

**National Achievement Test (NAT) for Grade 10  
Statistical Data Output Requirements**

**Priority A**

- a.1. Printing and Processing of Certificate of Rating (COR) per examinee using BEA approved format.
- a.2. Master List of examinees by schools, individual raw score, mean raw score, mean percentage score, and by 21<sup>st</sup> century skills. *(Please see appendix 1, for sample table format)*
- a.3. Electronic file of Master List by Division. If the mode of administration is through census, the legislative district's Masterlist is also required.
- a.4. School Header's data – crosstabs with frequency counts and percent, MPS by variable, by legislative district.
- a.5. Quartile Distribution by School, Division and Region. If the mode of administration is through *census* the legislative district's Masterlist is also required.
- a.6. Proficiency levels by school, division, and region by 21<sup>st</sup> century skills. If the mode of administration is through *census* the legislative district's Masterlist is also required.

**Priority B**

**B.1. Frequency and percent distribution of total examinees.**

- b.1.1. Division
- b.1.2. Regional (17 Regions)
- b.1.3. National (overall total)

**B.2. Frequency, percentage distribution, and MPS, of demographic characteristics by 21<sup>st</sup> century skills of total examinees.**

- b.2.1. Gender
- b.2.2. Municipality type (Rural, Urban)
- b.2.3. Class Size
- b.2.4. School Type
- b.2.5. Legislative District
- b.2.6. School Type (Public vs. Private)
- b.2.7. Region
- b.2.8. Division
- b.2.9. Teacher given grades by subject.
- b.2.10. EDQ Variables
- b.2.11. School Header variables
- b.2.12. IP
- b.2.13. Type of Public School: National High School, Comprehensive HS, Integrated School, Public Science HS, Public Vocational HS, State College/University HS
- b.2.14. Type of Private School: Sectarian, Non-Sectarian, Vocational HS, Science HS.

**B.3. Regional and Division Level Analysis**

- b.3.1. Do the same as the foregoing for each of the Seventeen (17) Regions

- Examples (Sample Table) Regional N, Mean, Raw % Score, SD, Lowest and Highest and for each of the 5 tests and Overall Test
- b.3.2. Division N, Mean (Raw and Percent) Scores, SD, Lowest and Highest scores per Test, for Overall Test
- b.3.3. Mean, N, SD, by Subtest and for Total test by SCHOOL, DIVISION, and REGION Cluster

### Descriptive Statistics for Total and Subtests by Cluster

School Cluster	N	MPS
Cluster 1		
Cluster 2		
Cluster 3		
Cluster 4		
Cluster 5		
Cluster 6		

#### Cluster Scale:

Cluster	Schools with examinees of:
<b>Cluster 1</b>	<b>400 and above</b>
<b>Cluster 2</b>	<b>200 to 399</b>
<b>Cluster 3</b>	<b>100 - 199</b>
<b>Cluster 4</b>	<b>55 - 99</b>
<b>Cluster 5</b>	<b>20 - 54</b>
<b>Cluster 6</b>	<b>19 and below</b>

#### Division Scale:

Cluster	Divisions with examinees of:
<b>Cluster 1</b>	<b>10,001 and above</b>
<b>Cluster 2</b>	<b>5,001 to 10,000</b>
<b>Cluster 3</b>	<b>5,000 and below</b>

#### Regional Scale:

Cluster	Regions with examinees of:
<b>Cluster 1</b>	<b>100,001 and above</b>
<b>Cluster 2</b>	<b>75,000 to 100,000</b>
<b>Cluster 3</b>	<b>74,999 and below</b>

### B.4. Three Year Trend using MPS by Subtest

- b.4.1. Individual score represented by the highest and lowest Raw Score by subject area and Overall Test
- b.4.2. Three Year trend using MPS by 21<sup>st</sup> century skills/subtest starting School Year 2016 – 2017
- b.4.3. Frequency and Percentage **Distribution of Examinees** and School type based on the Criteria on **Proficiency Level** by subtest
- b.4.4. Frequency and Percentage **Distribution of Schools** by type based on the criteria on **Proficiency Level** by subtest.

