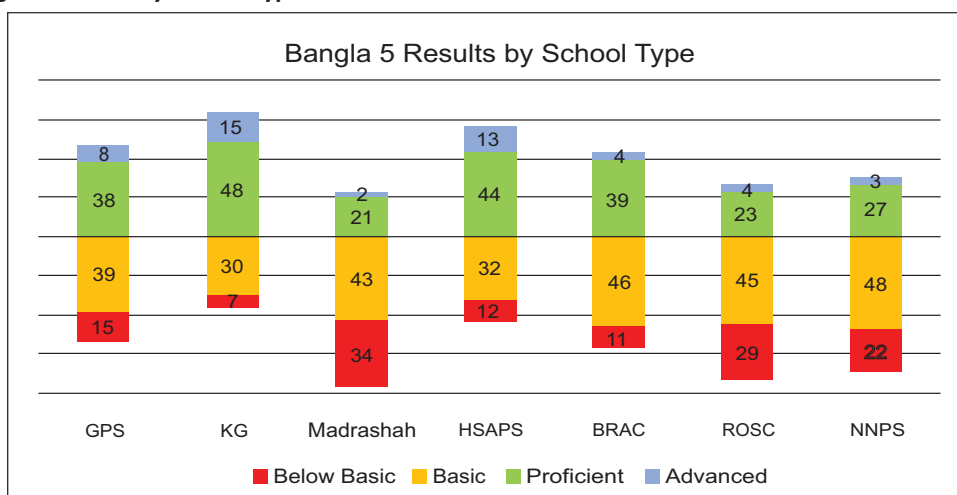


Figure 35 : Math 3 Results by School Type

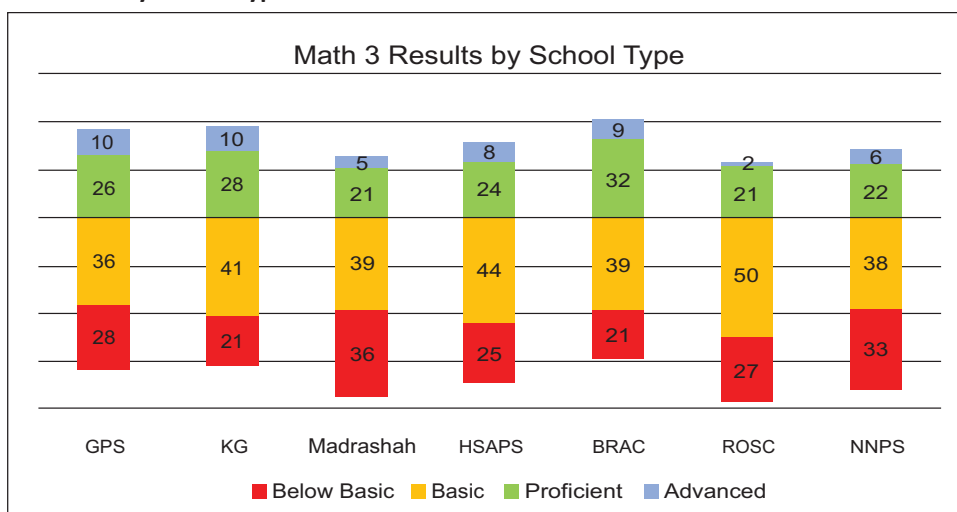
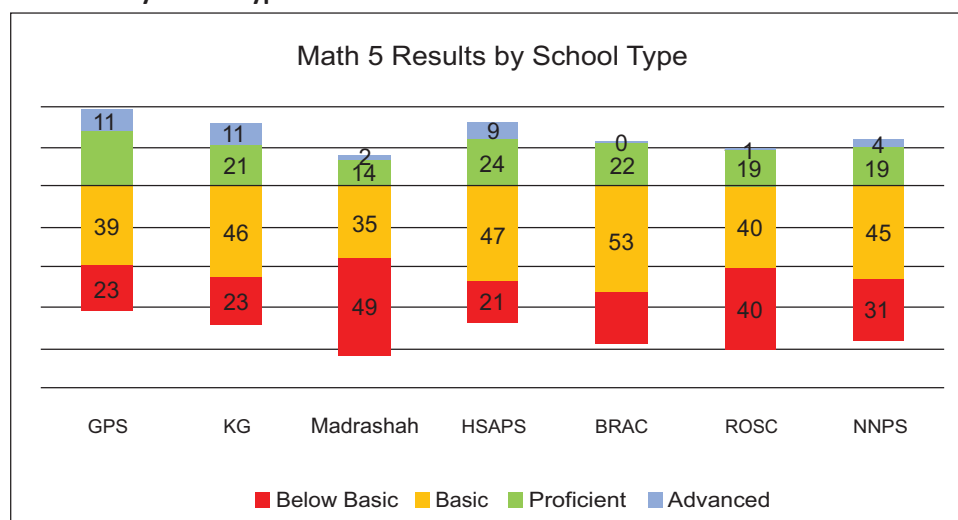


Figure 36 : Math 5 Results by School Type


Looking at the NSA 2017 performance by divisions, as shown in Figure 37 through Figure 40, it can be observed that there are several top performing divisions in Bangla language with relatively similar percentage of students in “proficient” and above. On the other hand, performance in Mathematics is dominated by Barisal, Mymensingh, and Rangpur in Grade 3, and by Barisal, Rajshahi, and Mymensingh in Grade 5.

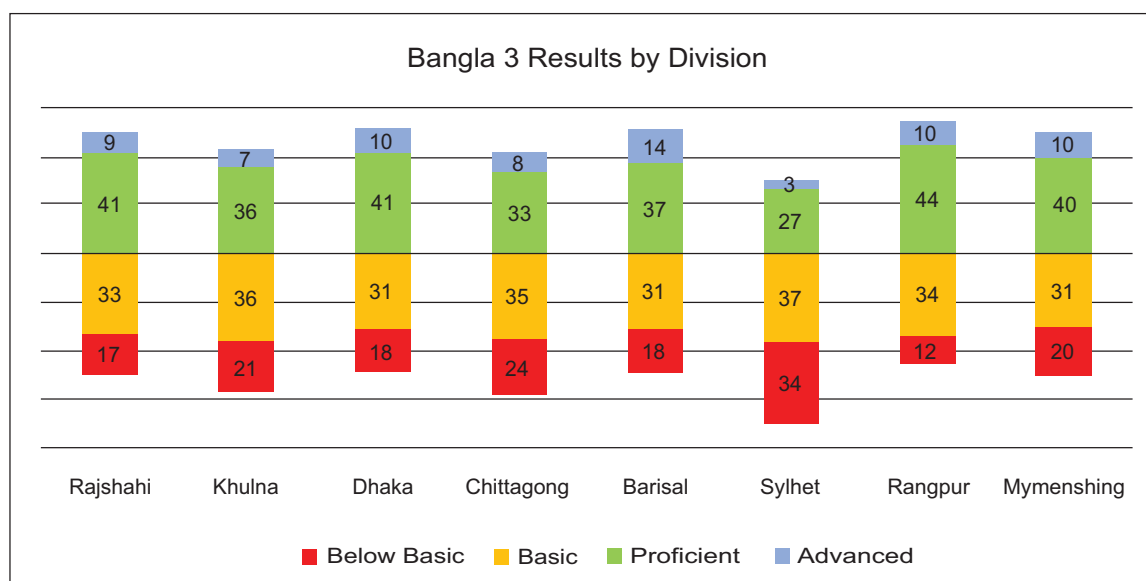
Figure 37 : Bangla 3 Results by Division


Figure 38 : Bangla 5 Results by Division

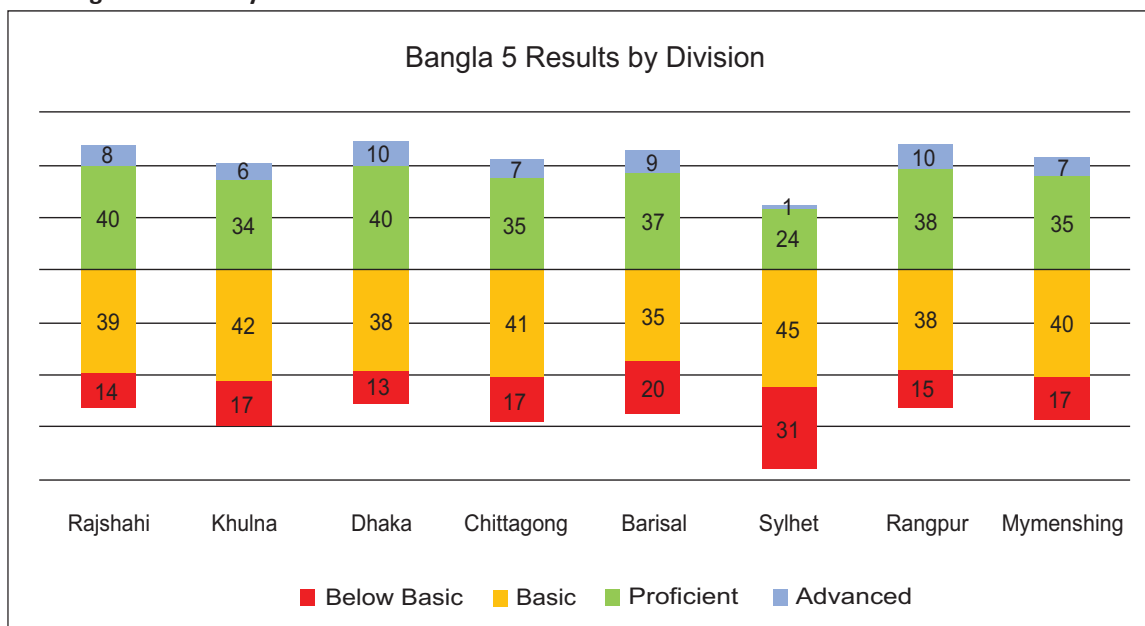


Figure 39 : Math 3 Results by Division

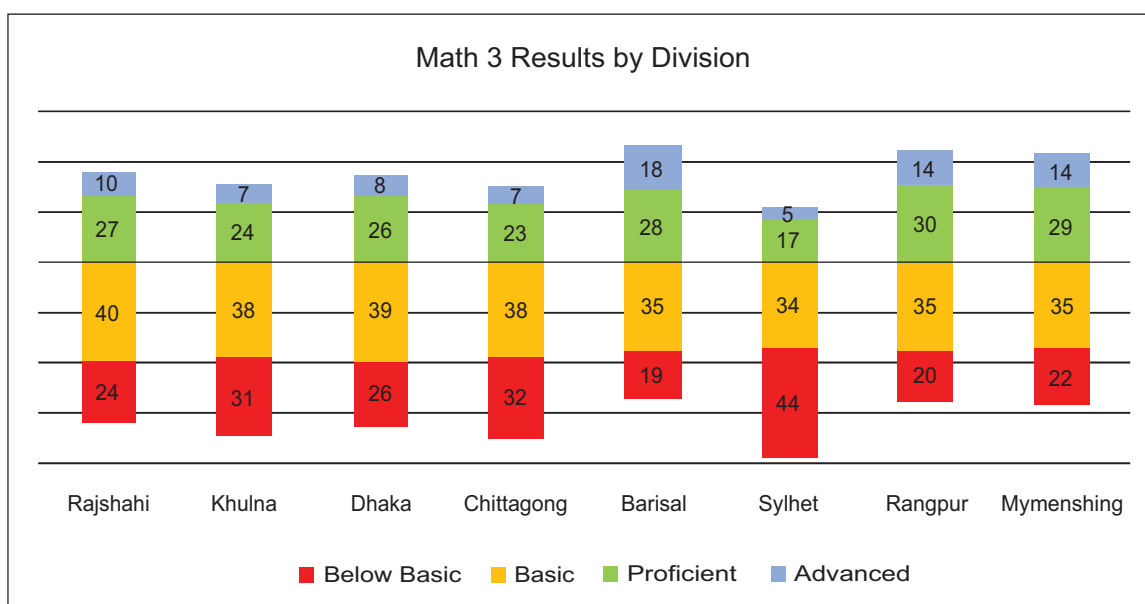
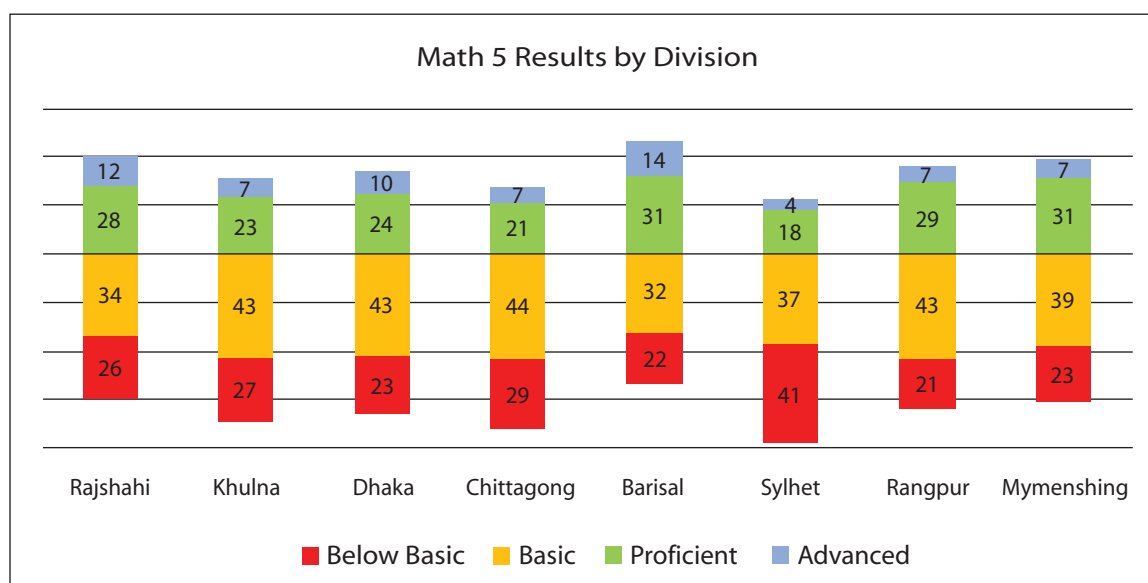


Figure 40 : Math 5 Results by Division



Results of NSA 2017 Expressed by Scale Scores Linked to Performance Levels

New scale scores have been created for NSA 2017 that are anchored to performance levels, adding in such a way more meaning to the scaled individual results. Scale scores are different from raw scores in several aspects: 1) they are based on Item Response Theory (IRT), which represents a suitable psychometric model for establishing comparability across different test forms (equating), 2) they are anchored to performance levels as a common framework, which enables comparability between different subjects and grades, and 3) meaning of scale scores is the same regardless of difficulty of each particular instrument.

