

## 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](mailto:Nancy.Walt@gov.bc.ca) or Jiemei Li at [Jiemei.Li@gov.bc.ca](mailto: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](mailto: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](mailto:Jiemei.Li@gov.bc.ca)
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Thank you!

**Quick Scale: Numeracy Performance Standards (Grades 1-3)**

**Task:** \_\_\_\_\_

**Grade** \_\_\_\_\_

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

	<b>Not Yet Within Expectations</b>	<b>Meets Minimal Expectations</b>	<b>Fully Meets Expectations</b>	<b>Exceeds Expectations</b>
<p><b>Snapshot</b>  <i>Note: the snapshot can be used alone as a holistic scale for marking some assignments</i></p>	<p><i>Unable to complete tasks in a reasonable amount of time without one-to-one help. Cannot explain results.</i></p>	<p><i>Completes most parts of basic tasks, but without help, work and explanation are flawed and/or incomplete in important ways.</i></p>	<p><i>Completes all parts of basic tasks; reaches and explains the results. May have minor flaws.</i></p>	<p><i>Completes all parts of basic tasks, including explanations, appropriately, with confidence and ease. Flexible; often innovative.</i></p>
<p><b>Concepts and Connections</b></p> <p>- recognizes/connects mathematics (see relevant and application to problems) [R] [V] [CN]</p> <p>- explains/demonstrates relevant concepts [R]</p>	<ul style="list-style-type: none"> <li>Needs one-to-one support to recognize and connect mathematical concepts/procedures</li> <li>Shows very limited understanding of relevant concepts; does not explain or demonstrate</li> </ul>	<ul style="list-style-type: none"> <li>In simple situations, recognizes/connects concepts/procedures with limited support</li> <li>Shows partial understanding of relevant concepts; explanations/demonstrations may be vague and incomplete</li> </ul>	<ul style="list-style-type: none"> <li>In familiar situations, recognizes/connects concepts and procedures needed for all parts of the task(s)</li> <li>Shows understanding of relevant concepts; explanations are logical and complete</li> </ul>	<ul style="list-style-type: none"> <li>In various contexts, recognizes/connects concepts/procedures needed for all parts of the task</li> <li>Shows thorough understanding of relevant concepts/procedures; explanations/demonstrations are precise and show insight</li> </ul>
<p><b>Problem-solving and reasoning</b></p> <p>-selects and uses appropriate strategies (including visualization; technology) to analyze, solve and create problems [PS] [V]</p> <p>- uses estimation strategies [ME]</p> <p>- verifies and justifies that results are reasonable [R]</p>	<ul style="list-style-type: none"> <li>Does not use appropriate strategies; needs extensive support</li> <li>No evidence of estimation strategies (answers are often highly improbable)</li> <li>Does not verify results or solutions without step-by-step help</li> </ul>	<ul style="list-style-type: none"> <li>Uses some appropriate strategies</li> <li>Some evidence of estimation; somewhat effective (some answers reasonable)</li> <li>Inconsistent in verifying results or solutions (may verify parts; often needs direction)</li> </ul>	<ul style="list-style-type: none"> <li>Uses appropriate strategies</li> <li>Uses estimation strategies appropriately; most answers are reasonable</li> <li>Verifies and justifies results or solutions (may be inefficient; imprecise)</li> </ul>	<ul style="list-style-type: none"> <li>Uses highly effective, and often innovative, strategies</li> <li>Uses effective estimation strategies; answers are reasonable (relatively precise)</li> <li>Verifies and justifies results or solutions with efficiency and precision</li> </ul>
<p><b>Procedures</b></p> <p>- accurate and precise in recording, substitutions, calculations, units, and symbols [C]</p> <p>- fluent; efficient in applying procedures including mental math [ME]</p>	<ul style="list-style-type: none"> <li>Uses procedures with Limited accuracy; major errors or omissions</li> <li>Inefficient; struggles (e.g., false starts; repeats; little evidence of mental math strategies)</li> </ul>	<ul style="list-style-type: none"> <li>Uses some procedures accurately; some errors or omissions</li> <li>Inconsistent; may be fluent with some procedures but inefficient or struggle with others</li> </ul>	<ul style="list-style-type: none"> <li>Uses procedures accurately with some minor errors or omissions</li> <li>Uses most procedures and strategies fluently; self-corrects; may be inefficient with procedures in places</li> </ul>	<ul style="list-style-type: none"> <li>Uses procedures with accuracy and precision; very few if any minor errors/omissions</li> <li>Uses procedures and mental math strategies with ease and efficiency; may find own 'shortcuts'</li> </ul>
<p><b>Representation and Communication</b></p> <p>- represents numbers required by grade level LOs concretely, pictorially, symbolically [C] [V]</p> <p>- communicates mathematically [C]</p>	<ul style="list-style-type: none"> <li>Represents a limited range of numbers; does not use a variety of ways; frequent errors/omissions</li> <li>Unable to explain or demonstrate how to complete the task</li> </ul>	<ul style="list-style-type: none"> <li>Represents most numbers required in some ways; noticeable errors/omissions</li> <li>With prompting, partially explains/demonstrates how to complete task</li> </ul>	<ul style="list-style-type: none"> <li>Represents most numbers required in a variety of ways; some errors or inconsistencies</li> <li>Explains/demonstrates how to complete task (some math'l language)</li> </ul>	<ul style="list-style-type: none"> <li>Represents numbers required in a variety of ways; very few/no errors</li> <li>Clearly explains or demonstrates how to complete task; uses appropriate mathematical language</li> </ul>

Used for major tasks, projects, or ongoing observations.



