

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 anticipate having a minimum of two tasks/student sample sets – and at least one of these will feature **number**)

Field-testing Procedures

Some tasks and samples have been developed as prototypes for field-testing. The prototypes start to show what the final product will look like. These tasks and student samples may or may not be selected for the final version of the standards. It is critical that these prototypes be field-tested by students and teachers.

We currently have prototypes available for Grades 1 to 9. Prototypes for Grades 10 to 12 will be forthcoming.

Each prototype includes:

- (1) Quick Scale
 - (2) Designation of the key concepts involved
 - (3) Task description
 - (4) One sample at each of the four levels of performance
 - (5) The teacher's observations for each sample
 - (6) The small 'logo' form of the scale showing which level(s) each aspect was rated as.
- We need teachers and students to try the prototype tasks. For example, using one of the tasks with a class; then using the scale and samples to try to assess the results gives the best possible insight into how they are working. Another example is that a group of teachers get together to work through the prototype at their grade level as a form of Pro-D.

Numeracy Performance Standards, Grade 2 Prototype

- Provide specific, concrete feedback. For example, if you don't agree with the placement of a sample, please be as specific as possible about why and where you think it should be rated. Use the attached *Prototype Feedback Questions* to provide focused feedback.
- Send your comments and any additional student exemplars from your field testing to the Ministry. We'd like to hear from you by **September 30, 2011**.
- These prototypes are being circulated as widely as possible, so please feel free to share them with others.

What's Next?

- We will be working on similar prototypes for grades 10, 11 and 12 and would welcome any contributions.
- We need to keep adding to the task/sample sets for Grades 1 to 9. We aim to have two sets per grade for the published materials eventually. We would welcome task/sample sets, especially in patterns and relations, shape and space, statistics and uncertainty.
- If you have something suitable, please either post it on the Moodle site at <http://www.learnnowbc.ca/educators/default.aspx>, or contact Jiemei Li at Jiemei.Li@gov.bc.ca or Nancy Walt at Nancy.Walt@gov.bc.ca

Numeracy Performance Standards, Grade 2 Prototype

Numeracy Performance Standards Revision

Prototype 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. Are the rating scales easy to apply to samples of student work? What improvements are needed?
3. Is the task grade/age-appropriate? Provide your opinion and comments.
4. What suggestions do you have for improving the student samples in the prototype? Do you agree with the rating? If not, what is the rating and rationale for the rating?
5. Would you suggest other samples that better exemplify the performance levels?
6. Are these materials helpful to discuss with students and parents? In what ways?
7. Would you like to contribute new tasks/samples?

Please send your comments and materials by **September 30, 2011** to Jiemei Li

- by email at Jiemei.Li@gov.bc.ca
- by mail at: Student Assessment Branch, PO Box 9143 Stn Prov Govt
Victoria, BC V8W 9H1

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

Thank you!

Numeracy Performance Standards, Grade 2 Prototype

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

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

Used for major tasks, projects, or ongoing observations.

The Wolf's Chicken Stew

Context

Where's the Math?

The "Ways to Make" problem helps to reveal the students' understanding of part-part-whole relationships. Thinking about a number in terms of its parts is an important milestone in the development of early number sense.

The ability to think of numbers in terms of part-whole relationships is one of many landmarks in developing more complex understanding about number. Understanding that a quantity can be decomposed into different size parts is fundamental to grasping the concepts of place value. The ability to deal with part-whole relationships allows student to go beyond simple counting to solve problems. Part-part-whole relationships are also an important bridge to addition, subtraction and fraction concepts.

This type of problem requires that the students use strategies for generating, recording, and organizing part-part combinations for the whole number. Some of the students may generate possibilities through trial and error, whereas some students will begin to notice patterns and relationships.