The total range of the new score scale is 100 – 500, with selected points anchored to the cut scores of performance levels yielding the following ranges for each performance level:

- 100 – 199 range of scale scores for **Below Basic**
- 200 – 299 range of scale scores for **Basic**
- 300 – 399 range of scale scores for **Proficient**
- 400 – 500 range of scale scores for **Advanced**

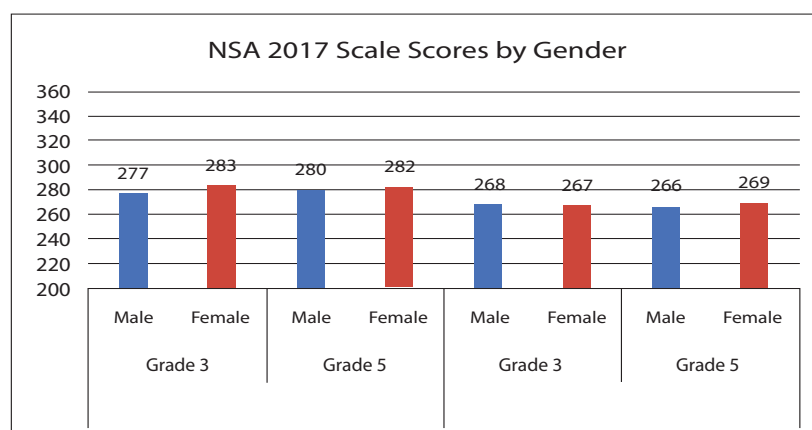
The percentages of students falling in such defined scale score categories are equivalent to percentages of students in performance levels presented in figures above. The national averages on the new scale scores are the following: 280 for Bangla grade 3, 281 for Bangla grade 5, 268 for Math grade 3 and 267 for Math grade 5.

Table 34 and Figure 41 below presents the results of NSA 2017 given in the new scale scores for each test overall and by gender. Testing the significance of differences between boys and girls again confirms the gender parity in Bangladesh.

Table 34 : Gender Differences in NSA 2017 New Scale Scores

Subject	Grade	Gender	Scale Score	N	SD	Sig	Cohen's D
Bangla	Grade 3	Male	277	15002	72.3	0.00	-0.07
		Female	283	13098	72.0		
		Total	280	28099	72.2		
	Grade 5	Male	280	11969	66.9	0.00	-0.04
		Female	282	12140	66.4		
		Total	281	24109	66.6		
Math	Grade 3	Male	268	14693	78.7	0.08	0.02
		Female	267	13904	81.0		
		Total	268	28597	79.8		
	Grade 5	Male	268	12225	74.6	0.01	-0.03
		Female	269	11873	76.8		
		Total	267	24099	75.7		

Figure 41 : NSA 2017 Results by Gender in Terms of New Scale Scores



NSA 2017 Results by Districts

Since the NSA 2017 sampling design is providing a representative selection of schools for each district, it enables evaluation of the performance at district level. New scale scores were used to compute the average performance of students within each district aggregated for the 4 tests.

To enhance understanding of the geographical distribution of the performance in the NSA 2017, the results by district and division are presented in a map, where the districts and divisions are divided in three categories: those performing around the national mean (color coded green), those that are substantially above the national mean (blue), and those substantially below the national mean (orange). The criterion for classifying district performance in categories substantially above or below the national mean is based on the effect size (Cohen's D) of 0.20.

Figure 42 and Table 35 below present the results by district, and more detailed descriptive statistics for the NSA 2017 performance in each district is given in Appendix 4. It can be observed that the three highest performing districts are Madaripur, Nilphamari, and Pirojpur, whereas the three lowest performing districts are Sylhet, Cox's Bazar, and Khagrachhari. As it can be seen from Table 35, a variation of performance among districts is substantial, the difference between the lowest and highest performing district being 108 scale score points, which is over two standard deviations, implying extremely high practical significance (equivalent to effect size about 1.5 expressed by Cohen's D).

Figure 42 : NSA 2017 Results by Districts



Below the national mean	Around the national mean	Above the national mean
-------------------------	--------------------------	-------------------------

Table 35 : NSA 2017 Results by Districts

Below the national mean		Around the national mean		Above the national mean	
District	Combined Mean	District	Combined Mean	District	Combined Mean
Sylhet	224	Rajshahi	260	Brahmonbaria	289
Cox's Bazar	233	Faridpur	261	Bandarban	290
Khagrachhari	234	Meherpur	262	Gaibandha	291
Jaipurhat	236	Noakhali	263	Dhaka	292
Rangamati	246	Sherpur	264	Magura	294
Feni	248	Kishorgonj	264	Shariatpur	294
Kushtia	248	Tangail	264	Mymensingh	295
Hobigonj	248	Barguna	266	Nawabgonj	298
Bogra	250	Sunamgonj	266	Lalmonirhat	298
Netrokona	252	Rangpur	267	Pabna	302
Moulvibazar	253	Patuakhali	269	Naogaon	316
Chittagong	253	Narail	271	Jhalokathi	317
Bhola	256	Thakurgaon	271	Chandpur	318
Rajbari	256	Dinajpur	273	Barisal	318
Chuadanga	257	Comilla	274	Pirojpur	319
Narsingdi	257	National Mean	274	Nilphamari	320
Khulna	258	Panchagarh	278	Madaripur	332
Bagerhat	258	Luxmipur	278		
Jessore	259	Sirajgonj	281		
		Munshigonj	282		
		Narayangonj	283		
		Manikgonj	283		
		Jhenaidah	284		
		Jamalpur	284		
		Gazipur	285		
		Natore	286		
		Satkhira	287		
		Gopalganj	288		
		Kurigram	288		

Note: Boundaries around the National Mean were constructed using Cohen's D measure of effect size (Cohen, 1988) equal to ± 0.20 . The differences between the National Mean and District Means that are less than $D=0.20$ are considered small and practically insignificant, so those districts are in the category "around the national mean". Similarly, if the differences between the national mean and district means would be more than $D=0.20$, those districts would be classified as either above or below the national average.

Figure 43 and Table 36 show the map of the NSA 2017 results by geographical division and more detailed descriptive statistics for the NSA 2017 performance in each division is given in Appendix 5. Considering a practical significance as a criterion, it can be observed that Rangpur and Barisal are classified as performing substantially above the national mean, Sylhet performed below the national mean, and all other divisions are clustered in the category not substantially different from the national average.

Figure 43 : NSA 2017 Results by Divisions

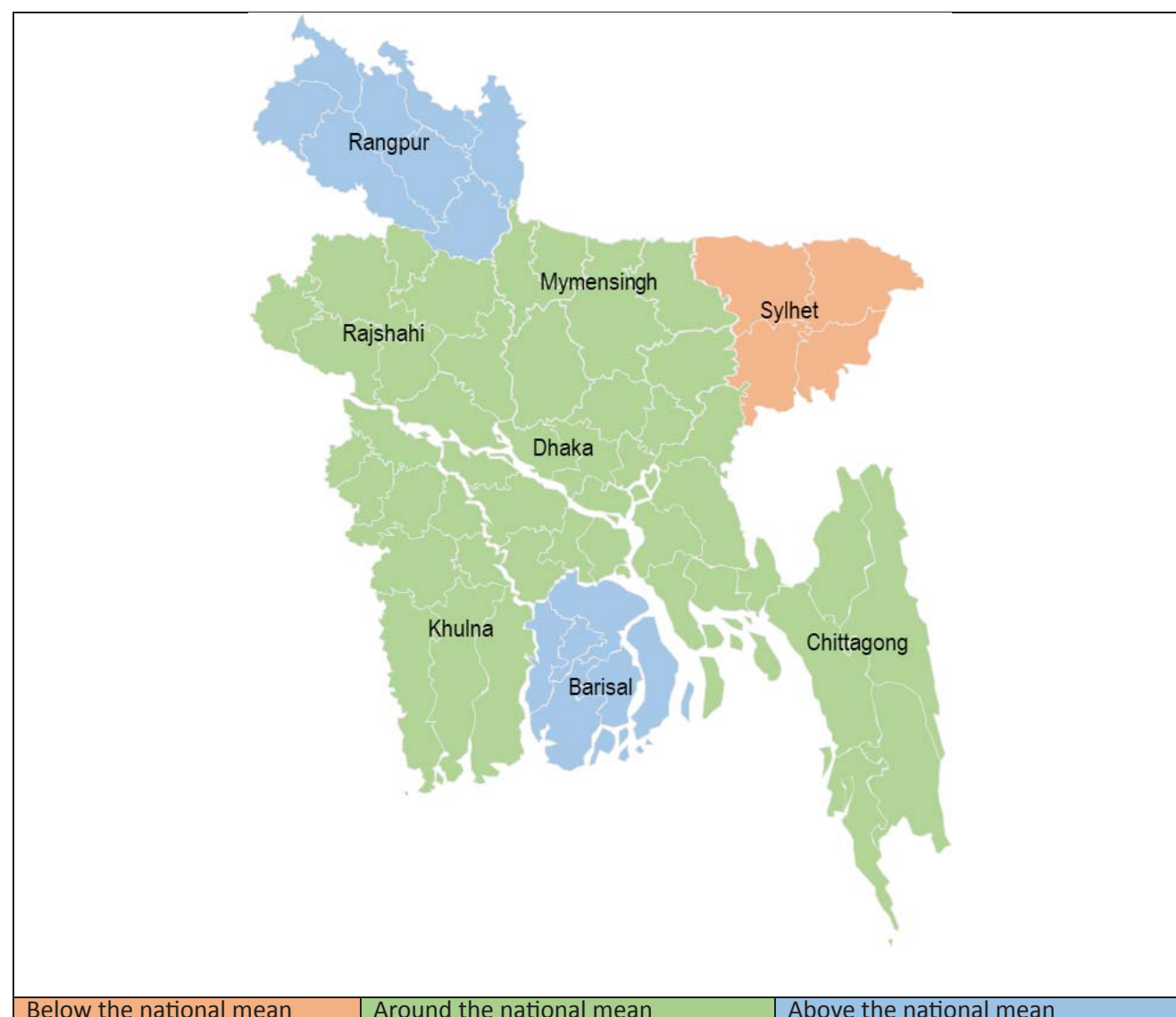


Table 36 : NSA 2017 Results by Division

Below the national mean		Around the national mean		Above the national mean	
Division	Combined Mean	Division	Combined Mean	Division	Combined Mean
Sylhet	245	Chittagong	267	Rangpur	285
		Khulna	268	Barisal	289
		National Mean	274		
		Dhaka	279		
		Rajshahi	280		
		Mymensingh	281		

Note: Boundaries around the National Mean were constructed using Cohen's D measure of effect size (Cohen, 1988) equal to ± 0.20 . The differences between the National Mean and District Means that are less than $D=0.20$ are considered small and practically insignificant, so those districts are in the category "around the national mean". Similarly, if the differences between the national mean and district means would be more than $D=0.20$, those districts would be classified as either above or below the national average.

CHAPTER 5

COMPARATIVE ANALYSIS OF NSA 2015 WITH NSA 2017

In this section the comparative results for the NSA are presented across two administration years: 2015 and 2017. These comparative results are presented in the metrics of new scale scores as well as percentages of students in each performance level, disaggregated by grade, gender and school type. The comparability between the results of these two NSA administrations is enabled through equating using common items method under the 2-parameter IRT model.

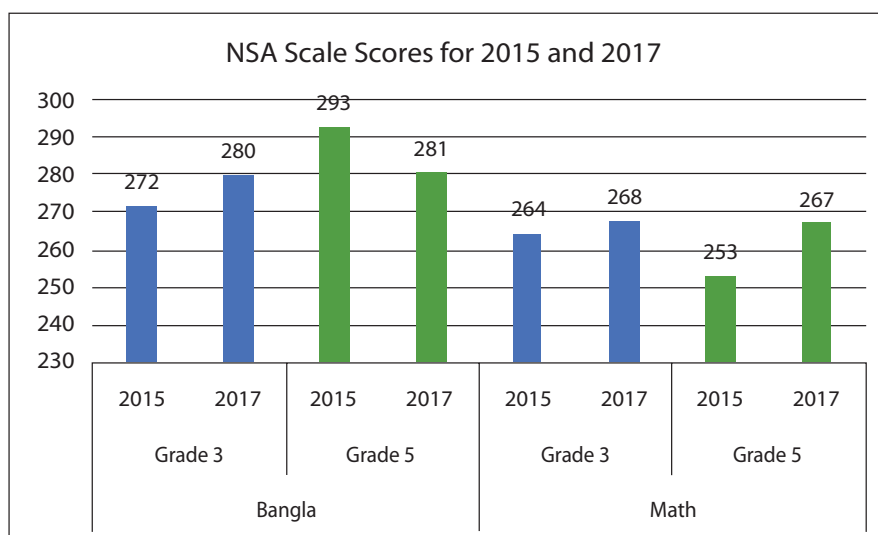
Overall Comparison by Scale Score Means

The descriptive statistics of NSA 2015 and NSA 2017 results expressed in the new scale score metrics, along with tests of significance and effect sizes are presented in Table 37 and depicted in Figure 44. It can be observed that there was a statistically significant increase of student performance scores from 2015 to 2017 in three of the four tests: Bangla Grade 3, Mathematics Grade 3, and Mathematics Grade 5, whereas a decrease was observed only in Bangla grade 5.

Table 37 : Results of NSA 2015 and 2017 Expressed in New Scale Scores

Subject	Grade	Year	Scale Score	SD	N	Sig	Cohen's D
Bangla	Grade 3	2015	272	69.4	22889	0.00	0.12
		2017	280	72.2	28099		
	Grade 5	2015	293	68.4	19388	0.00	-0.18
		2017	281	66.6	24109		
Math	Grade 3	2015	264	71.1	22954	0.00	0.04
		2017	268	79.8	28597		
	Grade 5	2015	253	70.9	19382	0.00	0.19
		2017	267	75.7	24099		

Figure 44 : Comparative Results of NSA 2015 and 2017 Expressed in New Scale Scores



The sizes of the differences between student performance in two compared administration years, evaluated by Cohen's D, are relatively small to negligible for growth in Bangla 3 and Mathematics 3, however the growth of Mathematics 5 is at margin of practical significance, as is the decline of Bangla 5 results. Since the results for Bangla grade 5 in NSA 2015 were unreasonably high, which may unsettle the trust in their accuracy, this drop in Bangla grade 5 scores should be taken with reservation.

Overall Comparison by Percentage of Students in Performance Levels

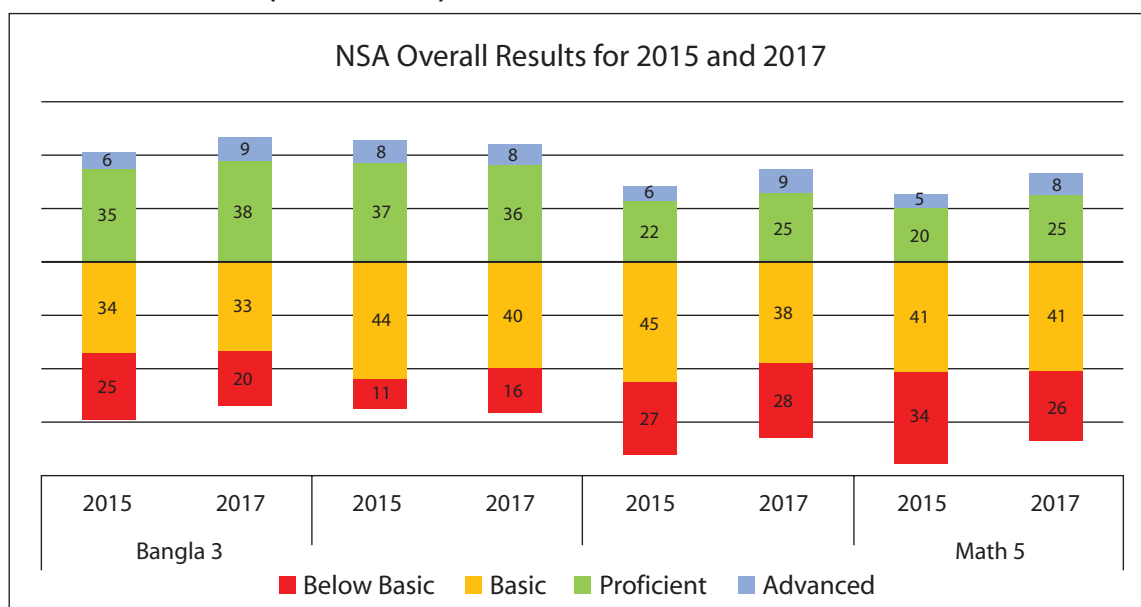
Table 38 and Figure 45 show the percentages of students at each performance level in both NSA 2015 and 2017. It can be noted that there was a growth in learning achievement from 2015 to 2017 in Bangla 3, Mathematics 3, and Mathematics 5 where the percentage of students in the top two performance levels (proficient and above) increased. In the case of Bangla 5 the percentage of students in the top two performance levels is virtually the same, but there is an increased percentage of students at the Below Basic level in 2017.