## Numeracy Performance Standards: Grade 1 Task



### Comparing Cakes

#### Context

The length of a shape describes a one-dimensional attribute, while area describes a two dimensional attribute. Area is the amount of two-dimensional (flat) space that a shape covers or that is required to cover a shape. Because it is often difficult to compare the area of two shapes by placing one on top of the other, students need to learn how to cover each shape with the same unit to decide which of the two shapes covers more area.

As students investigate area, they are learning to visualize and calculate the number of square units that would be needed to completely cover the inside surface of a shape.

The 'Comparing Cakes problem' asks the students to demonstrate their understanding of measurement (area) by filling, covering and making comparisons.

This task should be administered after the students have explored filling, covering and making comparisons of different shapes.

#### Prescribed Learning Outcome:

##### Grade 1

**C1** demonstrate an understanding of measurement as a process of comparing by identifying attributes that can be compared, ordering objects, making statements of comparison filling, covering or matching [C,CN,PS, R,V]

#### Process

Every student should be able to show their understanding of mathematical skills and concepts, and be allowed to represent their (his/her) understanding through concrete materials, pictures, numbers or words. Providing the opportunities for students to show what they know in a way that makes sense to them is a critical component of assessment.

To help address the diversity of learners in your classroom, consider the following before administering the assessment:

- provide manipulatives or other 'thinking tools'
- plan for adjustments of the tasks to meet the need of diverse learners (e.g., individual conferencing may be required to uncover their understanding)
- plan for flexible completion time (e.g., early finishers)
- plan for students who require additional adult support (e.g., students requiring scribing or digital recording)

- consider various methods of administering (e.g., small groups, one to one conferencing etc.)
- consider having more than one than one adult in the classroom during the assessment

Assessing student’s thinking requires presenting questions that prompt and extend their thinking. Students may struggle to solve the problem. It is very important that the teacher allow the student to struggle as they work through the problem.

The teacher’s role is to ask questions that prompt and extend thinking by:

- providing support and guidance
- helping students build on prior knowledge
- scaffold student thinking

Allow time for students to process their thinking.

Thoughtful questions will enable students to communicate their thinking and facilitate their meta-cognition as they work out the problem.

## Before



Read the book “Bigger, Better, Best!” by Stuart J. Murphy. As you read the story, have a volunteer count the number of pieces of paper need to cover the windows and the floor in the illustrations. Explain to the students that the children in the story of finding the area of the windows.

- Ask the students to share what they noticed about how the areas are covered (e.g., that the pieces of paper are the same size).
- Ask the students to compare the area of the shapes.
- Show the students a piece of paper and fold it in half (hamburger folder – short and wide) then cut it.
- Take another piece of paper and fold it the other way (hot dog fold- long and tall) and cut it.
- Ask the students to choose which shape has the largest area.
- Ask the students to explain how we could prove which space is larger.
- Ask for volunteers to help choose units to cover and fill the shapes.
- Brainstorm units (e.g., colour tiles, pattern blocks, stacking counters)

Note: This could be a partner activity.

- Provide pre-cut rectangles (hot dog, hamburger folded & cut) for each pair of students.
- Have the students cover and fill the two shapes and make comparisons.
  - Which has the greatest area? How could you find out?
- Ask students to explain the strategies they used.
- Ask students to share their discoveries.

## During

**NOTE: Teachers may find it beneficial to administer the assessment task to small group of students, rather than the whole class at one time.**

- Explain to the students that they are going to decorate the top of a cake.
- Give each student a piece of 8.5 X 11 paper.
- Ask the students to make one fold on the paper and make one cut to make the shape of their cake.
- Ask the students to fill the cake with unit of some kind of unit.(e.g.,, colour tiles, pattern blocks)

Present the problem to the students.

“Find someone who you think has about the same size cake as yours.  
Whose cake has the least/greatest area? How do you know?”

- Clarify the problem with the students. Make sure that they are clear on the expectations.
- Explain to the students that they can use anything in the classroom to help them find solutions.
- Encourage them to compare their cake with more than one other cake.
- Ask the students to record their solutions on the Student Page. Remind them that they may use pictures, numbers or words to show their thinking.
- As the students finish, have them explain their thinking to you
- **If necessary**, conference with the student and scribe what the student says.
- Refer to the ‘Assessment Rubric’ to guide your inquiries.
- You may need to ask the students prompting questions/statements to help uncover their strategies and thinking processes:
  1. How do you know?
  2. How did you start solving this problem?
  3. Tell me what you are thinking.
  4. Show me what you know.
  5. What do you see in your head?
  6. What questions did you ask yourself?
  7. Why do you think that?
  8. Could there be a different answer?
  9. What strategies did you use to ...?
  10. How does your strategy make sense to you?
  11. What tools help you?

**NOTE: For the fast finishers, they can start decorating the top of their cakes.**

## After

**Conduct a ‘SHOW AND SHARE’ session, encouraging the students to share their strategies/thinking and to explain their reasoning to complete the task.**

- Refer to the ‘Assessment Rubric’ to guide your inquiries.
- Consider the following questions before recording information on the Assessment Rubric:
  1. How well did the student understand the question?
  2. What strategies did the student use to solve the problem?

3. How much support did the student require?
4. How did the student represent and communicate their thinking?
5. How well did the students reason or justify the solution?
6. In what way/s did the student make connections to other mathematical concepts or real life situations?



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Name \_\_\_\_\_



## Comparing Cakes



Record your discoveries from comparing cakes.

Explain how you know which one has the largest area.