

Numeracy Performance Standards Revision

Instructions for Field-Testing

Context

Over the past year, the Ministry has been working with math educators to update the BC Numeracy Performance Standards to ensure that they are aligned with the current curriculum, while continuing to build on the extensive work that many BC districts, schools, teachers, and inquiry groups have already done.

The revised standards will feature:

- One scale for each of grades 1-3; 4-6; 7-9; 10-12, with space to indicate the specific **strands** and **key concepts** that are being assessed in specific cases.
- Tasks/sample sets at each grade (we plan to have a minimum of two tasks/student sample sets – and at least one of these will feature **number**)

In the first phase of the revision, prototypes for Grades 1 to 9 have been field-tested. These prototypes mainly feature number. Currently, we have developed more tasks featuring other strands and they need to be field-tested.

Field-testing Procedures

Tasks for Grades 1 to 9 have been developed for field-testing. This task package includes a task description and the quick scale.

- We need you and your students to try the task and send the students' work to the Ministry.
- We need you to evaluate the task and use the quick scale to score students' work.
- Provide specific, concrete feedback. Use the attached *Feedback Questions* to provide focused feedback.
- Send your comments and students' work from your field testing to the Ministry. We'd like to hear from you by **December 23, 2011**.
- If you have developed any 'student-friendly' materials/tasks, please send them along.
- These tasks are being circulated as widely as possible, so please feel free to share them with others.

If you want to discuss the field testing process, please contact Nancy Walt at Nancy.Walt@gov.bc.ca or Jiemei Li at Jiemei.Li@gov.bc.ca

Please send your comments, student samples and any new materials or tasks by **December 23, 2011** to Jiemei Li

- by email at Jiemei.Li@gov.bc.ca
- by mail at: Curriculum and Assessment, PO Box 9183 Stn Prov Govt
Victoria, BC V8W 9H1

or post them on the Moodle at <http://www.learnnowbc.ca/educators/default.aspx>

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Feedback Questions

1. What suggestions do you have about the use of the numeracy performance standards? Are these materials easy for teachers to use?
2. Is the task grade/age-appropriate? Provide your comments and suggestions for improvement.
3. Are the rating scales easy to apply to student work? What improvements are needed?
4. Do you have student samples to demonstrate the various performance levels? Please send all or a selection of your students' work to the Ministry.
5. Have you developed any 'student-friendly' materials or tasks? Please send them to the Ministry.

Please send your comments and student samples by **December 23, 2011** to Jiemei Li

- by email at Jiemei.Li@gov.bc.ca
- by mail at: Curriculum and Assessment, PO Box 9183 Stn Prov Govt
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Thank you!

Quick Scale: Numeracy Performance Standards (Grades 7-9)

Task: _____

GRADE _____

Strand	Key concepts required by this task (see IRP p. 16)

	Not Yet Within Expectations	Meets Minimal Expectations	Fully Meets Expectations	Exceeds Expectations
Snapshot	<ul style="list-style-type: none"> Does not meet basic requirements of the task without close, ongoing assistance. No adequate explanation. 	<ul style="list-style-type: none"> Satisfies basic requirements for most parts of the task; some important aspect is flawed or incomplete. Partial explanation. 	<ul style="list-style-type: none"> Satisfies basic requirements for all parts of the task; reaches a reasonable solution. (may be minor flaws.) 	<ul style="list-style-type: none"> Thoroughly satisfies requirements of the task; solution is well-developed and justified; shows insight; often innovative.
Concepts and Connections - recognizes the math; applies appropriate concepts [R] [V] [CN] - explains/demonstrates relevant concepts; makes connections [R]	<ul style="list-style-type: none"> Does not identify or apply concepts and procedures needed Does not show understanding of relevant concepts; explanations are incomplete or illogical 	<ul style="list-style-type: none"> Identifies/applies concepts/procedures needed for most parts of task (may not be best choice) Shows partial understanding of relevant concepts; explanations may be incomplete 	<ul style="list-style-type: none"> Identifies/applies concepts and procedures needed for all parts of task Shows understanding of relevant concepts; explanations are logical and complete 	<ul style="list-style-type: none"> Identifies/ applies a wide range of concepts and procedures including those that have not been recently taught Shows thorough understanding; explanations are insightful
Problem-solving and reasoning -selects and uses appropriate strategies to analyze, solve and create problems [PS] [V] [T] - uses estimation strategies [ME] - verifies and justifies that results are reasonable [R]	<ul style="list-style-type: none"> Does not use appropriate strategies to analyze and solve problems No evidence of estimation strategies (answers are often highly improbable) Does not verify results or solutions 	<ul style="list-style-type: none"> Uses some appropriate strategies to analyze and solve problems Some evidence of estimation; may be somewhat ineffective (some answers reasonable) May verify parts of results/solution; often needs direction 	<ul style="list-style-type: none"> Uses appropriate strategies to analyze and solve problems Uses estimation strategies appropriately; most answers are reasonable Verifies and justifies results or solutions (may be inefficient; imprecise) 	<ul style="list-style-type: none"> Uses highly effective, often innovative, strategies to analyze and solve problems Uses estimation strategies effectively; answers are reasonable (high precision) Verifies and justifies results or solutions efficiently; precise
Procedures - accurate and precise in recording, substitutions, calculations, units, and symbols [C] - fluent; efficient in applying procedures including mental math [ME]	<ul style="list-style-type: none"> Limited accuracy in applying procedures. Inefficient; struggles (e.g., false starts; repeats; little evidence of mental math strategies) 	<ul style="list-style-type: none"> Partially accurate; some errors Inconsistent; fluent with some procedures but inefficient or not demonstrated in others 	<ul style="list-style-type: none"> Generally accurate with some minor errors or omissions Follows most procedures appropriately; uses mental math strategies 	<ul style="list-style-type: none"> Accurate and precise; very few if any minor errors/ omissions Uses range of procedures and mental math strategies fluently and efficiently; may find own 'shortcuts'
Representation and Communication -communicates mathematically including mathematical language [C] -includes appropriate graphics; representations (e.g., charts, tables, graphs, diagrams; sketches) [V]	<ul style="list-style-type: none"> Does not explain procedures and results clearly; key information missing Omits required graphics or representations and/or does not construct them appropriately; many omissions; serious flaws 	<ul style="list-style-type: none"> Partially explains procedures; results; parts are confusing, vague, incomplete Constructs most required graphics; representations; some features are seriously flawed/ incomplete (e.g., not to approximate scale) 	<ul style="list-style-type: none"> Explains results and procedures clearly using some math language Constructs required graphics and/or representations appropriately; may have minor errors or flaws (e.g., missing labels or dimensions) 	<ul style="list-style-type: none"> Explains procedures and results precisely; uses mathematical language Constructs required graphics and/or representations effectively and accurately