Based on the comparisons between student's attaining performance levels, it can be concluded that there was an overall progress in student learning between years 2015 and 2017. The percent of students achieving the top two performance levels (proficient and advanced) has increased from 34.9% to 39.4%, which means that the percentage of Bangladeshi students who reached the targeted performance level "Proficient and above" has increased for 4.5%. This is a very encouraging finding because this level of growth can be considered as a significant improvement of student learning in Bangladesh.

Table 38 : Percentage of Students in Performance Levels (2015 and 2017)

Test	Year	Below Basic	Basic	Proficient	Advanced	Proficient +Advanced
Bangla 3	2015	25.1	34.0	34.9	6.1	41.0
	2017	20.3	33.3	37.7	8.7	46.4
Bangla 5	2015	11.1	43.4	37.2	8.3	45.5
	2017	16.4	39.8	36.2	7.6	43.8
Math 3	2015	26.7	45.0	22.4	5.9	28.3
	2017	28.0	37.5	25.3	9.1	34.4
Math 5	2015	33.8	41.6	19.8	4.9	24.7
	2017	26.1	41.0	24.4	8.5	32.9
Overall	2015	24.2	41.0	28.6	6.3	34.9
	2017	22.7	37.9	30.9	8.5	39.4

Figure 45 : NSA Overall Results (2015 and 2017)

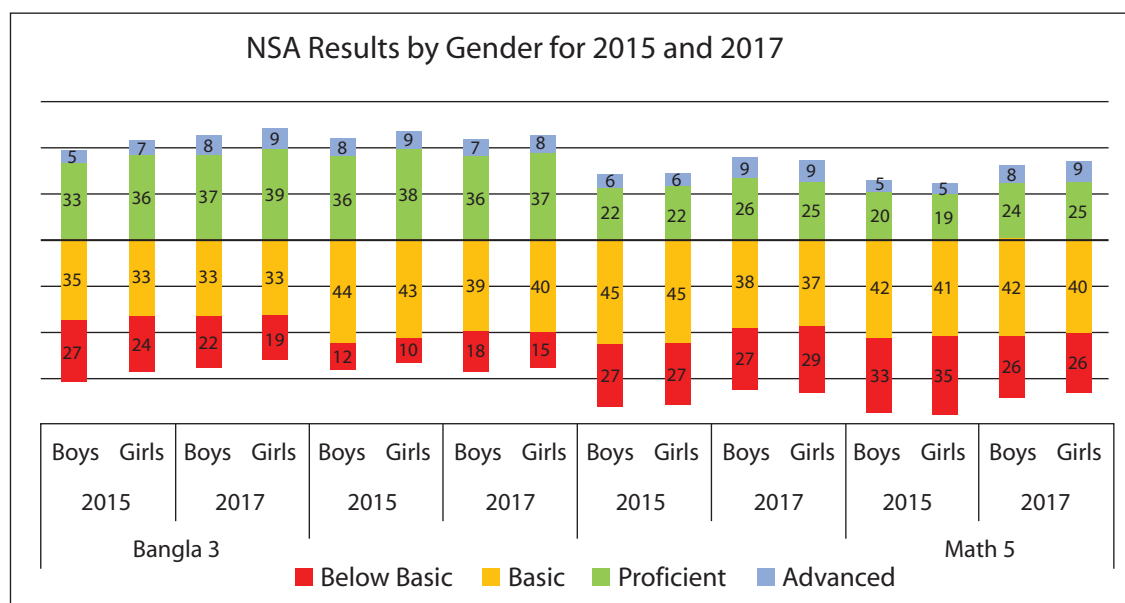


Comparison by Gender in Terms of Performance Levels

The results of the NSA 2015 and 2017 disaggregated by gender are shown in Table 39 and Figure 46 below. It can be observed that the percentage of boys and girls achieving each performance levels follow the same pattern of change from 2015 to 2017 in all 4 tests, as found on the overall results presented above. No differential changes could be observed between boys and girls, which represents another evidence of gender parity in Bangladesh. Though, it can be noted that in Bangla language the percentage of girls achieving the upper two performance levels is somewhat higher than that of boys, whereas in Mathematics the percentage of boys and girls reaching targeted performance levels is virtually the same.

Table 39 : NSA Results by Gender (2015 and 2017)

Test	Year	Gender	Below Basic	Basic	Proficient	Advanced
Bangla 3	2015	Boys	27	35	33	5
		Girls	24	33	36	7
	2017	Boys	22	33	37	8
		Girls	19	33	39	9
Bangla 5	2015	Boys	12	44	36	8
		Girls	10	43	38	9
	2017	Boys	18	39	36	7
		Girls	15	40	37	8
Math 3	2015	Boys	27	45	22	6
		Girls	27	45	22	6
	2017	Boys	27	38	26	9
		Girls	29	37	25	9
Math 5	2015	Boys	33	42	20	5
		Girls	35	41	19	5
	2017	Boys	26	42	24	8
		Girls	26	40	25	9

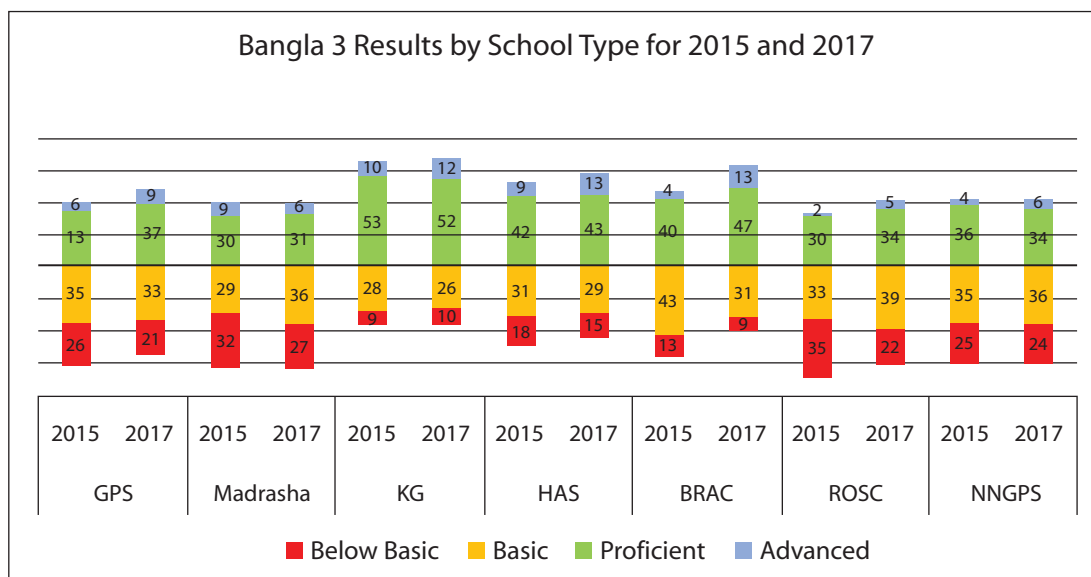
Figure 46 : NSA Results by Gender (2015 and 2017)


Comparison by School Type in Terms of Performance Levels

The following tables and figures present the NSA 2015 and 2017 results disaggregated by school type. For Bangla 3, it can be noted that Kindergarten Schools (KG) have the highest percentage of students in the top two performance levels in both administration years, over 60%. On the other hand, Madrasha and Newly Nationalized Government Primary Schools (NNGPS) show virtually the same results across the 2015 and 2017 test administrations as shown in Table 40 and Figure 47, with NNGPS showing no gains and Madrasha showing a 2% decrease in the Proficient and Advanced levels. The school type that achieved the highest in the percentage of students in the Proficient and Advanced levels was BRAC, in 2017 16% more students than in 2015.

Table 40 : Bangla 3 Results by School Type (2015 and 2017)

School Type	Year	Below Basic	Basic	Proficient	Advanced
GPS	2015	26	35	33	6
	2017	21	33	37	9
Madrasha	2015	32	29	30	9
	2017	27	36	31	6
KG	2015	9	28	53	10
	2017	10	26	52	12
HAS	2015	18	31	42	9
	2017	15	29	43	13
BRAC	2015	13	43	40	4
	2017	9	31	47	13
ROSC	2015	35	33	30	2
	2017	22	39	34	5
NNGPS	2015	25	35	36	4
	2017	24	36	34	6

Figure 47 : Bangla 3 Results by School Type (2015 and 2017)


The results for Bangla 5 are shown in Table 41 and Figure 48. As is the case with Bangla 3, Kindergarten Schools (KG) have the highest percentage of students in the top two performance levels in both administration years. It can also be noted that the performance in the NSA 2017 decreased for all school types when comparing their performance in the NSA 2015. The school types that show the biggest decrease of students in Proficient and Advanced levels are Madrasha and NNGPS, with a 5% and 6% decrease respectively compared to the 2015 results.

Table 41 : Bangla 5 Results by School Type (2015 and 2017)

School Type	Year	Below Basic	Basic	Proficient	Advanced
GPS	2015	10	43	39	8
	2017	15	39	38	8
Madrasha	2015	23	49	23	5
	2017	34	43	21	2
KG	2015	5	31	45	19
	2017	7	30	48	15
HAS	2015	11	30	44	15
	2017	12	32	43	13
BRAC	2015	5	48	37	10
	2017	11	46	39	4
ROSC	2015	24	45	26	5
	2017	29	44	23	4
NNGPS	2015	15	49	32	4
	2017	22	48	27	3

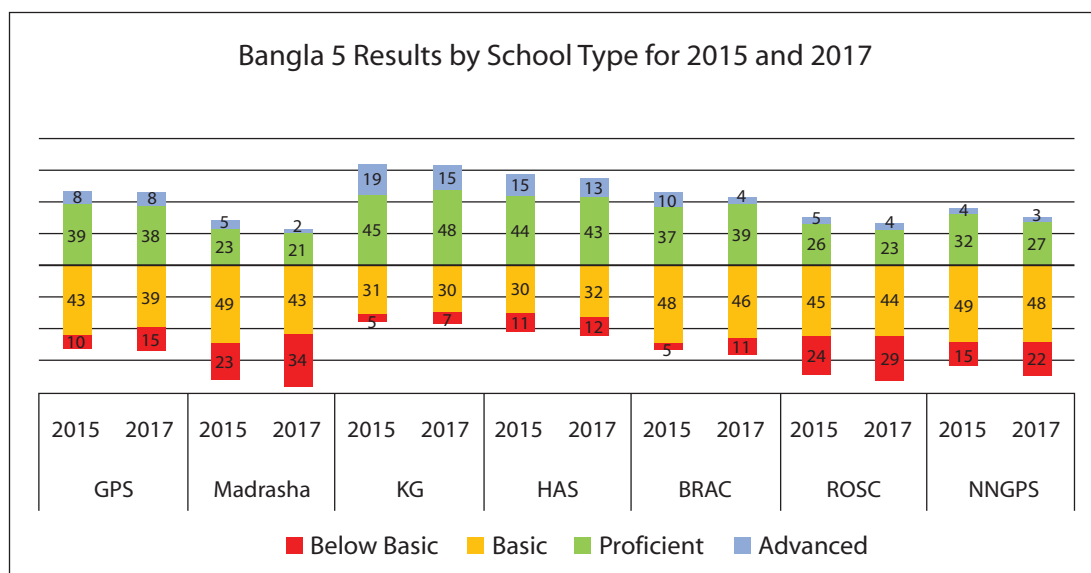
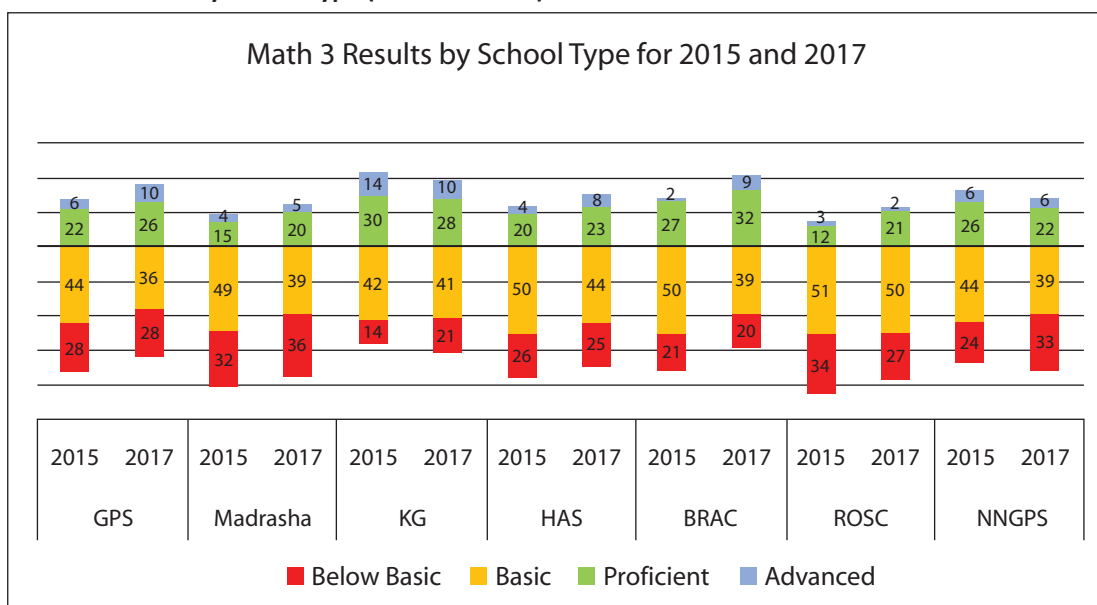
Figure 48 : Bangla 5 Results by School Type (2015 and 2017)


Table 42 and Figure 49 show the results for Math 3 for the NSA 2015 and the NSA 2017. In Math 3, the performance of Kindergarten Schools and Newly Nationalized Government Primary Schools (NNGPS) showed decreased performance in the NSA 2017, 6% less students in the Proficient and Advanced levels for KG and Madrasha, and a 4% decrease for NNGPS respectively. The rest of school types demonstrated increased performance in the NSA 2017, where BRAC showed an increase of 12% more students in the top two levels when compared to 2015.