## CRITERIA FOR PROFICIENCY LEVELS

PROFICIENCY LEVEL	
PL	Descriptive Equivalent
90 – 100	<i>Highly Proficient</i>
75 - 89	<i>Proficient</i>
50 - 74	<i>Nearly Proficient</i>
25 - 49	<i>Low Proficient</i>
0 - 24	<i>Not Proficient</i>

- b.4.5. Frequency Distribution of Raw Scores and its Equivalent by subtest and Overall Test (e.g. Raw → PS → SS → PR and %) regardless if the mode of administration is sampling or census.
- b.4.6. Regional Performance by gender in the 21<sup>ST</sup> CENTURY SKILLS MPS by subject area and Overall Test
- b.4.7. Division Performance by gender in 21<sup>ST</sup> CENTURY SKILLS MPS by subject area and Overall Test
- b.4.8. Frequency and Percentage Distribution of scores based on the criteria on quartile distribution by:
  - b.4.8.1. subject and overall test
  - b.4.8.2. distribution of examines
  - b.4.8.3. distribution of school
  - b.4.8.4. distribution of division
  - b.4.8.5. distribution of region

Quartile Distribution of Scores	
Quartile	Descriptive Equivalent
76 – 100	<i>Q1 Superior</i>
51 – 75	<i>Q2 Upper Average</i>
26 – 50	<i>Q3 Lower Average</i>
0 – 25	<i>Q4 Poor</i>

### B.5. 21<sup>st</sup> century skills ranking based on Z-scores or percentile rank scores.

- b.5.1. Regions ranking
- b.5.2. Division with each Region
- b.5.3. Top 10 students by subtest based on  $\sum$  of Scores of each student in the 5 subjects
- b.5.4. Top 10 divisions in Mean Percentage Score (MPS) by subject area and Overall Test
- b.5.5. Top 10 students in Percentage/Z Score obtained in Math
- b.5.6. Top 10 students in Percentage/Z Score obtained in Science
- b.5.7. Top 10 students in Percentage/Z Score obtained in English
- b.5.8. Top 10 students in Percentage/Z Score obtained in Filipino
- b.5.9. Top 10 students in Percentage/Z Score obtained in Aralin Panlipunan
- b.5.10. Top 10 students Overall Z Score
- b.5.11. Top 10 schools based on MPS obtained by enrolment size

## Priority C

**C.1.** Information dissemination through submission of compact disk per region (17 regions) and divisions (225 divisions) which includes:

- c.1.1. IPP per school and its respective divisions (for SDO's copy)
  - c.1.2. IPP per school, division, and region (for RO's copy)
  - c.1.3. IPP per school, division, region, and national (BEA copy)
1. Electronic copy of the Graphical Presentation of Percentage of Correct Response (PCR) by 21<sup>st</sup> century skills vis a vis by its subject area and proficiency levels through regional and national performance.
  2. Electronic copies of Institutional Performance profile (IPP) by Division. The IPP contains the gender, subject area, and overall test MPS and SD. (Division, Region, and National Performance should appear after the last school of the division)

## Priority D:

### D.1. GUIDELINES FOR GENERATING INFERENCE STATISTICS

Stage 1 → 10 Regions:

Regions I, III, IV-A, V and NCR – Luzon  
Regions VI, NIR and VII – Visayas  
Regions X, XII – Mindanao

Stage 2 → Division Level – 4 division per region

Cluster 1 – per region  
Cluster 2 – per region  
Cluster 3 – per region  
Cluster 4 – per region

Stage 3 → School Level

Public	Private
1 National High School	1 Sectarian
1 National Comprehensive HS	1 Non Sectarian
1 Integrated School	1 Vocational HS
1 Public Science HS	1 Private Science HS
1 Public Vocational HS	
1 state College/University HS	

Stage 4 → 80 – 100 students per school

- Male – Female almost equal distribution

Stage 5 → All variables indicated on Priority B.2.

