

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

Numeracy Performance Standards, Grade 5 Prototype

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.

- 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

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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!

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Quick Scale: Numeracy Performance Standards (Grades 4-6)

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(s) without close, ongoing assistance. Usually unable to explain result. 	<ul style="list-style-type: none"> Satisfies basic requirements for most parts of the task, but some important aspect is flawed or incomplete. Partial explanation. 	<ul style="list-style-type: none"> Satisfies basic requirements for all parts of the task(s); reaches and explains reasonable solution(s). (may be minor flaws) 	<ul style="list-style-type: none"> Thoroughly satisfies requirements of all parts of the task; solution is well-developed and justified; often insightful or 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 recognize or apply basic concepts needed for the task(s) Shows little understanding of relevant concepts; explanations are incomplete or illogical 	<ul style="list-style-type: none"> Recognizes/applies concepts needed for most parts of the task(s) (may not be best choice) Shows partial understanding of relevant concepts; explanations may be vague; partially incomplete 	<ul style="list-style-type: none"> Recognizes/applies concepts needed for all parts of the task(s) Shows understanding of relevant concepts; explanations are logical and complete 	<ul style="list-style-type: none"> Recognizes/applies a wide range of concepts including those that have not been recently taught; may offer alternatives Shows thorough understanding; explanations are insightful;
Problem-solving and reasoning -selects and uses appropriate strategies to analyze, solve and create problems [PS] [V] [T] - flexible; perseveres - uses estimation strategies [ME] - verifies and justifies that results are reasonable [R]	<ul style="list-style-type: none"> Does not use appropriate strategies; requires extensive support No flexibility; does not persevere to a solution Does not verify or justify Unable to use estimation strategies (answers are often highly improbable) 	<ul style="list-style-type: none"> Uses some appropriate strategies if problem appears familiar; may need some help Limited flexibility and perseverance Needs help to verify or justify; inconsistent Some evidence of estimation; (some answers reasonable) 	<ul style="list-style-type: none"> Uses appropriate strategies Shows some flexibility; in most cases, perseveres to find a solution With prompting, verifies and justifies Uses estimation strategies appropriately; most answers are reasonable 	<ul style="list-style-type: none"> Uses appropriate strategies; often innovative; may add some complexity Shows flexibility; perseverance to find a solution Verifies; justifies Uses effective estimation strategies; answers are reasonable (relatively 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"> Follows 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"> Follows procedures with partial accuracy; some errors or omissions Inconsistent; may be fluent with some procedures but inefficient or not demonstrated in others 	<ul style="list-style-type: none"> Follows procedures accurately with some minor errors or omissions Uses most procedures and mental math strategies fluently; may be inefficient 	<ul style="list-style-type: none"> Follows procedures with accuracy and precision; very few if any minor errors/omissions Uses 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 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; parts are seriously flawed/ incomplete (e.g., scale inappropriate) 	<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) 	<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.

Grade 5 Family Night (number)

CONTEXT

This activity was part of a district assessment of numeracy conducted part way through the year in grade 5. Teachers had recently emphasized the importance of mathematical communication.

KEY CONCEPTS

- Estimation strategies for problem solving
- Addition and subtraction of decimals
- Numbers in-depth (cumulative from earlier grades)

PROCESS

The teacher directed students to read the task, and then spend 5 minutes discussing the problem in groups. The group discussion was intended to ensure that all students understood the question, and began to formulate some strategies. Students were not permitted to write anything down during the discussion.

When they returned to their desks, they were asked to:

- describe how they were going to start solving the problem
- do their rough work on a designated page where they could cross out work if they wanted, but they were not to erase anything
- in an organized way, present and explain the computations that led to their solution
- in sentences, explain and justify their final choice by giving specific details and showing that their solution satisfied all conditions in the original task

Students had approximately 60 minutes to complete the task.

Grade 5 Numeracy Task – Grade 5 Family Night

You are on the Grade 5 Family Night planning committee. Your committee has to come up with two possible plans for Family Night. Your goal is to design a plan that is enjoyable for all of the partygoers (even your parents). You must present both of your plans to the Grade 5 students and the PAC and justify why you would choose one plan over the other.

You have been given \$550 from the PAC and an additional \$4.50 per person for tickets. The tickets were pre-sold and 101 tickets were purchased.

You must choose an option from each of the three categories (food, entertainment, and decorations). If you have money left over you may choose from the optional items.

Food	Entertainment	Decorations	Optional Items
Catered Dinner: \$7.75 per person	Live Band: \$500	Streamers, Confetti, Helium Balloons, and	Karaoke machine rental: \$150
Appetizers/Snacks: \$ 3.50 per person	D.J.: \$400	Table Decorations: \$120	Dance Revolution Rental: \$120
Pot Luck: \$1.25 per person (dish rental)	School Stereo: \$0	Made Decorations: \$25	Light Show and Disco Ball: \$100
		Dollar Store Balloons and Streamers: \$25	

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NOT YET WITHIN EXPECTATIONS

Teacher's Observations

The student chooses appropriate strategies for a small part of the task, but omits major aspects and does not complete basic requirements of the task (developing and comparing two options.)