Table 42 : Math 3 Results by School Type (2015 and 2017)

School Type	Year	Below Basic	Basic	Proficient	Advanced
GPS	2015	28	44	22	6
	2017	28	36	26	10
Madrasha	2015	32	49	15	4
	2017	36	39	20	5
KG	2015	14	42	30	14
	2017	21	41	28	10
HAS	2015	26	50	20	4
	2017	25	44	23	8
BRAC	2015	21	50	27	2
	2017	20	39	32	9
ROSC	2015	34	51	12	3
	2017	27	50	21	2
NNGPS	2015	24	44	26	6
	2017	33	39	22	6

Figure 49 : Math 3 Results by School Type (2015 and 2017)

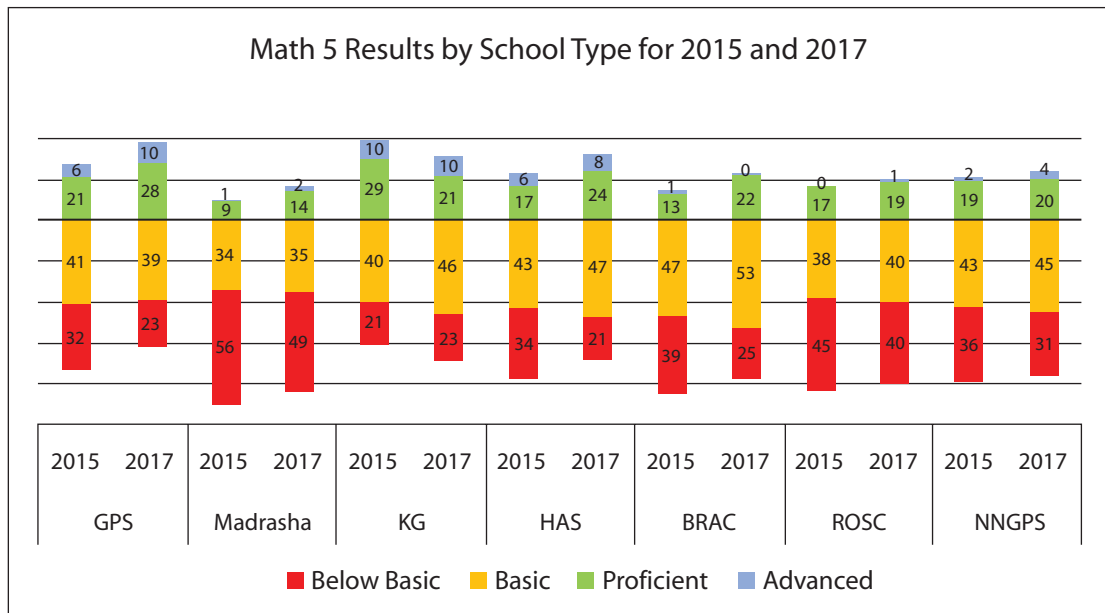


The results for Math 5 in Table 43 and Figure 50 indicate an increase in performance in the NSA 2017 compared to NSA 2015 for all school types except KG, which shows a decrease for 8% of students achieving the Proficient and Advanced levels. Madrasha and NNGPS show an increase of 6% and 3% respectively. GPS are the school type that demonstrates the biggest increase, 11%, followed by HAS.

Table 43 : Math 5 Results by School Type (2015 and 2017)

School Type	Year	Below Basic	Basic	Proficient	Advanced
GPS	2015	32	41	21	6
	2017	23	39	28	10
Madrasha	2015	56	34	9	1
	2017	49	35	14	2
KG	2015	21	40	29	10
	2017	23	46	21	10
HAS	2015	34	43	17	6
	2017	21	47	24	8
BRAC	2015	39	47	13	1
	2017	25	53	22	0
ROSC	2015	45	38	17	0
	2017	40	40	19	1
NNGPS	2015	36	43	19	2
	2017	31	45	20	4

Figure 50 : Math 5 Results by School Type (2015 and 2017)



CHAPTER 6

FACTORS ASSOCIATED WITH STUDENT ACHIEVEMENT

The following sections present findings on the associations between performance on the NSA 2017 tests and various contextual factors assessed by means of student, teacher, and head teacher background questionnaires. These factors include but may not be limited to pedagogical approaches of teachers, school support activities by head teachers or other education officers, teachers' and principals' characteristics, school environment factors, and student home environment.

The analyses of background factors were carried out by comparing the scores in Bangla and Math related to the respondents' answers to the questionnaire. For example, the question in the head teacher questionnaire 'Do children take books from the Library or Book corner and read?', head teachers were divided into two groups, those who answered 'Yes' and those who answered 'No'. The mean scores on the Bangla and Math tests were computed for the schools corresponding to these two groups of head teachers. Finally, the difference between mean student scores for the two groups of schools was calculated, the statistical significance of this difference was tested, and the associated effect sizes were calculated using Cohen's D measure.

A similar approach was used for questions that have more than two options, one of the responses was taken as a reference, typically the one representing the least desirable condition addressed by the question, and the rest of the options were compared against this reference. Bar charts for each analyzed background question show the difference in scores between the groups of respondents choosing different options, along with the corresponding statistical significances and effect sizes.

The contextual variables for head teachers were grouped into three categories: personal characteristics, their pedagogical activities, and school environment/resource factors. For teachers, the contextual variables were grouped into four categories: personal characteristics, activities by others, teacher activities, and school environment/resources. On the other hand, the contextual variables for students were grouped as student personal characteristics, home environment, and socioeconomic variables.

It is important to remind the reader that these analyses report the associations between Bangla and Math scores and various contextual variables. These associations do not provide sufficient information to attribute cause, and these contextual variables should not be viewed as factors that influence student achievement. The associations between two variables, 'Variable X' and 'Variable Y' for example, may be due to Variable X causing Variable Y, or Variable Y causing Variable X, or some third factor may be affecting both variables making them correlated with one another. Thus, causal interpretation of the associations between contextual variables and student performance requires additional scrutiny and understanding of many circumstances that could contribute to associations between analyzed variables.

In selecting significant associations, we used measures of both statistical significance ($p < 0.05$) and practical significance (Cohen's D greater than 0.20) for all three questionnaires.

Head teacher Questionnaire

For the NSA 2017, one thousand two hundred seventy-eight (1,278) head teachers responded to the questionnaires. Of these, 65.7% are male and 34.3% are female. The average length of service as head teacher is 12.75 years. Regarding educational qualification, 38% reported holding a Master's degree, 42% a Graduate degree, 15% HSC, and 5% SSC.

Head teacher Characteristics

The head teacher characteristics that were analyzed for their potential association with reading performance were gender, age, and professional qualification. Interestingly, none of these head teacher characteristics showed either positive or negative associations with student performance.

Head teacher Activities

The head teacher activities analyzed to determine their associations with student performance were: decisions head teachers make when a teacher is absent from school, frequency of classroom observations, if he/she provides advice to teachers on how to improve their teaching, and the frequency in which they improve their professional skills.

The activities that showed positive statistical and practical significance were: the frequency that he/she gives advice to teachers, frequency of improving his/her own professional skills and the frequency of classroom observation. Regarding giving advice to teachers, those head teachers that reported giving advice several times a week and every day showed high positive associations with student achievement when compared to those who reported never giving advice to teachers. Head teachers that reported improving their professional skills every day showed positive association with student performance when compared to those that reported never acting to improve their professional skills. In terms of classroom observation, not surprisingly those head teachers that reported higher frequencies are associated with increased student performance. Table 44 shows the associations for the aforementioned factors.

Table 44 Head teacher Activities Associated with NSA 2017 Scores

			-20	-10	0	10	20	30	40	50	60	70	80	90		
															Sig	D
B5	How often gives advice to teachers: Naver vs Several times a month													67.7	0.01	1.51
M5	How often gives advice to teachers: Naver vs Several times a month													75.3	0.04	1.21
B5	How often gives advice to teachers: Naver vs Every day													74.6	0.01	1.63
M5	How often gives advice to teachers: Naver vs Every day													82.8	0.02	1.32
B5	How often gives advice to teachers: Naver vs Onve a month													51.0	0.03	1.31
B5	How often gives advice to teachers: Naver vs Several Times a week													71.0	0.01	1.58
M5	How often gives advice to teachers: Naver vs Several Times a week													84.2	0.02	1.34
B5	How often improves professional skills: Naver vs Every day													31.7	0.02	0.69
B5	How often observes classroom: Does not observe vs Every day													25.2	0.02	0.53
M5	How often observes classroom: Does not observe vs Every day													37.4	0.01	0.60
M5	How often observes classroom: Does not observe vs Every week													29.7	0.03	0.47

School Resources and Environment

The availability of school resources and school environment assessed through the head teacher questionnaire that yielded statistically and practically significant associations are presented in Table 45 below. Head teacher responses about school resources and environment include: availability of teaching resources (teaching materials, school library), perceived problems at school (teacher absenteeism, teacher vacancies, overcrowded classrooms, lack of funds), head teacher opinions about school environment (teachers' job satisfaction, teachers' professional skills, teachers' understanding

of school goals, parental support and involvement in school activities, and expectations about student abilities on good results).

The factors that were positively associated with student performance are teachers reading to enhance their knowledge, head teacher expectations about student's abilities, involvement and support of parents, availability of school activities for competency-based teaching and school supplying food to students.

Regarding perceived problems at school, there is a positive association when head teachers responded that they considered the following as not a serious problem in their schools: lack of operating funds, lack of teaching materials, teacher vacancies and teachers working long hours meaning that schools that are well provisioned are more likely to demonstrate increased performance.

Table 45 : School Resources (Reported by Head teachers) Associated with NSA 2017 Scores

		-20	-10	0	10	20	30		
B5	Do teachers read to enhance knowledge: None vs Most or all						22.6	Sig	D
B3	Expectations about students abilities on good results: Low vs High						23.0	0.04	0.50
B3	How is involvement of parents: Low vs High						16.3	0.01	0.46
B3	How is support from parents to the school: Low vs High						12.0	0.00	0.32
B5	Rate the problem: Lack of operation funds: very serious vs Not a problem						12.6	0.01	0.24
B5	Rate the problem: Lack of teaching materials: Very serious vs A bit of a problem						12.2	0.01	0.27
B5	Rate the problem: Lack of teaching materials: Very serious vs Not a problem						15.8	0.00	0.27
M5	Rate the problem: Teacher vacancies: Very serious vs A bit of a problem						14.7	0.00	0.34
B5	Rate the problem: Teacher vacancies: Very serious vs Not a problem						10.9	0.01	0.24
M5	Rate the problem: Teachers work long hours: Very serious vs A bit of a problem						17.1	0.00	0.25
M5	Rate the problem: Teachers work long hours: Very serious vs Serious						16.2	0.01	0.27
M3	School has activities for competency-based teaching: No vs Yes						14.4	0.01	0.27
M5	School supplies food to students: No vs Yes						14.8	0.00	0.23
								0.00	0.24

Teacher Questionnaire

For the NSA 2017, four thousand five hundred one teachers responded to the questionnaires. Of these, 39% are male and 61% are female. The average length of service as teacher is 12.84 years. Regarding educational qualification, 28.6% reported holding a Master's degree, 37.4% a Graduate degree, 24.6% HSC, 7.9% SSC and 1.3% less than SSC. The percentage of teachers regularly teaching Math or Bangla was distributed evenly, about half of the respondents teach Math and the other half teaches Bangla.

Teacher Characteristics

Among the teacher characteristics that were analyzed in the light of student performance are gender, age, professional qualification, training received, and future career plans. Regarding age, teachers who reported being over 30 years of age are positively associated with student performance. In the questionnaire teachers were asked about what career path they would like to follow in the future, those that responded they aspire to become a head teacher are positively associated with higher student performance. Regarding teacher qualification, holding a Master's degree is positively associated with student performance, but not other educational qualifications. These associations are shown in Table 46 below.

Table 46 : Teacher Characteristics Associated with NSA 2017 Scores

		-20	-10	0	10	20	30		
M5	Age: Less than 30 vs Between 30-40						21.5	Sig	D
M5	Age: Less than 30 vs Between 41-50						18.5	0.00	0.34
M5	Future plans: Wants to be headteacher: Disagree vs Agree						15.4	0.00	0.30
M5	Future plans: Wants to be headteacher: Disagree vs Fully Agree						14.6	0.03	0.25
B3	Gives private tutoring: Yes vs No						16.8	0.01	0.23
B3	Has received award for teaching: Yes vs No						12.2	0.00	0.33
M3	Qualification: Less than SSC vs master's						21.0	0.02	0.24
M5	Subject degree: Other vs Math						16.8	0.03	0.32
								0.04	0.26

Activities Performed by Others

The activities performed by other, as reported by teachers, were who observed the class, if teachers receive advice on his/her teaching methodology, and if the head teacher has observed their approach to teaching.

Teachers who reported that the head teacher always observes their teaching approaches are positively associated with increased student performance. Interestingly, teachers who reported that the head teacher or AUEO observe their classes are negatively associated to student performance. This contradiction may be due to a misunderstanding of the question by teachers. Table 47 below shows these associations.

Table 47 : Activities by Others (As Reported by Teachers) Associated with NSA 2017 Scores

		-20	-10	0	10	20	30		
B5	HT observes teaching approaches: No comment vs Always						9.3	Sig	D
B5	How often receives advice from HT: Never vs All the time						26.9	0.01	0.20
B5	Who observes your class: Other vs AVEO	-12.2						0.03	0.59
M5	Who observes your class: Other vs HT	-13.9						0.00	-0.29
								0.01	-0.22

Teacher Activities

Teacher activities analyzed to determine their association with student performance include pedagogical approach (following the curriculum and teacher guides, use of appropriate materials, different teaching techniques, etc.), problem managing the class, and interaction with colleagues to improve teaching skills.

Teachers who discuss teaching materials with colleagues at higher frequency intervals are associated with increased performance in the NSA 2017. The same trend can be observed with teachers who discuss teaching materials with the head teachers, those who do it on a more frequent interval are associated with higher student performance.

Regarding perceived problems at school that may impact teacher duties, it is interesting to mention that teachers that consider helping low ability children to be a problem are associated with higher student performance. One explanation could be that these teachers focus on higher-ability students

and not spend so much time helping low ability students. Another perceived problem is managing the class, in those cases where teachers reported never having problems to manage the class there was a positive association with student achievement, as shown in Table 48 below.

Table 48 : Teacher Activities Associated with NSA 2017 Scores

		-20	-10	0	10	20	30		
B5	HT observes teaching approaches: No comment vs Always				9.3			Sig	D
B5	How often receives advice from HT: Never vs All the time						26.9	0.01	0.20
B5	Who observes your class: Other vs AVEO	-12.2						0.03	0.59
M5	Who observes your class: Other vs HT	-13.9						0.00	-0.29
								0.01	-0.22

School Resources and Environment

Factors about school resources and environment reported by teachers include availability of funds to improve teaching-learning materials, time to prepare classes, receive subject matter help from colleagues, cooperation of the School Management Committee (SMC), and cooperation of the Education Office (EO).

Teachers that reported there is a lack of cooperation from the SMC or the EO are positively associated with high student performance in their school, most likely because their teaching practices are independent of the support the SMC or the EO may provide.

The factors that are negative associated with student performance are problems finding funds to improve teaching-learning materials, lack of subject matters help from colleagues and lack of enough time to prepare classes.