### D.2. Comparison and Inferential Statistics per Subject and 21st century skills.

D.2.1. T-test of differences on means or ANOVA and Chi-Square by Percentile Grouping

d.2.1.1. Gender

Sample table (for total examinees): t-test of difference of Means of Males vs. Females by subtests (Region I)

Test	Mean Score		Std. Deviation		Diff. between means	t-ratio/ F – ratio	Probability
	Male	Female	Male	Female			
Math							
Science							
English							
Filipino							
Aral. Pan							
Total Test							

**CHI-SQUARE BY PERCENTILE GROUPING**

Variable Labels	PERCENTILE GROUPING IN MPS								
	20 & below	21-29	30-40	41-50	51-60	61-70	71-80	81-90	91-99

d.2.1.2. Do the same as of # 3.1 for each of the 17 other Regions

d.2.1.3. Do the same for:

d.2.1.3.1. Community type (urban vs. rural) for whole population

d.2.1.3.2. Madrasah vs. Non Madrasah

d.2.1.3.3. Special Science Classes vs. Non- Special Science Classes

**D.3. Correlation and Regression Analysis**

D.3.1. Inter-correlation Analysis by subject test scores and 21<sup>st</sup> century skills (Please see appendix 3: sample table format for subject test scores and 21<sup>st</sup> century skills)

D.3.2. Correlations between 21<sup>st</sup> century skills score on 5 subtests and total test with some examinee characteristics *(please see appendix 4: sample table format for 21<sup>st</sup> century skills score and examinee characteristics)*

- d.3.2.1. Gender
- d.3.2.2. Cluster Type
- d.3.2.3. School Type
- d.3.2.4. Number of Siblings
- d.3.2.5. Community Type
- d.3.2.6. Teacher-given grades in
  - Math
  - Science
  - English
  - Filipino
  - Aralin Panlipunan
- d.3.2.7. Madrasah
- d.3.2.8. IP
- d.3.2.9. SPED

d.3.3. Split-half reliability coefficient for each of the 5 subtests and Total tests GSA & TVA

d.3.4. Kuder-Richardson alpha Reliability

**D.4. One-way ANALYSIS OF VARIANCE OF scores on each of the 5 subtests of NAT based on the overall 21<sup>st</sup> century skills raw data.**

- d.4.1. Across the 17 regions
- d.4.2. Across the 5 cluster types
- d.4.3. If F is significant in the one-way ANOVA and D.2 has a significant relationship, do a test or Schiff test of Duncan test on the data to identify significantly different group.

**D.5. Test Validation and Development**

➤ **Classical Test Theory (CTT)**

D.5.1. Item Analysis and Item Validation Tests

d.5.1.1. Do an item analysis of each of the 5 subtests to produce the following facility:

- d.5.1.1.1. Facility/difficulty indices
- d.5.1.1.2. Discrimination indices
- d.5.1.1.3. Frequency of choosers per option (option analysis)

D.5.2. If possible print out an item analysis matrix like the following for each of the subject tests.

**Table \_\_\_: Item Analysis Index for subtests**

**Discrimination Index (DI)**

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Facility Level (%)	≤ .00	.01 - .15	.16 – .30	.31 - .45	.46 - .60	≥.61 and above	Total No. of Items
81 – 100							
61 – 80							
41 – 60							
21 – 40							
0 – 20							
Total Items							

$$\text{Where: } F1 = \frac{\mu - l}{U + L} \times 100\%$$

$$D.I = \frac{\mu - l}{U}$$

**Where:**

- $\mu$  – number of examinees among the highest scoring 27% of the ranked Distribution who answered the item correctly
- $l$  – number of examinees in the L group who answered the item correctly
- $U$  – number of examinees in the top 27% of the test takers
- $L$  – number of examinees in the bottom 27% of the test takers

Note:  $U = L$

F1 -Facility Index  
DI – Discrimination Index

D.5.2. Generate an Item Analysis Report for National Achievement Test for Grade Ten following the **Classical Test Theory Approach**.

D.5.3. Generate the R Markdown report following the **Item Response Theory** approach, which deals primarily with the following:

- IRT ability measures
- IRT item difficulty
- IRT test reliability
- IRT Item Discrimination
- Parallel ICCs
- WrightMap
- IRT item analysis
- R markdown

**Conditions:**

- *All data/statistical outputs required by the BEA should also be in electronic file and submitted to the BEA.*
- *Computed and validated data file of scanned data (includes scores of each subtest, division and region code) should also be submitted to BEA*
- ***Any statistical data not indicated herein but emerged necessary should also be generated.***