Grade

2

Prescribed Learning Outcomes

A4 represent and describe numbers to 100, concretely, pictorially, and symbolically [C, CN, V]

A5 compare and order numbers up to 100 [C, CN, R, V]

Process

{Explain the process used to conduct the gathering of the student samples. This includes directions and other information that would help other teachers repeat the process.}

Before

- Read the story *The Wolf's Chicken Stew* by Keiko Kasza (or a book that focuses on the quantity of 100).
- Ask the students to predict what will happen next at various part of the story.
- Discuss the page in the book where all the chicks are giving him 100 kisses.
- Ask: How many chicks are on the wolf? How many are flying around? How many are on the ground?
- Have the students create equations that represent the 3 quantities and equal the total 100 (i.e. $12 + 8 + 80 = 100$)
- Ask for volunteers to explain their thinking.

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

Numeracy Performance Standards, Grade 2 Prototype

During

Present the problem to the students:

"The wolf wanted to make 100 cookies for the chicks. He made chocolate chip, peanut butter, and raisin oatmeal cookies. He made more chocolate chip than any other cookie. The quantity of each type of cookie he made was not the same. How many of each type of cookie did he bake to make a total of 100 cookies? Can you solve it another way?"

- Clarify the meaning of the problem and any questions the student may have.
 - Explain to the students that they can use anything in the classroom to help them find solutions (i.e. manipulatives, ten frames, hundreds charts)..
 - Encourage them to find as many possible combinations.
 - 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 finding solutions, ask them to explain their thinking on the Student page. **If necessary**, conference with some students to get a clear picture of the student's thoughts and strategies.
 - 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?

After

Conduct a 'SHOW AND SHARE' sessions, 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 about 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?
- In what way/s did the student make connections to other mathematical concepts

Numeracy Performance Standards, Grade 2 Prototype

Final Grade 2 Problem Solving Assessment



The wolf wanted to make 100 cookies for the chicks.
He made chocolate chip, peanut butter, and raisin oatmeal cookies.
He made more chocolate chip than any other cookie.
The quantity of each type of cookie he made was not the same.
How many of each type of cookie did he bake to make a total of 100 cookies? Can you solve it another way?



Numeracy Performance Standards, Grade 2 Prototype

NOT YET WITHIN EXPECTATIONS

Teacher's Observations

The student did not recognize the concepts required.

- Does not connect mathematical concepts and procedures
- Does not use appropriate strategies
- Adds 100+100 accurately but this is not relevant to the task.
- Unable to offer an explanation that involves mathematics.

	NYM	MM	FM	Ex
OVERALL				
Snapshot				
Concepts				
Connections				
Prob-Solving				
Reasoning				
Procedures				
Represent'n				
Commun				

Grade 2 Problem Solving Assessment - Final

The wolf wanted to make 100 cookies for the chicks. He made chocolate chip, peanut butter, and raisin oatmeal cookies. He made more chocolate chip than any other cookie. The quantity of each type of cookie he made was not the same. How many of each type of cookie did he bake to make a total of 100 cookies? Can you solve it another way?

they sed thank you ucle wolf
 your + he best + cooker.
 he made choclate chip cookies.

$$\begin{array}{r}
 + 100 \\
 100 \\
 \hline
 200
 \end{array}$$

Numeracy Performance Standards, Grade 2 Prototype

MEETS EXPECTATIONS (MINIMAL LEVEL)

Teacher's Observations

The student needed support and prompting to recognize the requirements of the task.

- Recognizes concepts needed with limited support
- Uses some appropriate strategies (counted by 10's using 100 chart) but did not complete all parts of the task without ongoing support
- Uses procedures accurately
- Explains results with prompting

	NYM	MM	FM	Ex
OVERALL				
Snapshot				
Concepts				
Connections				
Prob-Solving				
Reasoning				
Procedures				
Represent'n				
Commun				

Final Grade 2 Problem Solving Assessment



The wolf wanted to make 100 cookies for the chicks.
 He made chocolate chip, peanut butter, and raisin oatmeal cookies.
 He made more chocolate chip than any other cookie.
 The quantity of each type of cookie he made was not the same.
 How many of each type of cookie did he bake to make a total of 100 cookies? Can you solve it another way?