Table 49 : School Resources(As Reported by Teachers) Associated with NSA 2017 Scores

		-20	-10	0	10		
B5	Is a typical problem: finding funds: Disagree vs Agree	-17.7				Sig	D
B5	Is a typical problem: finding funds: Disagree vs Fully Agree	-14.4				0.00	-0.37
B5	Is a typical problem: finding funds: Disagree vs Somewhat agree	-19.1				0.03	-0.30
B5	Is a typical problem: lack of help from SMC: Disagree vs Somewhat agree	-13.7				0.00	-0.43
M3	Is a typical problem: lack of cooperation EO: Disagree vs Somewhat agree				6.7	0.00	-0.30
M3	Is a typical problem: lack of cooperation SMC: Disagree vs agree				7.5	0.04	0.10
M3	Is a typical problem: lack of cooperation SMC: Disagree vs Somewhat agree				6.0	0.03	0.12
M5	Is a typical problem: lack of help from Colleagues: Disagree vs Somewhat agree	-17.5				0.03	0.09
B3	Is a typical problem: lack of time to prepare classes: Disagree vs Somewhat agree		-4.7			0.00	-0.28
						0.04	-0.09

Student Questionnaire

Student contextual factors were analyzed based on the responses of 48,803 students, 45% are female and 55% are male. Regarding literacy in the family, 81% reported that their father is educated and 19% reported their father is illiterate. When reporting about their mother, 83% reported that their mother is educated and 17% reported their mother is illiterate. The following sections present student factors that are associated statistically and practically with student performance.

Student Characteristics

Among the student characteristics analyzed for their association with the NSA 2017 are student gender, reading habits, absenteeism from school, time to travel to school, study habits, and their opinions about the NSA test difficulty and school.

Gender was not positively or negatively associated with student performance. Students that reported not being absent from school demonstrate higher performance in the NSA 2017. Factors about reading habits have an interesting behavior, students who reported they have read more than once in class are associated with lower performance in the NSA 2017 when compared to those students that reported not reading in class. On the other hand, students that reported reading books other than their textbooks reflect higher performance in the NSA 2017 versus those that do not. Regarding study habits, the data shows that the more hours the students to individual study at home, there is increased performance in the NSA 2017. It also can be noted that students that perceived the tests as very easy demonstrated higher performance than those that perceived the tests as very hard. Table 50 below shows the associations for student characteristics.

Table 50 : Student Characteristics Associated with NSA 2017 Scores

		-30	-20	-10	0	10	20	30	40	50		
											Sig	D
M3	Days absent: More than 5 vs No absent						21.6				0.00	0.26
B3	Has read more than once in class: No vs Yes	-26.9									0.00	-0.38
B5	Has read more than once in class: No vs Yes	-22.6									0.00	-0.35
M3	Has read more than once in class: No vs Yes	-24.9									0.00	-0.31
M5	Has read more than once in class: No vs Yes	-17.6									0.00	-0.24
M3	Hours of study: Less than 1 vs 1 hours					15.6					0.00	0.21
M3	Hours of study: Less than 1 vs 2-3 hours					23.1					0.00	0.29
M3	Hours of study: Less than 1 vs 4-5 hours					36.2					0.00	0.46
B5	Hours of study: Less than 1 vs more than 5 hours					39.3					0.00	0.59
B5	Opinion about school: Enjoys school vs dislikes school but is need in life	-14.2									0.00	-0.22
B5	Opinion about school: Enjoys school vs dislikes school but parents make me go	-13.0									0.00	-0.20
B3	Opinion of NSA test difficulty: Very hard vs Very easy					14.3					0.00	0.20
B5	Reads books other than text books: No vs Yes					19.8					0.00	0.31

Home Environment

Student factors under home environment were number of hours the student helps with housework, education of mother and father, occupation of mother and father, and if the student receives help with coursework either from a tutor or from a household member.

Of the factors mentioned above, the ones that showed statistical and practical significance are education of father, education of mother, hours devoted to housework, occupation of father, and occupation of mother. For both education of father and mother, students who reported that either parent was literate demonstrate increased performance in their scores. Among all the different educational qualifications for father and mother (read at secondary level, SSC, HSC, Degree, and Master's), parents who hold a Master's or Degree are associated with much higher achievement of their students in the NSA 2017. Regarding occupation of father and mother, the two occupations more strongly associated with increased student performance are government employee and private company employee. Finally, doing between 1 and 2 hours of housework a day is positively associated with student performance when compared to doing more than 5 hours. Table 51 below show these associations.

Table 51 : Home Environment (As Reported by Students) Associated with NSA 2017 Scores

		-30- 20- 10 0 10 20 30 40 50 60 70 80 90																		
B5	Education of father: Illiterate vs Degree																			
B5	Education of father: Illiterate vs Masters																			
B5	Education of mother: Illiterate vs Degree																			
B5	Education of mother: Illiterate vs Masters																			
B5	Hours of house work: More than 5 hours vs Between 1-2 hours																			
B3	Occupation for father: Unemployed vs Gov. employee																			
B3	Occupation for father: Unemployed vs Private company employee																			
B5	Occupation for mother: Unemployed vs Gov. employee																			
B5	Occupation for mother: Unemployed vs Private company employee																			

Sig	D
0.00	0.84
0.00	1.00
0.00	0.91
0.00	0.93
0.00	0.24
0.00	0.71
0.00	0.53
0.00	1.10
0.00	1.12

Socioeconomic Variables

The student questionnaire also allowed for the collection of information about the living conditions of the students and their relationship with educational performance. The variables analyzed were access to food, access to clean water, access to a sanitary latrine, having electricity at home, possession of a T.V., mobile phone, bicycle, motorcycle, private car, and a separate room in the home for studying. Of the afore-mentioned variables, having electricity at home, access to clean water, access to a sanitary latrine and possession of a T.V. are all positively associated with student performance. In addition, information about type of dwelling was collected. The dwelling categories are “Puccas” (concrete building), “Semi-puccas” (modest, brick wall homes), and “kutchas” (bamboo, wood, or other natural materials). Students who live in puccas demonstrate higher performance in the NSA 2017 than those living in kutchas. Table 52 presents the associations between the student socioeconomic background and their performance on NSA 2017 tests.

Table 52 : Socioeconomic Variables (As Reported by Students) Associated with NSA 2017 Scores

		-30	-20	-10	0	10	20	30		
BS	In your house, do you have: Electricity (No vs Yes)							16.7	Sig	D
	In your house, do you have: Safe water (No vs Yes)							26.3	0.00	0.26
	In your house, do you have: Sanitary Latrine (No vs Yes)							22.0	0.00	0.41
	In your house, do you have: TV (No vs Yes)							14.8	0.00	0.34
	Type of house: Katcha vs Pucca							18.6	0.00	0.23
									0.00	0.29

CHAPTER 7

DISCUSSION AND CONCLUDING REMARKS

Understanding the state of Bangla Language and Mathematics instruction is a first step towards improving instruction and achievement outcomes. It is essential to understand what is happening in these content areas and to monitor progress at all levels to adjust interventions and supports as necessary. It is also important that any proposed initiatives or reforms to the system be tightly aligned with other parts of the system. The purpose of this section is not to suggest a list of policy or program interventions but rather to raise pertinent questions related to 2017NSA results and how they can be studied, analyzed, and employed effectively to improve instruction and achievement outcomes.

Discussion for Policy Makers

Content Coverage on the NSA

For Bangla Language Grade 3, the vocabulary tasks were the easiest while the reading comprehension tasks were the most challenging, whereas performance in Bangla grade 5 was about the same over all content domains. For Mathematics Grade 3, students scored highest on Shape and Space closely followed by Numbers and Operations, but for Grade 5 they scored the highest on Shape and Space and Data. The DPE will seek to engage with MoPME system-level counterparts as well as teacher training institutes in structured conversations around the following core questions:

- In addition to this National Report, what are the other mechanisms through which the Government of Bangladesh (GOB) will ensure that lessons are learned from NSA results system-wide and that findings are disseminated widely and acted upon all the way down to the classroom level?
- For example, as reading comprehension and higher order processing skills need more focused attention, what is the mechanism through which this information becomes available at the school level?
- Do teachers and school administrators currently have the necessary resources and support to improve students' knowledge in the needed areas? What are the barriers to improvement? Are these barriers related to materials, teacher knowledge, or other constraints?
- How can NSA reporting provide more focused strand and item level analyses? How can NSA reporting with strand and item level analyses be produced and distributed efficiently so that teachers receive adequate information about areas of student weaknesses?
- What are some of the barriers to enhancing the utility of the NSA so that NSA results reach the classroom level and impact instruction? How can these barriers be overcome?
- Are instructional priorities and materials at the national, divisional and upazila level(s) tightly aligned with the content covered on the NSA? If not, how can that alignment be improved?

Cognitive Processing Levels on the NSA

NSA results for Bangla Language and Mathematics indicate that students at both Grades 3 and 5 answered questions correctly requiring lower level cognitive processing (Knowledge and Understanding) in greater proportions than they answered questions requiring application and higher order thinking. Acknowledging the challenges of employing instructional approaches that seek to be more rigorous in cognitive demand, more focus and investment could be directed towards this endeavor. The DPE will seek to engage with MoPME system-level counterparts as well as teacher training institutes in structured conversations around the following core questions.

- At what level(s) of analysis do teachers need information or feedback from the NSA results in order to realistically adjust instructional approaches based on NSA findings related to cognitive processing levels?
- Do the current curricula and mandated cognitive processing standards align tightly with how teachers are trained in regard to instructional best practices and methods? If not, what can the DPE or other agencies do to focus more attention on this issue?
- Is more training necessary through pedagogical or other institutes in order to improve the alignment between NSA results and instructional practice?
- Are there currently incentives for teachers to embrace the additional work required in preparation time to develop lessons that demand more rigor from students? If not, what are the barriers to incentivizing teachers to make changes? Who will be responsible for creating the incentives necessary for change in instructional practice?

Quality Gaps by Division, District, and School Types

While the evidence from the 2015 and 2017 NSA indicates no gaps in achievement by gender, there are achievement gaps by school type, division, and district. As the NSA 2017 exercised a representative sampling by districts, DPE and other stakeholders can analyze NSA results at the district, upazila, and school levels, to identify those schools performing poorly, and consider providing more targeted support and outreach to those schools most in need.

Regarding mean scores by division, we see that the Rajshahi has retained a relatively higher position in comparison to other divisions across grades and subjects. Sylhet Division has consistently been in the lower ranks at both grade levels and subjects.

Rangpur has also been a top four scorer for both assessment years and Sylhet remained at the bottom for Grade 5 Mathematics and Rangpur, Chittagong, and Khulna remained in the middle in both assessment years.

Regarding the results of districts, the achievement gap between low performing districts and the highest scorers is very large, over 1.5 standard deviation in score difference, which requires a high attention of policy and instructional support teams. How can resources be better focused on those districts that scored the lowest on the NSA?

KG Schools and schools with High Schools Attached Primary Schools performed at the highest levels in both grades in both 2015 and 2017. Madrasah and ROSC schools scored relatively lower in both assessment years. For Grade 5 Mathematics, the same two school types were the top performers in both 2015 and 2017 – KG and GPS. Madrasah and ROSC were also near the bottom in both 2015 and 2017. The differences between the top scoring school types and the bottom scoring school types were large, close to 1 standard deviation in some cases. How can resources be better focused on those school types that scored the lowest on the NSA?

The DPE will seek to engage with MoPME system-level counterparts as well as teacher training institutes in structured conversations around the following core questions:

- In particular, what factors might be contributing to the overall stagnation of GPS and NNPS scores from 2015 to 2017? Are there systemic issues that might explain the stagnation in performance for these two school types?
- Beyond the obvious economic and background factors that may explain achievement gaps by school type or division, are there approaches or methods that the higher achieving school types and regions are doing that lower achieving school types or areas are not doing?

- If yes, differences need to be diagnosed (in terms of curricula and assessment alignment, investment, resource allocation, teacher attraction, teacher retention, or pedagogical training) and analyzed. What means does DPE have to identify gaps in these areas? Which institution or agency will lead this initiative?
- How could more resources be focused on closing achievement gaps by school type and between school differences within the same school type but where achievement gaps are large?
- Is the issue of directing resources towards improvement related primarily to limitations on funding or are there other contributing factors such as bureaucratic obstacles or teacher incentives?

Monitoring Progress

The NSA program is assumed to be a major tool for longitudinal monitoring of national educational attainment over years. This role is enabled through a strong technical support that the programs receives from international donors and technical consultants, which resulted in implementation of a high industry-standard processes for test development and sophisticated psychometric solutions for horizontal and vertical comparability required for the monitoring role. Thus, it can be safely stated that the monitoring role of NSA is pretty much functional and providing useful information.

On the other hand, the formative role of NSA does not seem to be sufficiently exercised and a huge amount of information that can be generated from data remains underutilized. The repertoire of possible activities based on the NSA data that could serve promoting of student success in learning is pretty wide, for example dissemination and socialization of the assessment results at regional, district, and upazila levels, creation of formative reports for the schools that participated in the administration, reaching out to civil society through different media, etc.

The monitoring role is especially enhanced in the NSA 2017 when DPE, with support of AIR, carried out setting performance standards and established a new reporting scale anchored to performance levels. These new performance standards resolved the issues with the system of 'legacy' performance bands described in several parts in this report and offered a fresh start for monitoring student performance in future years. Moreover, by setting the NSA 2017 as a reference year, it is also possible to look backwards and conduct equating between the NSA 2017 and previous years. This report presents the results of backwards equating between data obtained in the years 2017 and 2015. These results, expressed in the percentage of students reaching the targeted performance level "proficient and above", clearly demonstrate that there was a significant gain in student performance from 2015 to 2017. When looking to student achievement in all 4 NSA tests combined, it can be observed that the percentage of students reaching the targeted performance level increased for 4.5%, a difference that can be reasonably interpreted as a relevant evidence that learning outcomes of Bangladeshi students in primary grades significantly improved.

Recommendations for Improvements in Future NSA

The NSA 2015 and 2017 have introduced into the procedures for test development several modifications designed to improve the quality of the NSA. These changes include: integrating into the operational test forms a small number of new items that will be piloted during administration; redesign of the test blueprints to align with the newly revised 2012 national curriculum; organization of all content standards measured on the tests in terms of a horizontal structure; use of item cards containing all piloted items with content and psychometric information to facilitate item review and test assembly, among other changes.

