

Provincial Assessment: Report on Student Performance

Numeracy, January 2019

"Information from this report will be used in the Ministry's Report to Schools. These comments are intended to provide teachers with information on students' strengths and weaknesses as indicated by their performance on the Provincial Assessment."

The scoring team identified the following strengths and weaknesses for students according to each of the four types of tasks, as described in the *Design Specifications for the Numeracy Assessment*.

- 1. Reasoned Estimates** – These tasks require students to make or use estimates across multiple variables in order to build a logical argument for a possible solution.

Strengths	Weaknesses
<ul style="list-style-type: none">• Most were able to enter the problem and demonstrate an understanding of its context.• Most were able to use proportions or percentages.• Several determined the range between a low and high value to determine an average (optimal) solution.• Many followed a logical process which was organized and clearly communicated. <p>(Note: Student communication of problem-solving strategies has improved over previous sessions. This strength was bi-modal: communication was a strength for students who excelled.)</p>	<ul style="list-style-type: none">• Some found it difficult to work with large values – not being able to understand appropriate magnitudes of their final answers; large values also contributed to students not recognizing arithmetic errors. Using scientific notation could have been a viable alternative.• Students who did not excel at reasoned estimates typically also did not attempt to describe their logic or provide written support for their calculations.• Many "estimated" answers for an item or populations to several decimal places – not realizing solutions should be integers.• Many responses indicated that students could not recognize when a solution was not reasonable in the context of the problem (e.g. fractions of population or numbers indicated that the population shifted from millions to single digits).• Although these types of questions are designed to give a wide margin for interpretation, this intended ambiguity was seen by some students as insufficient direction in the question.• Some students with limited provincial context had difficulty with vocabulary, meanings and context when presented with questions that referenced First People's culture.

- 2. Plan and Design** – These tasks may require students to analyze time, space, cost, and people in order to make a recommendation.

Strengths	Weaknesses
<ul style="list-style-type: none">• Most were able to enter the problem.• Most responses were clear and well-organized.• Most understood area and volume.	<ul style="list-style-type: none">• Some had difficulty interpreting the meaning of an operating cost compared to a start-up cost.• Some confused volume and surface area.• Students who performed poorly often did not attempt to explain their logic behind their problem-solving process.

3. Fair Share – These tasks require students to decide how to best share something fairly.

Strengths	Weaknesses
<ul style="list-style-type: none"> Most communicated their strategy effectively – labelling sections of their solutions – their work was well organized. Many stated assumptions clearly, showing they understood the context of the question. Most were able to assess whether their solution was reasonable – they included a written reflection as part of their problem-solving process. Students who performed well understood and could apply the concept of percentages. Most interpreted the graph correctly. 	<ul style="list-style-type: none"> Some responded to the question using their opinion in justifying a fair share, as opposed to applying numeracy skills to determine a solution. Some did not use information from the question to support their solution. Some did not understand the context of the questions (concept of tax, interest, asset, or quotas). Poor mathematical solutions also tended to have poor communication of their logic. A significant number could not determine a percentage share: dividing rather than multiplying by the percentage. Some had difficulty applying the concept of a rate (price per unit).

4. Model – These tasks require students to come up with a model or strategy, given a data set; to apply this model or strategy to a new data set; and to refine the model if necessary.

Strengths	Weaknesses
<ul style="list-style-type: none"> The majority could enter the questions and identified that there was an identifiable trend (improvements in the athlete's times). Most could plot data points correctly. 	<ul style="list-style-type: none"> Many did not understand the meaning of 'extrapolation'. Some were unable to identify a linear trend, or how to create a line of best fit. A significant number had difficulty creating scales for graphs. Many tried to use proportional reasoning or percentage change (ratios between two data points) instead of using an overall trend (an extrapolation of the data). Some had difficulties plotting irregular intervals of measurements.

General Comments (across all forms)

- Students communicated most effectively when explaining their logic in point-form rather than in paragraphs.
- Students performed best when graphs or calculations were supported by explanations of their problem-solving logic.
- Students are encouraged to reflect whether their solutions are relevance or appropriate; this will often help them to identify and correct errors.
- Using appropriate units often helped to provide insights into their logic or identify errors in calculations (particularly related to unit conversions).
- Students should be encouraged to write Common Questions calculations on scrap paper rather than the response sheets that are scanned. Otherwise it can be difficult to distinguish between the Constructed Response answer and the rough work for the Common Questions.
- Ensure students are familiar with the reference pages tab on the assessment.
- In many instances, students who performed poorly mistook information from the Common Questions section of the assessment as relevant to the Constructed Response questions, and developed their solutions incorporating Common Question information not applicable to the Constructed Response.