Used for major tasks, projects, or ongoing observations.

Numeracy Performance Standards – Grade 7 Task

Dart Board Designs

Context

This task features area of circles, triangles and parallelograms, as well as probability. Students are asked to create a dartboard that satisfies certain criteria.

Prescribed Learning Outcome:

Grade 7

D4 – express probabilities as ratios, fractions, and percents [C, CN, R, T, V]

C2 – develop and apply a formula for determining the area of Triangles Parallelograms Circles [CN, PS, R, V]

C1 – demonstrate an understanding of circles by solving problems involving the radii, diameters, and circumferences of circles [C, CN, R, V]

Process

Before Pose this problem at the end of a unit on measurement (area of circles, triangles and parallelograms).

Make scrap paper, rulers, calculators and grid paper available to students so they can test dartboard ideas.

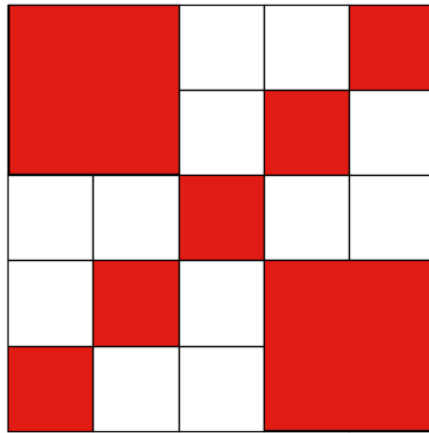
To situate the learning, show students an enlargement of the sample dart board on the student worksheet. Talk about how the probability of having a dart land on a red region was calculated. Have students hypothesize about how the scoring for each region on the sample dartboard might have been calculated.

Make the formula for the area of a circle, a parallelogram and a triangle available to students.

- During** As students create possible dartboard patterns, ask questions about students' strategies. (*How are you sorting out the area of each shape? How does that affect the probability of landing on each region? What points will you assign to each shape?*)
- After** Have students ensure their work is complete, including their calculations for the area of each shape, an explanation of the probability of landing on the red regions and a description of their thinking relative to the scoring for each shape. Encourage students to share their dartboards. Consider posting some of the dartboards on the white board and conducting a probability experiment using magnetic darts!

Dart Board Designs

Here is an unusual dartboard. It measures 50 cm by 50 cm. Each region on the dartboard is a square. If your dart hits a large red square, you get 5 points. If your dart hits a small red square, you get 20 points. The probability of landing on a red region is $\frac{13}{25}$ or 52%. The ratio of white to red is 1 : 1.13.



Over to you!

You must create a dartboard in a similar style.

The rules are:

- Your dartboard can be made of circles, triangles or parallelograms.
- Your inner regions must match the outer shape. That is,
 - Circular regions in a circle-shaped dartboard
 - Triangular regions in a triangle-shaped dartboard
 - Parallelogram-shaped regions in a parallelogram-shaped dartboard.

- You must include at least 5 regions within your dartboard.
- The probability of landing on a red region must be between 30% and 60%.
- The height – or diameter – of your shape is 50 cm.
- Explain how you calculated the probability of landing on a red region. Include your thinking in percentage, fractions and ratios.
- You must assign points for each sized region and explain your reasoning.

Have fun! ☺