The design, development, and implementation of the NSA 2017 has provided all of the participating stakeholders with extensive opportunities for reflection on the types of changes that might be suggested

for improving procedures for the next iteration of the NSA. These suggestions are presented below:

1. We recommend that the next NSA introduce an independent test of the writing domain (i.e., creative writing) as part of the Bangla Language test. Writing, which is an important subject on the curriculum, is complex to assess, mostly related to the need for objective procedures for scoring via rubrics. The DPE has some experience handling open-ended test items in both Mathematics and Bangla Language (in the Reading Comprehension domain). We would recommend assessing writing through a sub-sample of the main sample.
2. The report of the NSA 2015 and 2017 administration points out that the “legacy bands” established in 2011 and used for providing performance levels defined by the content assessed on the tests has certain limitations. These limitations are in part due to the fact that the performance level cut across the grades assessed (viz. Grades 3 and 5). Data from the NSA 2017 show that there is a large difference in the percentage of students in Grade 5 who achieve grade level performance (between 11%-32% depending on the subject) compared to the percentage of students in Grade 3 who perform at Grade 3 level (41%-75% depending on the subject).
3. To alleviate issues with “legacy bands”, DPE has accepted an alternative methodology and conducted setting of in-grade performance standards by subject area and established cut-points on each test using the 2017 operational test data. Results on the NSA 2017 are now reported by means of these grade-specific performance levels. The standards that were set for NSA 2017 can also be used retrospectively to plot 2015, 2013, and 2011 scores. These performance standards have many advantages, including allowing teachers, schools, and districts to set annual achievement targets and then monitoring achievement by reference to the performance standards.
4. We suggest Intensifying MoPME and DPE capacity-building around key technical areas in test development, administration, analysis and reporting in order to consolidate and improve the skills already acquired by technical staff. Long-term sustainability of the assessment system in the hands of local experts must continue to be a major goal of the NSA.
5. One of the limitations of the NSA 2017 is that it is not possible to evaluate the associations between student achievement, as measured by the NSA, and program support provided under the PEDP3. While it is possible to informally suggest the effects of PEDP on student learning outcomes, this cannot be done through any formal methodology. We recommend identifying implementation indicators from the post-PEDP3 program implementation plans and measure them concurrently with the NSA so that achievement results on the NSA can be correlated with school support initiatives.
6. More preparation and monitoring of the administration of the NSA in the field, as well as data cleaning and scoring, needs to take place to ensure availability of high-quality data.
7. Greater focus on formative uses of the results of the NSA should be integrated into the study; teachers, schools and districts can benefit greatly from the availability of data and school reports for instructional planning purposes.
8. We recommend that the NSA 2017 be considered as a baseline for the implementation of the newly modified national curriculum as well as a baseline for post-PEDP3 programming.
9. Given the somewhat low levels of motivation of students and schools reported in the administration of the NSA 2017, we would recommend greater marketing of the NSA highlighting the differences between the PECE and the NSA, what the different goals of both testing programs are, and why it is necessary for students and schools to take the NSA seriously.

APPENDIX 1. Sample Participation by Division

Division	District	Grade 3		Grade 5	
		# Schools	# Students	# Schools	# Students
Rajshahi	Jaipurhat	16	300	16	281
	Bogra	25	476	25	378
	Naogaon	22	460	21	374
	Nawabgonj	23	473	19	334
	Rajshahi	27	572	26	487
	Natore	19	430	21	380
	Sirajgonj	25	519	28	481
	Pabna	29	569	27	439
	Rajshahi: 8	186	3799	183	3154
Khulna	Kushtia			21	371
	Meherpur	15	372	16	302
	Chuadanga	18	382	18	338
	Jhenaidah	23	458	23	390
	Magura	18	336	17	255
	Jessore	27	538	25	438
	Narail	17	353	17	295
	Satkhira	21	468	20	353
	Khulna	18	353	19	316
	Bagerhat	20	339	20	320
	Khulna: 10	177	3599	196	3378
Mymensing	Jamalpur	25	524	28	513
	Sherpur	17	335	18	243
	Mymensingh	28	630	45	762
	Netrokona	37	723	33	494
	Mymensing: 4	107	2212	124	2012
Dhaka	Kishorgonj	35	713	27	474
	Tangail	27	538	27	444
	Gazipur	28	568	27	466
	Narsingdi	23	488	27	511
	Manikgonj	20	426	20	365
	Dhaka	32	546	32	436
	Narayangonj	24	516	29	511
	Munshigonj	19	358	20	343
	Rajbari	19	374	19	325
	Faridpur	21	497	22	409
	Madaripur	22	485	23	422
	Shariatpur	18	399	18	328
	Gopalganj	20	483	20	408
	Dhaka: 13	308	6391	311	5442

		Grade 3		Grade 5	
Division	District	# Schools	# Students	# Schools	# Students
Chittagong	Brahmonbaria	27	596	26	470
	Comilla	33	703	33	599
	Chandpur	25	537	25	437
	Luxmipur	22	461	25	427
	Noakhali	26	471	31	482
	Feni	22	418	23	364
	Chittagong	30	608	32	528
	Cox'S Bazar	24	490	24	429
	Khagrachhari	14	268	19	284
	Rangamati	14	170	13	137
	Bandarban	15	301	15	248
	Chittagong: 11	252	5023	266	4405
Barisal	Barisal	24	426	23	319
	Pirojpur	17	267	18	231
	Jhalokathi	16	257	19	254
	Barguna	15	337	15	284
	Patuakhali	15	196	11	144
	Bhola	40	687	23	282
	Barisal: 6	127	2170	109	1514
Sylhet	Sunamgonj	22	364	22	261
	Sylhet	26	498	27	425
	Hobigonj	22	421	23	385
	Moulvibazar	30	590	28	484
	Sylhet: 4	100	1873	100	1555
Rangpur	Panchagarh	18	364	17	277
	Thakurgaon	22	423	19	315
	Dinajpur	22	386	22	365
	Nilphamari	22	509	23	397
	Rangpur	13	217	13	185
	Lalmonirhat	18	421	18	341
	Kurigram	21	513	21	398
	Gaibandha	24	502	24	407
	Rangpur: 8	160	3335	157	2685
Overall Total		1417	28402	1446	24145

APPENDIX 2. Specific Performance Level Descriptors for Mathematics.

Mathematics Specific Performance Level Descriptors					
Performance Level	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Advanced	<p>Able to count the numbers from 1 to 50 in groups of ten or any ways & write in digits and able to write in words up to 20.</p> <p>Able to identify symbols 1 to 9 from their names.</p> <p>Able to compare any two numbers from 1 to 19 and say and write which number is smaller and which is larger and able to arrange and write them in order.</p> <p>Able to read, write and use the ordinal numbers from the first to the fifth.</p> <p>Able to add & subtract two numbers without carrying and able to solve problems by using the methods of adding and subtracting (will use numbers no larger than 50 and the result will not exceed 50)</p> <p>Able to recognize the coins and the currency notes of Bangladesh and use them in day to day exchange of money (up take 50.)</p> <p>Able to recognize and say which of the surrounding objects are round, triangular and quadrilateral in shape</p>	<p>Able to count & write numbers as two's, three's, four's, five's and tens & arrange them in order of magnitude.</p> <p>Able to tell, determine & write the place values of the digits used in numbers up to 100.</p> <p>Able to use the ordinal numbers up to tenth.</p> <p>Able to add & subtract two numbers having not more than two digits in each by placing one below the other or side by side with carrying.</p> <p>Able to solve problems in real life involving multiplication and division by using multiplication table upto 10.</p> <p>Able to solve problems by using coins and notes in day to day transactions.</p> <p>Will tell & write one digit denominator and numerator of a fraction.</p> <p>Able to use the different units of measurement (length, weight, area and land).</p> <p>Able to use the units of measures time in day to day life.</p> <p>Able to arrange different shapes (like cubes, spheres, cones, cylinders etc) separately according to their shapes and identify the shapes from the surroundings.</p> <p>To be able to classify the different geometrical shapes and name them (triangle, quadrangle, and circle) and draw their pictures.</p>	<p>Able to count up to the number 10,000 correctly in any ways (tens, hundreds and thousands etc.)</p> <p>Able to solve two step problems by using the method of addition and subtraction of numbers not exceeding four digits.</p> <p>Able to solve two step problems by using either addition or subtraction and either multiplication or division (at all the stages of operation the numbers used should not have more than two digits, but in case of division, the divisor should be an one digit number).</p> <p>Able to solve simple problems involving four basic methods.</p> <p>Able to exchange coins and notes and will be able to solve problems related to the use of coins and notes in day to day transaction.</p> <p>Able to add & subtract fractional numbers (the denominators will be of one digits).</p> <p>Able to solve problems involving addition and subtraction of time correctly.</p> <p>Able to draw diagrams using different geometric shapes.</p>	<p>Able to count numbers up to a crore correctly in any ways (tens, hundreds, thousands and lac.)</p> <p>Able to read any number up to a crore.</p> <p>Able to write any numbers in words which are written in digits.</p> <p>Able to tell and determine the place values of the different digits used in writing numbers upto one crore correctly.</p> <p>Will be able to add two or more numbers (with or without carrying) by putting them one below the another or side by side.</p> <p>Able to subtract a smaller number with not more than five digits from a number of five digits (with or without carrying) by putting them one below the another or side by side.</p> <p>Able to multiply a number by a number in any method & able to multiply by inter changing the multiplicand and the multiplier.</p> <p>Able to divide one number by another number (the dividend having not more than 5 digits and divisor having not more than 3 digits).</p> <p>Able to solve problems of three steps by using two or three of the processes of adding, subtracting, multiplying and dividing in the whole process, the numbers used will be of no more than four digits.</p> <p>Will get the idea of prime numbers and compound numbers and will be able to identify the prime numbers and the compound numbers within 100.</p> <p>Able to determine the prime factors.</p> <p>Able to find out L.C.M & H.C.F of maximum three numbers by using the prime factors.</p> <p>Understand mathematical quantities and mathematical sentences and will be able to use symbols in mathematical sentences.</p> <p>Able to tell which fraction is larger or smaller by comparing them and will be able to express them in writing using mathematical symbols To be able to add, and subtract common fractional numbers and to solve problems related to them.</p> <p>Able to tell which of the two decimal fractions is larger or smaller and will be able to express it by symbols.</p> <p>Able to convert common fractions into decimal fractions correctly. Able to convert decimal fractions into common fractions correctly.</p> <p>To be able to add, subtract, multiply and divide decimal fractions and use them to solve problems correctly.</p> <p>Have clear idea on units of length, weight, volume of liquids and land measurements & able to convert one unit to another unit and use them.</p> <p>Know the units of area measures and will be able to use them.</p> <p>Able to draw different triangles as formed by the differences in the sides of a triangle and draw different triangles based on differences in their angles.</p>	<p>Able to multiply one number by another number using different methods (the multiplicand will be of not more than four digits and the multiplier will be of not more than three digits).</p> <p>Able to divide a number by another number using different methods (the dividend will be of not more than five digit a number and the divisor will be of not more than three digits.)</p> <p>Able to divide by 10 or 100 a number of not more than five digits using the easy method.</p> <p>Able to solve problems by using a maximum three processes of adding, subtraction, multiplying and dividing in different ways.</p> <p>Able to solve any problems related to average.</p> <p>Able to solve problems using H. C. F and L. C. M. by different ways.</p> <p>Able to construct mathematical sentences by using letter symbols, the information contained in words & pictures. and solve problems.</p> <p>Able to solve mathematical and day to day problems by using addition, subtraction, multiplication, of, division and brackets related to fraction.</p> <p>Able to carry out addition, subtraction, multiplication and division of decimal fractions and be able to use them in solving problems.</p> <p>Able to convert common fractions into percentage and percentage to fractions</p> <p>Able to use percentage to solve real problems of day to day life involving population, profit or loss etc.</p> <p>Able to solve all problems using different units of time, length, weight, volume of liquids area and land measures.</p> <p>Able to draw arallelogram, rhombus, rectangle and square and able to identify the difference between them. Also get the idea of arc, chord, diameter and radius of a circle and will be able to identify them.</p> <p>Able to collect different data of the environment and arrange them and to be able to show the different information about population through graphs.</p>

Mathematics Specific Performance Level Descriptors					
Performance Level	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Proficient	<p>Get the clear idea of less and more, small and large, light and heavy, near and far, short and tall.</p> <p>Able to count & write in digits the numbers from 1 to 50 and able to write most of the numbers in words from 1 to 20.</p> <p>Will be able to recognize the number symbols from 0 to 9 and will be able to identify each of them according to their names.</p> <p>Able to compare any two numbers within 1 to 0 to find out which is smaller & which is larger and arrange them in order of their values. Able to read, write and most of the cases rightly use the ordinal numbers from the first to the fifth.</p> <p>Able to add & subtract two numbers without carrying and able to solve simple problems by using the methods of adding and subtracting (the result will not exceed 50). Able to recognize the Bangladesh coins and notes up to take 50.</p> <p>Able to recognize and say the name of circular, triangular, quadrilateral objects</p>	<p>Able to write the numbers up to 100 in words & identify even and odd numbers.</p> <p>Most of the cases able to tell and determine the place values of the different digits used in the numbers up to 100.</p> <p>Most of the cases able to use the ordinal numbers from sixth to tenth.</p> <p>Most of the cases able to add & subtract two numbers having not more than two digits in each by placing one below the other or side by side with carrying.</p> <p>Able to use multiplication table up to 10 in carrying out multiplication and division.</p> <p>Able to interchange coins and notes.</p> <p>Able to read, write and compare the two fractions $\frac{1}{2}$ and $\frac{1}{4}$.</p> <p>Able to recognize the different units of measurement (length, weight, area and land)</p> <p>Able to determine the relations between the different units of time measure.</p> <p>Able to identify different shapes (like cubes, spheres, cones, cylinders etc) arrange separately according to their shapes.</p> <p>Able to recognize the different geometrical shapes (triangle, quadrangle, and circle) and draw their pictures.</p>	<p>Most of the cases able to count up to the number 10,000 correctly in tens, hundreds and thousands etc.</p> <p>Able to solve two step problems in most of the cases by using the method of addition and subtraction of numbers not exceeding four digits.</p> <p>Able to solve two step problems involving multiplication and division (the numbers will not be of more than two digits, however, in the case of division divisor will be of one digit).</p> <p>Able to exchange coins and notes and will be able to solve problems related to the use of coins and notes.</p> <p>Able to determine equivalent fractions & able to add & subtract of proper fractions (denominators will be of one digit).</p> <p>Know the different units of length & weight. Know the units of time & able to solve simple problems involving addition and subtraction of time.</p> <p>Able to identify surface, line, point, different angle, Rectangle, square & circle and able to draw.</p>	<p>Able to read any number up to a crore</p> <p>Able to write any numbers up to crore in words which are written in digits. Able to identify the place values of the different digits used in writing numbers up to one crore.</p> <p>Able to express the concept of bigger or smaller number by using symbols ($>$, $<$)</p> <p>Able to add two or more numbers (with or without carrying) by putting them one below the other or side by side.</p> <p>Able to subtract a four digit number from a five digits number (with or without carrying) by putting them one below the other or side by side.</p> <p>Able to multiply a four digit number by a three digit number in any method & able to multiply by inter changing the multiplicand and the multiplier.</p> <p>Almost able to divide one number by another number (the dividend having not more than 5 digits and divisor having not more than 3 digits).</p> <p>Almost able to solve problems of three steps by using two or three of the processes of adding, subtracting, multiplying and dividing in the whole process, the numbers used will be of no more than four digits.</p> <p>Will get the idea of prime numbers and compound numbers and will be able to identify the prime numbers and the compound numbers within 100.</p> <p>Almost able to determine the prime factors.</p> <p>Get the idea of L.C.M & H.C.F and most of cases able to find out L.C.M & H.C.F of maximum three numbers by using the prime factors.</p> <p>Almost able to tell which fraction is larger or smaller by comparing them and will be able to express them in writing using mathematical symbols.</p> <p>Able to add, and subtract common fractional numbers and to solve problems related to them (denominators of the fractions will not be of more than two digits).</p> <p>Will get the clear concept of decimal fractions and able to express it by using decimal points.</p> <p>Able to convert common fractions into decimal fractions.</p> <p>Able to convert simple decimal fractions into common fractions</p> <p>Able to compare larger and smaller decimal fractions using symbols.</p> <p>Able to add, subtract, multiply and divide decimal fractions and all most use them to solve problems.</p> <p>Know the units of length, weight, volume of liquids and land measurements & in most of the cases able to convert one unit to another unit and use them.</p> <p>Get the idea about units of area measures and most of the cases able to use them.</p> <p>Most of the cases able to draw different triangles as formed by the differences in the sides of a triangle and draw different triangles based on differences in their angles.</p>	<p>Able to multiply a number of not more than four digits by a number of not more than three digits (the product will not be more than one crore) & able to multiply by inter changing the multiplicand and the multiplier.</p> <p>Able to divide a number of maximum five digits by a three digit number.</p> <p>Able to divide by 10 or 100 a number of five digits using the easy method.</p> <p>Able to solve problems by using a maximum three processes of adding, subtraction, multiplying and dividing.</p> <p>Able to solve simple problems related to average.</p> <p>Able to determine H.C.F and L.C.M by the prime factors. & able to solve simple problems using H. C. F and L. C. M.</p> <p>Able to determine the values of the letter symbols mathematically from the sentences containing letter symbols.</p> <p>Able to add, subtract, multiply and divide fractions and solve simple mathematical problems involving brackets.</p> <p>Able to solve three step decimal fraction problems involving addition, subtraction, multiplication and division.</p> <p>Able to convert common fractions into percentage and percentage to fractions. Able to use percentage to solve real problems of day to day life involving population, profit or loss etc.</p> <p>Able to solve all problems using different units of time, length, weight, volume of liquids area and land measures.</p> <p>Able to draw parallelogram, rhombus, rectangle and square and able to identify the difference between them.</p> <p>Also get the idea of arc, chord, diameter and radius of a circle and will be able to identify them. Able to draw graphs from population based data and identify different information from the graphical pictures.</p>