I pointed
1/10 out
I counted
by 10's using
a 100
chart.

10 chocolate chip cookies +
 30 peanut butter cookies +
 60 raisin oatmeal cookies =
 100.

With support, he said
 he could switch 10 and 60

~~50~~ chocolate chip cookies + 20 peanut butter
 cookies + 10 oatmeal = 100

50 chocolate chip + 20 peanut butter + 30
 oatmeal = 100

I put 50 choc. chip + 20 pb + 30 oatmeal = 100
 I used my number chart. I first
~~went~~ went to 50 then added 20 more
 then added 30.

Numeracy Performance Standards, Grade 2 Prototype

FULLY MEETS EXPECTATIONS

Teacher's Observations

The student completed all parts of the task, with one minor flaw.

- Shows understanding of relevant concepts; gave a logical oral explanation.
- Uses appropriate strategies, including 100 chart.
- Minor error in procedures
- Clearly explains how to do the task.

	NYM	MM	FM	Ex
OVERALL				
Snapshot				
Concepts				
Connections				
Prob-Solving Reasoning				
Procedures				
Represent'n Commun				

Final Grade 2 Problem Solving Assessment



The wolf wanted to make 100 cookies for the chicks.
 He made chocolate chip, peanut butter, and raisin oatmeal cookies.
 He made more chocolate chip than any other cookie.
 The quantity of each type of cookie he made was not the same.
 How many of each type of cookie did he bake to make a total of 100 cookies? Can you solve it another way?

$$88 + 11 + 10 = 100 \text{) incorrect}$$

$$21 + 19 + 60 = 100 \checkmark$$

$$10 + 40 + 50 = 100 \checkmark$$

I chose ten and forty, to make 50 and another 50 to make 100. Because my friends always do 50+50 to do 100 so I figured I could do the same 50 chocolate chip, 10 oatmeal rasin + 40 peanut butter

I figured $20 + 20 = 40$, then I counted by tens to 100 it counted to 60. 60 chocolate chips, I realized there can't be 2 - 20's - so I added one more to 20 and took one away from 20 = 19 and total is 100. 19 oatmeal rasin, 21 peanut butter.

Numeracy Performance Standards, Grade 2 Prototype

EXCEEDS EXPECTATIONS

Teacher's Observations

The student completed the task with confidence and ease, finding several different ways to solve the problem. She explained her strategies in an interview.

- Shows thorough understanding of relevant concepts.
- Uses highly effective strategies
- Uses procedures with accuracy and precision
- She gave a clear and thorough oral explanation.

	NYM	MM	FM	Ex
OVERALL				
Snapshot				
Concepts				
Connections				
Prob-Solving				
Reasoning				
Procedures				
Represent'n				
Commun				

Final Grade 2 Problem Solving Assessment



The wolf wanted to make 100 cookies for the chicks. He made chocolate chip, peanut butter, and raisin oatmeal cookies. He made more chocolate chip than any other cookie. The quantity of each type of cookie he made was not the same. How many of each type of cookie did he bake to make a total of 100 cookies? Can you solve it another way?

I took 37 pastos and then I took 40 and then I counted what was left

$$37 + 40 + 23 = 100 \checkmark$$
 peanut butter oatmeal

$$34 + 52 + 16 = 100 \checkmark$$

$$26 + 53 + 24 = 100$$

$$9 + 67 + 24 = 100 \checkmark$$

$$95 + 2 + 3 = 100 \checkmark$$

$$89 + 6 + 5 = 100 \checkmark$$

$$86 + 6 + 8 = 100 \checkmark$$

$$80 + 12 + 8 = 100 \checkmark$$

$$75 + 12 + 13 \checkmark$$

This is chocolate chip because it's the highest

I used pasta
 I took out 95.
 $2 + 3 = 5$. $95 + 5 = 100$