

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

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- 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

Number Patterns, Please!

Context

This task features patterns and relations – specifically, the translation of a written pattern into a linear relation and a concrete representation. Students are asked to create a series of different number patterns using the numbers provided. Next, they translate the patterns into linear equations. Students are then asked to create a model for their pattern using materials, pictures and/or a graph.

Prescribed Learning Outcome:

Grade 7

B1 – demonstrate an understanding of oral and written patterns and their equivalent linear relations [C, CN, R]

B6 – model and solve problems that can be represented by one-step linear equations of the form $x + a = b$ concretely, pictorially, and symbolically, where a and b are integers [CN, PS, R, V]

Process

Before

Pose this problem at the end of a unit on patterns and relations.

Make manipulatives available to students so they can model their relations.

To situate the learning, consider creating a simple visual pattern and displaying the first 3 or 4 terms of it for the students. Ask students to describe the pattern and the rate of growth, and to make a generalization that is true for any term in the pattern. Explain that these skills will be among those used to solve the next problem.

During

Encourage students to list as many different patterns as they can for the given numbers. Invite students to include the most unusual patterns they can think of, and to include a description of the pattern.

As students build or create a visual image to match their number pattern and linear equation, ask questions about students' strategies. (*How are you figuring out what parts of your design will change? What is the hardest part? What's the easiest? How do you know that your design matches the linear equation you have recorded?*)

After

Have students ensure their work is complete, including a description of the parts of their design that change and those that remain the same.

Name _____

Number Patterns, Please!

There are at least 5 numbers in a number pattern.

12 and 48 are in the pattern.

What might the pattern be?

How many ways can you find?



Pick at least three of your patterns.

What expression would a mathematician write to match each one of them?

Now pick just one of your linear equations.

Create a visual representation of the pattern using materials or drawings.

How does your model show the change over time?

Include all your thinking and calculations.

Visual representation of the pattern