Mathematics Specific Performance Level Descriptors					
Performance Level	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Basic	<p>Will get the idea of less and more, small and large, light and heavy, near and far, short and tall.</p> <p>Able to count real objects from 1 to 50.</p> <p>Able to identify the number symbols from 0 to 9.</p> <p>Able to compare any two numbers within 1 to 10 to find out which is smaller & which is larger</p> <p>Able to read and write the ordinal numbers from the first to the fifth.</p> <p>Will be able to add & subtract two numbers without carrying (the result will not exceed 50)</p> <p>Able to recognize the Bangladesh coins and notes up to 50</p> <p>Able to recognize the circular, triangular, quadrilateral objects</p>	<p>able to read & write in digits any numbers up to 100</p> <p>Get the idea of the place values of digits (ones, tens), in some cases able to tell & determine the place values of the different digits used in the of the numbers up to 100.</p> <p>Able to tell, read & write the ordinal numbers from sixth to tenth.</p> <p>Able to add & subtract two numbers having not more than two digits in each by placing one below the other or side by side without carrying.</p> <p>Able to say & write multiplication table up to 10.</p> <p>Able to multiply & divide using objects and multiply a number by zero or multiply zero by a number.</p> <p>Able to recognize and tell the notes up to 100 taka.</p> <p>Able to recognize $\frac{1}{2}$ as the half and $\frac{1}{4}$ as the one fourth of a full object.</p> <p>Able to say the different units of measurement (length, weight, area and land) Know second, minute and hour as units of time measure.</p> <p>Able to identify and name different shapes (like cubes, spheres, cones, cylinders etc) separately according to their shapes.</p> <p>Able to recognize the different geometrical shapes (triangle, quadrangle, and circle).</p>	<p>Able to count up to the number 10,000.</p> <p>Able to solve one step problems by using the method of addition/ subtraction of numbers not exceeding four digits.</p> <p>Able to solve one step problems involving multiplication / division (the numbers will not be of more than two digits, however, in the case of division divisor will be of one digit.)</p> <p>Able to identify & exchange coins and notes.</p> <p>Able to determine equivalent fractions (denominators will be of one digit).</p> <p>Know the units of length & weight</p> <p>Know the units of time & able to tell the time by looking at a clock.</p> <p>Able to identify surface, line, point, different angle, Rectangle, square & circle.</p>	<p>Able to read any number up to a crore but some problem in ten thousandth & millionth.</p> <p>Most of the cases able to write any numbers up to crore in words which are written in digits.</p> <p>Have some ideas of the place values of the different digits used in writing numbers up to one crore.</p> <p>Most of the cases able to express the concept of bigger or smaller number by using symbols ($>$, $<$)</p> <p>Able to add two numbers (with carrying).</p> <p>Able to subtract a four digit number from a four digits number (with or without carrying) by putting them one below the another or side by side.</p> <p>Able to multiply a four digit number by a three digit number.</p> <p>Able to divide one number by another number (the dividend having not more than 4 digits and divisor having not more than 2 digits).</p> <p>Almost able to solve problems of two steps by using two of the processes of adding, subtracting, multiplying and dividing in the whole process, the numbers used will be of no more than four digits.</p> <p>Will get the idea of prime numbers and compound numbers and most of the cases able to identify the prime numbers and the compound numbers.</p> <p>Majority cases able to determine the prime factors.</p> <p>Get the idea of L.C.M & H.C.F and many cases able to find out L.C.M & H.C.F of maximum three numbers by using the prime factors.</p> <p>In many cases able to tell which fraction is larger or smaller by comparing them and will be able to express them in writing using mathematical symbols.</p> <p>Able to add, and subtract common fractional numbers and in some cases able to solve problems related to them (denominators of the fractions will not be of more than two digits).</p> <p>Will get the concept of decimal fractions and most of the cases able to express it by using decimal points.</p> <p>Able to convert simple common fractions into decimal fractions.</p> <p>Most of the cases able to convert decimal fractions into common fractions.</p> <p>Most of the cases able to compare larger and smaller decimal fractions using symbols.</p> <p>Able to add, subtract, multiply and divide decimal fractions and in some cases use them to solve simple problems.</p> <p>Know the units of length, weight, volume of liquids and land measurements & in some cases able to convert one unit to another unit.</p> <p>Get the idea about units of area measures and in some cases able to use them.</p> <p>Know the different angles and in some cases able to draw different triangles.</p>	<p>Able to multiply a three digit number by a three/two digit number.</p> <p>Able to divide a number of maximum four digits by a two digit number.</p> <p>Able to divide by 10 or 100 a number of five digits using the easy method.</p> <p>Able to solve problems by using a maximum two processes of adding, subtraction, multiplying and dividing.</p> <p>Get the idea of average & able to find out the average.</p> <p>Able to determine H.C.F and L.C.M by the prime factors.</p> <p>Able to express in mathematical sentences formed by letter symbols, the information contained in words.</p> <p>Able to solve mathematical simple problems by using addition, subtraction, multiplication, and division in related to fraction.</p> <p>Able to perform addition, subtraction multiplication and division of decimal fractions</p> <p>Get the idea of percentage and able to convert common fractions into percentage and percentage to fractions</p> <p>Able to use percentage to determine population pattern, profit- loss etc.</p> <p>Able to use & convert different units of time, length, weight, volume of liquids area and land measures.</p> <p>Get the concept of parallelogram, rhombus, rectangle, square and circle and get the idea of arc, chord, diameter and radius of a circle and will be able to identify them.</p> <p>Able to organize the data which are in disorder and tell different information from the given graphical pictures.</p> <p>Able to determine the smaller or the larger of the given fractions by comparing and arrange them in order from small to large or from large to small, using symbols.</p>

APPENDIX 3. Specific Performance Level Descriptors for Bangla

Bangla Specific Level Descriptors					
Performance Level	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
	1 Identify (read) letters and syllables, words, short sentences, and punctuation marks (EGRA) 2 Read simple texts with fluency (EGRA)	1 Identify (read) letters and syllables, words, short sentences, and punctuation marks (EGRA) 2 Read simple texts with fluency and comprehension. (EGRA and NSA)	1 Identify (read) letters and syllables, words, sentences, and punctuation marks. (EGRA) 2 Read texts with fluency and comprehension. (EGRA and NSA)	1 Read words and sentences taking into consideration punctuation marks. (EGRA) 2 Read texts with fluency and comprehension. (EGRA and NSA)	1 Read words and sentences taking into consideration punctuation marks. (EGRA) 2 Read texts with fluency and comprehension. (EGRA and NSA)
Advanced	1.1-1.3 ...can read (identify) all of the letters, vowel signs and selected compound consonants of Bangla correctly and with automaticity. 1.4 ...can read common words, new words and sentences fluently, automatically and with standard pronunciation. 1.5 ...can recognize the full stop, reading with appropriate pauses and intonation. 2.4 ...can read aloud a grade appropriate text and also above grade level fluently, with standard pronunciation, and appropriate intonation and stress.	1.3 ...can read (identify) all of the compound consonants of Bangla correctly and with automaticity. 1.4 ...can read common words, new words and sentences fluently, automatically and with standard pronunciation. 1.5 ...can recognize full stop, question mark, and comma, reading with appropriate pauses and intonation. 2.4 ...can read aloud a text at grade level and also above grade level fluently, with standard pronunciation, and appropriate intonation and stress. 2.5 ...can understand all of the main ideas, secondary ideas and most of the inferences of grade appropriate texts. 2.6-2.8 ...can identify the meaning of all grade appropriate vocabulary items as well as some of those of higher grades.	1.3 ...can read (identify) all of the compound consonants of Bangla correctly and with fluently. 1.4 ...can read words, new words and sentences texts fluently, automatically and with standard pronunciation. 1.5 ...can recognize punctuation marks, reading with appropriate pauses and intonation. 2.4 ...can read aloud a text at grade level and also above grade level fluently, with standard pronunciation, and appropriate intonation and stress. 2.5 ...can understand all of the main ideas, secondary ideas and most of the inferences of grade appropriate texts. 2.6-2.8 ...can identify the meaning of all grade appropriate vocabulary items as well as some of those of higher grades.	1.3 ...can read words, new words and sentences fluently, automatically and with standard pronunciation. 1.5 ...can recognize punctuation marks, reading with appropriate pauses and intonation. 2.4 ...can read aloud a text at grade level and also above grade level fluently, with standard pronunciation, and appropriate intonation and stress. 2.5 ...can understand all of the main ideas, secondary ideas and most of the inferences of grade appropriate texts. 2.6-2.8 ...can identify the meaning of all grade appropriate vocabulary items as well as some of those of higher grades.	1.3 ...can read words, new words and sentences fluently, automatically and with standard pronunciation. 1.5 ...can recognize punctuation marks, reading with appropriate pauses and intonation. 2.4 ...can read aloud a text at grade level and also above grade level fluently, with standard pronunciation, and appropriate intonation and stress. 2.5 ...can understand all of the main ideas, secondary ideas and most of the inferences of grade appropriate texts. 2.6-2.8 ...can identify the meaning of all grade appropriate vocabulary items as well as some of those of higher grades.

Bangla Specific Level Descriptors					
Performance Level	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
	<p>1 Identify (read) letters and syllables, words, short sentences, and punctuation marks</p> <p>(EGRA)</p> <p>2 Read simple texts with fluency</p> <p>(EGRA)</p>	<p>1 Identify (read) letters and syllables, words, short sentences, and punctuation marks</p> <p>(EGRA)</p> <p>2 Read simple texts with fluency and comprehension.</p> <p>(EGRA and NSA)</p>	<p>1 Identify (read) letters and syllables, words, sentences, and punctuation marks.</p> <p>(EGRA)</p> <p>2 Read texts with fluency and comprehension.</p> <p>(EGRA and NSA)</p>	<p>1 Read words and sentences taking into consideration punctuation marks.</p> <p>(EGRA)</p> <p>2 Read texts with fluency and comprehension.</p> <p>(EGRA and NSA)</p>	<p>1 Read words and sentences taking into consideration punctuation marks.</p> <p>(EGRA)</p> <p>2 Read texts with fluency and comprehension.</p> <p>(EGRA and NSA)</p>
Proficient	<p>1.1-1.3 ...can read (identify) most of the letters, vowel signs and selected compound consonants of Bangla correctly.</p> <p>1.4 ...can read grade appropriate common words and short sentences mostly fluently and with standard pronunciation.</p> <p>1.5 ...can recognize the full stop, reading with appropriate pauses and intonation.</p> <p>2.4 ...can read aloud a grade appropriate short text mostly fluently and with standard pronunciation.</p>	<p>1.3 ...can read (identify) most of the compound consonants of Bangla correctly.</p> <p>1.4 ...can read grade appropriate common words and short sentences mostly fluently and with standard pronunciation.</p> <p>1.5 ...can recognize full stop, question mark, and comma, reading with appropriate pauses and intonation.</p> <p>2.4 ...can read aloud a grade appropriate short text mostly fluently and with standard pronunciation.</p> <p>2.5 ...can understand many of the main ideas and secondary ideas and some of the inferences of grade appropriate texts.</p> <p>2.6-2.8 ...can identify the meaning of many grade appropriate vocabulary items.</p>	<p>1.3 ...can read (identify) most of the compound consonants of Bangla correctly and fluently.</p> <p>1.4 ...can read grade appropriate words and sentences mostly fluently and with standard pronunciation.</p> <p>1.5 ...can recognize common punctuation marks, reading with appropriate pauses and intonation.</p> <p>2.4 ...can read aloud a grade appropriate text mostly fluently and with standard pronunciation.</p> <p>2.5 ...can understand many of the main ideas and secondary ideas and some of the inferences of grade appropriate texts.</p> <p>2.6-2.8 ...can identify the meaning of many grade appropriate vocabulary items.</p>	<p>1.3 ...can read grade appropriate words and sentences mostly fluently and with standard pronunciation.</p> <p>1.5 ...can recognize common punctuation marks, reading with appropriate pauses and intonation.</p> <p>2.4 ...can read aloud a grade appropriate text mostly fluently and with standard pronunciation.</p> <p>2.5 ...can understand many of the main ideas and secondary ideas and some of the inferences of grade appropriate texts.</p> <p>2.6-2.8 ...can identify the meaning of many grade appropriate vocabulary items.</p>	<p>1.3 ...can read grade appropriate words and sentences mostly fluently and with standard pronunciation.</p> <p>1.5 ...can recognize common punctuation marks, reading with appropriate pauses and intonation.</p> <p>2.4 ...can read aloud a grade appropriate text mostly fluently and with standard pronunciation.</p> <p>2.5 ...can understand many of the main ideas and secondary ideas and some of the inferences of grade appropriate texts.</p> <p>2.6-2.8 ...can identify the meaning of many grade appropriate vocabulary items.</p>

Bangla Specific Level Descriptors					
Performance Level	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
	<p>1 Identify (read) letters and syllables, words, short sentences, and punctuation marks</p> <p>(EGRA)</p> <p>2 Read simple texts with fluency</p> <p>(EGRA)</p>	<p>1 Identify (read) letters and syllables, words, short sentences, and punctuation marks</p> <p>(EGRA)</p> <p>2 Read simple texts with fluency and comprehension.</p> <p>(EGRA and NSA)</p>	<p>1 Identify (read) letters and syllables, words, sentences, and punctuation marks.</p> <p>(EGRA)</p> <p>2 Read texts with fluency and comprehension.</p> <p>(EGRA and NSA)</p>	<p>1 Read words and sentences taking into consideration punctuation marks.</p> <p>(EGRA)</p> <p>2 Read texts with fluency and comprehension.</p> <p>(EGRA and NSA)</p>	<p>1 Read words and sentences taking into consideration punctuation marks.</p> <p>(EGRA)</p> <p>2 Read texts with fluency and comprehension.</p> <p>(EGRA and NSA)</p>
Basic	<p>1.1-1.3 ...can read (identify) some of the letters, vowel signs and selected compound consonants of Bangla, with hesitation and often making errors.</p> <p>1.4 ...can read some grade appropriate common words, and short easy sentences, with a lot of hesitation and many errors.</p> <p>1.5 ...can recognize a full stop, although often reading without a pause and appropriate intonation.</p> <p>2.4 ...can read aloud a grade appropriate short text slowly and with many errors.</p>	<p>1.3 ...can read (identify) some compound consonants of Bangla, with a lot of hesitation and many errors.</p> <p>1.4 ...can read some grade appropriate common words, and short easy sentences, with a lot of hesitation and many errors.</p> <p>1.5 ...can recognize full stop, question mark, and comma, although often reading without pauses and appropriate intonation.</p> <p>2.4 ...can read aloud a grade appropriate short text slowly and with many errors.</p> <p>2.5 ...can understand some of the main ideas and secondary ideas but cannot understand the inferences of grade appropriate texts.</p> <p>2.6-2.8 ...can identify the meaning of some grade appropriate vocabulary.</p>	<p>1.3 ...can read (identify) some of the compound consonants of Bangla, with hesitation and errors.</p> <p>1.4 ...can read some grade appropriate common words, and short easy sentences, with a lot of hesitation and many errors.</p> <p>1.5 ...can recognize some common punctuation marks, although often reading without pauses and appropriate intonation.</p> <p>2.4 ...can read aloud a grade appropriate short text slowly and with many errors.</p> <p>2.5 ...can understand some of the main ideas and secondary ideas but cannot understand the inferences of grade appropriate texts.</p> <p>2.6-2.8 ...can identify the meaning of some grade appropriate vocabulary.</p>	<p>1.3 ...can read some grade appropriate words, and short easy sentences, with hesitation and errors.</p> <p>1.5 ...can recognize most common punctuation marks, although sometimes reading without pauses and appropriate intonation.</p> <p>2.4 ...can read aloud a grade appropriate short text slowly and with errors.</p> <p>2.5 ...can understand some of the main ideas and secondary ideas but cannot understand the inferences of grade appropriate texts.</p> <p>2.6-2.8 ...can identify the meaning of some grade appropriate vocabulary.</p>	<p>1.3 ...can read some grade appropriate words, and short easy sentences, with hesitation and errors.</p> <p>1.5 ...can recognize most common punctuation marks, although sometimes reading without pauses and appropriate intonation.</p> <p>2.4 ...can read aloud a grade appropriate text slowly and with errors.</p> <p>2.5 ...can understand some of the main ideas and secondary ideas but cannot understand the inferences of grade appropriate texts.</p> <p>2.6-2.8 ...can identify the meaning of some grade appropriate vocabulary.</p>

Bangla Specific Level Descriptors					
Performance Level	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
	<p>1 Identify (read) letters and syllables, words, short sentences, and punctuation marks</p> <p>(EGRA)</p> <p>2 Read simple texts with fluency</p> <p>(EGRA)</p>	<p>1 Identify (read) letters and syllables, words, short sentences, and punctuation marks</p> <p>(EGRA)</p> <p>2 Read simple texts with fluency and comprehension.</p> <p>(EGRA and NSA)</p>	<p>1 Identify (read) letters and syllables, words, sentences, and punctuation marks.</p> <p>(EGRA)</p> <p>2 Read texts with fluency and comprehension.</p> <p>(EGRA and NSA)</p>	<p>1 Read words and sentences taking into consideration punctuation marks.</p> <p>(EGRA)</p> <p>2 Read texts with fluency and comprehension.</p> <p>(EGRA and NSA)</p>	<p>1 Read words and sentences taking into consideration punctuation marks.</p> <p>(EGRA)</p> <p>2 Read texts with fluency and comprehension.</p> <p>(EGRA and NSA)</p>
Below basic	<p>1.1-1.3 ...can read (identify) few of the letters, vowel signs and selected compound consonants of Bangla, with a lot of hesitation and many errors.</p> <p>1.4 ...can read very few common words, with a lot of hesitation and many errors.</p> <p>1.5 ...can mostly not recognize a full stop and its function.</p> <p>2.4 ...can read aloud only a few words and phrases from a short text, slowly and with many errors.</p>	<p>1.3 ...can read (identify) few compound consonants of Bangla, with a lot of hesitation and many errors.</p> <p>1.4 ...can read very few common words, with a lot of hesitation and many errors.</p> <p>1.5 ...can mostly not recognize full stops, question marks, and commas and their function.</p> <p>2.4 ...can read aloud only a few words and phrases from a short text, slowly and with many errors.</p> <p>2.5 ...cannot understand any of the main ideas of grade appropriate texts.</p> <p>2.6-2.8 ...cannot identify the meaning of most grade appropriate vocabulary.</p>	<p>1.3 ...can read (identify) only a few of the compound consonants of Bangla, with a lot of hesitation and many errors.</p> <p>1.4 ...can read few common words, with a lot of hesitation and many errors.</p> <p>1.5 ...can mostly not recognize common punctuation marks and their function.</p> <p>2.4 ...can read aloud only a few words and phrases from a short text, slowly and with many errors.</p> <p>2.5 ...cannot understand any of the main ideas of grade appropriate texts.</p> <p>2.6-2.8 ...cannot identify the meaning of most grade appropriate vocabulary.</p>	<p>1.3 ...can read some common words, with a lot of hesitation and many errors.</p> <p>1.5 ...can recognize some common punctuation marks and their function.</p> <p>2.4 ...can read aloud a few words and phrases from a short text, slowly and with errors.</p> <p>2.5 ...can understand a few of the main ideas of grade appropriate texts.</p> <p>2.6-2.8 ...can identify the meaning of some grade appropriate vocabulary.</p>	<p>1.3 ...can read common words with some hesitation and errors.</p> <p>1.5 ...can recognize some common punctuation marks and their function.</p> <p>2.4 ...can read aloud a few words and phrases from a text, slowly and with errors.</p> <p>2.5 ...can understand a few of the main ideas and some secondary ideas of grade appropriate texts.</p> <p>2.6-2.8 ...can identify the meaning of some grade appropriate vocabulary.</p>

APPENDIX 4. NSA 2017 Results by Districts- All Tests

District	Bangla 3			Bangla 5			Math 3			Math 5			Combined Mean
	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD	
Jaipurhat	246.2	107	64.0	242.9	91	57.3	227.3	112	58.7	228.4	91	53.5	236.2
Bogra	248.5	417	68.5	267.1	399	62.6	243.1	431	76.7	242.9	406	60.7	250.4
Naogaon	313.2	330	64.7	311.7	280	60.7	316.9	320	76.2	320.5	270	73.6	315.6
Nawabgonj	296.2	245	72.9	286.1	199	67.1	301.4	250	79.6	307.7	205	84.0	297.9
Rajshahi	272.1	415	70.9	269.9	397	68.1	253.6	431	72.3	242.9	399	73.5	259.6
Natore	302.0	245	72.0	289.9	245	64.1	281.7	275	89.3	271.5	242	83.4	286.3
Sirajgonj	282.6	616	63.5	290.8	407	68.0	263.9	619	73.7	288.1	401	81.7	281.3
Pabna	305.3	488	64.2	310.6	365	54.2	284.6	488	71.9	306.0	364	79.7	301.6
Kushtia				257.9	298	59.1				237.1	301	56.2	247.5
Meherpur	258.4	109	64.3	270.8	91	53.7	245.5	106	60.0	272.7	88	62.0	261.9
Chuadanga	268.0	232	72.2	266.7	160	61.7	252.5	235	69.6	242.5	160	71.3	257.4
Jhenaidah	288.2	293	68.6	295.8	271	72.3	277.6	287	82.6	275.0	256	76.9	284.1
Magura	290.4	235	75.8	318.3	237	69.7	283.1	235	91.0	282.6	196	66.8	293.6
Jessore	267.7	492	70.7	265.4	458	63.4	251.3	501	78.1	252.8	459	70.9	259.3
Narail	279.2	160	79.6	271.2	127	61.9	273.2	160	80.3	261.0	127	78.3	271.2
Satkhira	288.5	336	61.6	289.3	315	59.6	272.3	340	69.9	298.9	323	83.7	287.2
Khulna	264.3	532	67.7	264.0	426	58.5	249.1	544	70.2	256.3	456	80.1	258.4
Bagerhat	263.0	240	64.9	273.0	187	63.3	245.4	243	63.1	248.5	186	59.3	257.5
Jamalpur	291.9	643	75.9	289.2	349	70.0	286.7	635	84.8	268.2	355	70.2	284.0
Sherpur	269.3	277	72.1	268.1	228	67.6	259.0	303	69.2	258.7	225	65.4	263.8
Mymensingh	292.1	1183	72.3	291.0	979	64.3	302.0	1208	88.1	293.2	930	72.4	294.6
Netrokona	264.7	483	71.6	252.0	397	59.4	249.0	474	68.8	242.0	406	69.9	251.9
Kishorgonj	256.5	698	66.6	261.6	547	58.0	261.8	709	73.3	274.9	519	77.9	263.7
Tangail	260.7	767	70.2	273.0	663	69.5	256.9	756	87.8	263.1	675	90.1	263.5
Gazipur	297.1	755	71.1	305.5	770	65.6	273.5	768	65.8	264.6	751	59.8	285.2
Narsingdi	266.0	536	64.8	277.0	423	59.1	234.7	542	59.4	248.7	408	60.7	256.6
Manikgonj	282.1	323	63.2	291.0	242	66.9	267.8	329	74.4	289.6	247	79.5	282.6
Dhaka	313.5	1525	65.7	299.8	1386	64.1	278.5	1558	75.8	274.9	1312	81.2	291.7
Narayangonj	290.1	682	68.2	298.7	672	62.7	259.5	710	64.5	284.4	670	68.9	283.2
Munshigonj	301.2	270	78.9	287.1	273	69.7	276.6	269	84.6	261.1	268	67.8	281.5
Rajbari	270.0	243	70.9	267.9	168	62.2	246.3	246	72.2	239.6	172	68.5	256.0
Faridpur	265.8	488	65.7	278.7	418	66.5	247.8	501	69.2	250.0	437	64.6	260.6
Madaripur	336.9	227	68.9	318.5	221	74.8	345.4	234	84.1	326.8	220	95.6	331.9
Shariatpur	285.9	218	68.9	293.7	220	61.3	301.3	216	83.1	293.5	231	68.9	293.6

District	Bangla 3			Bangla 5			Math 3			Math 5			Combined Mean
	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD	
Gopalganj	290.4	208	69.7	293.0	189	61.6	279.0	209	84.0	288.9	197	85.5	287.8
Brahmonbaria	292.1	946	70.9	292.9	757	69.8	282.1	971	77.1	288.3	770	79.9	288.9
Comilla	278.9	1306	70.2	281.1	1245	61.8	270.1	1340	76.4	266.6	1262	62.7	274.2
Chandpur	319.2	435	82.8	314.5	495	71.4	327.6	451	86.1	311.7	490	82.6	318.3
Luxmipur	287.8	507	77.6	283.5	477	64.6	282.7	499	86.8	256.6	457	81.0	277.7
Noakhali	269.8	758	75.8	262.4	818	71.3	269.4	761	73.8	250.3	808	70.7	263.0
Feni	257.5	292	68.4	257.0	343	57.1	243.6	296	62.6	233.8	352	54.8	248.0
Chittagong	264.5	1627	64.3	277.0	1486	61.1	226.6	1675	57.2	243.0	1496	66.2	252.8
Cox'S Bazar	232.5	747	60.9	252.4	437	55.9	218.9	779	55.8	227.5	453	49.7	232.8
Khagrachhari	247.8	129	56.2	255.4	99	58.1	217.5	124	56.9	215.6	100	38.1	234.1
Rangamati	254.8	90	57.9	256.2	74	55.6	228.1	88	61.7	243.9	79	57.6	245.7
Bandarban	277.8	109	66.7	282.0	74	59.7	284.7	113	73.5	316.1	80	63.9	290.2
Barisal	320.1	378	74.3	296.4	355	65.7	338.9	371	91.4	317.3	376	80.5	318.2
Pirojpur	326.7	132	78.3	291.8	112	68.8	334.9	127	99.6	321.9	115	77.6	318.8
Jhalokathi	328.6	76	83.2	302.8	78	80.7	335.5	79	94.5	299.0	83	89.6	316.5
Barguna	279.6	145	74.4	263.3	154	65.9	270.5	149	79.8	249.6	148	62.3	265.8
Patuakhali	257.5	204	59.7	278.4	183	72.8	262.6	209	73.4	278.8	190	78.6	269.3
Bhola	261.8	314	66.9	252.5	219	63.2	256.3	363	62.2	254.1	260	80.0	256.2
Sunamgonj	265.2	481	68.0	265.7	336	57.1	253.3	500	80.3	278.0	337	78.8	265.5
Sylhet	229.7	592	61.6	236.5	527	52.5	216.4	634	62.5	212.6	522	46.2	223.8
Hobigonj	246.9	609	62.7	246.8	384	52.4	240.9	629	63.8	255.5	379	74.7	247.5
Moulvibazar	269.9	395	69.8	241.1	271	57.9	260.3	385	79.7	240.3	265	57.0	252.9
Panchagarh	283.3	179	66.2	266.1	147	56.4	286.8	181	79.6	275.9	147	70.2	278.1
Thakurgaon	286.2	217	63.3	282.3	170	71.4	260.2	217	68.2	255.0	168	70.2	270.9
Dinajpur	275.8	449	65.7	284.8	365	66.2	259.2	457	77.7	270.5	377	71.2	272.6
Nilphamari	321.8	351	64.5	310.8	238	64.8	338.2	332	81.0	307.7	243	60.4	319.6
Rangpur	277.1	430	66.4	276.9	328	72.0	261.2	427	77.8	252.4	333	73.4	266.9
Lalmonirhat	306.3	227	63.5	291.4	186	58.7	302.9	225	79.5	290.2	184	75.1	297.7
Kurigram	286.1	393	67.5	289.4	323	69.5	299.6	403	88.7	275.6	324	64.6	287.7
Gaibandha	310.1	567	68.7	294.4	330	69.5	291.3	569	77.4	268.3	348	64.8	291.0
National	279.9	28099	72.2	280.8	24109	66.6	267.5	28597	79.8	267.2	24099	75.7	273.8

APPENDIX 5. NSA 2017 Results by Division - All Tests

Division	Bangla 3			Bangla 5			Math 3			Math 5			Combined Mean
	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD	
Rajshahi	284.9	2863	70.6	286.5	2383	66.1	272.0	2926	79.3	276.9	2378	81.2	280.1
Khulna	273.9	2629	70.0	276.4	2570	65.2	259.9	2651	75.9	262.1	2553	74.8	268.1
Dhaka	286.6	6940	71.6	289.6	6192	66.3	267.7	7047	77.0	271.8	6107	77.1	278.9
Chittagong	272.7	6945	72.5	278.0	6305	66.1	258.0	7096	76.8	259.3	6348	72.5	267.0
Barisal	291.7	1248	77.2	280.0	1101	70.2	295.1	1297	89.6	287.6	1171	83.5	288.6
Sylhet	250.6	2077	66.9	246.4	1518	55.6	240.0	2148	72.5	243.0	1502	68.8	245.0
Rangpur	293.8	2813	68.2	287.8	2087	68.0	286.5	2811	83.1	273.2	2124	70.4	285.3
Mymensingh	284.5	2586	73.9	280.1	1953	66.6	283.7	2620	84.7	273.7	1916	73.6	280.5
Total	279.9	28099	72.2	280.8	24109	66.6	267.5	28597	79.8	267.2	24099	75.7	273.8

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