- Does not apply basic concepts (no comparison)
- Uses some appropriate strategies
- Does not persevere to a solution
- Major omissions
- Does not explain procedures and results clearly

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

"ROUGH" WORK SPACE – This is a place for you to do your rough work. Do not erase anything. If you are unhappy with something cross it out. TRY TO BE ORGANIZED!

Things	Money (\$)
pot luck	126.75
live band	150.00
streamers, coh...	120
karaoke	150
fish & show...	100
total 996.25	

HOW ARE YOU GOING TO GET STARTED TO SOLVE THE PROBLEM?
~~It will use almost all the money.~~

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"GOOD" WORK SPACE - This is a space for you to show your work for your answer. In an organized fashion present and explain the computations that led to your solution. The person assessing your work should be able to understand what you have done by looking at this - so make sure you are communicating clearly.

things	money (\$)
Pot Luck	126.25
live band	500
streamers, con.	120
Karaoke	150
light show	100
total	996.25

SOLUTION SPACE - In complete sentences answer the original task question(s). Explain and justify your final choice by giving specific details. Show that your solution will satisfy ALL of the conditions listed in the original task.

I think it is the best choice
that I did.

Numeracy Performance Standards, Grade 5 Prototype

MEETS EXPECTATIONS (MINIMAL LEVEL)

Teacher's Observations

The student satisfies basic requirements for most parts of the task, but does not apply procedures accurately, or clearly explain mathematical concepts involved.

- Recognizes concepts needed for most parts of the task
- Uses some appropriate strategies (working backwards by subtracting)
- Does not use estimation strategies (no checking/verification)
- Limited accuracy
- Partially explains results

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

"ROUGH" WORK SPACE – This is a place for you to do your rough work. Do not erase anything. If you are unhappy with something cross it out. TRY TO BE ORGANIZED!

~~550~~ \$ 454,50
 +
 1004,50
 total
 620 total
 For Food
 entertainment act,

HOW ARE YOU GOING TO GET STARTED TO SOLVE THE PROBLEM?
 I am going to figure out my money total.
 Also I will plan out a budget.

Numeracy Performance Standards, Grade 5 Prototype

“GOOD” WORK SPACE - This is a space for you to show your work for your answer. In an organized fashion present and explain the computations that led to your solution. The person assessing your work should be able to understand what you have done by looking at this - so make sure you are communicating clearly.

$$\begin{array}{r} \text{Total} \\ \$1004.50 \\ - \cancel{620.00} \\ \hline 384.50 \\ - 3.50 \\ \hline 381.00 \end{array}$$

money spent on

- APPITISERS
- DJ
- Table decorations
- light show / disc ball

$$\begin{array}{r} \text{money left} \\ 381.00 \end{array}$$

second Plan

$$\begin{array}{r} \text{Total} \\ \$1004.50 \\ - \cancel{645.00} \\ \hline 359.50 \end{array}$$

Wrong

$$\begin{array}{r} \text{LCFT with} \\ 487.50 \end{array}$$

SOLUTION SPACE - In complete sentences answer the original task question(s). Explain and justify your final choice by giving specific details. Show that your solution will satisfy ALL of the conditions listed in the original task.

My total amount was \$1004.50. I finished buying and was left with \$381.00, ~~not~~ or my other plan which I was left with 359.50.

I think The second plan beacaus, It has live band a catend diner! Also it has made decorations. mo: all I like the disc ball too. I think we all will t a great family night!

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FULLY MEETS EXPECTATIONS

Teacher's Observations

The student satisfies basic requirements for all parts of the task, reaching and explaining a reasonable solution. However, there is a major error; the student does not include the money from the ticket sales.

- Shows understanding of relevant concepts; explanation is logical and complete.
- Uses appropriate strategies
- One major error in procedures: does not include ticket sales
- Work is clearly organized and complete; explains procedures and results clearly

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

-I would solve the problem by seeing how much money I have all together
 -By seeing what things people would like

"ROUGH" WORK SPACE – This is a place for you to do your rough work. Do not erase anything. If you are unhappy with something cross it out. **TRY TO BE ORGANIZED!**

~~550.00~~ 7.50
~~150~~ × 101
~~151.50~~
 550.00
 \$104.50 all together
 -154.50
 \$558.00 to spend

550.00
 -126.25 on food
 \$423.75 left
 - 0.00 on entertainment
 \$423.75 left

Plan A:

Dinner:	Entertainment:	Decorations:	Optional:
Petrich #1.25 per person - 1.25 × 101 \$126.25 spent	School stereo #0 101 101 spent	Streamers, confetti, Helium balloons, and Table decorations #125 24.15 48.75 -125.00 \$218.75 left	Karaoke machine Rental #100 & Dance Floor Rental #120 298.75 -150.00 \$148.75 left -120.00 \$28.75 left

Plan B:

Dinner	Entertainment	Decorations	Optional
Appetizer/snack 3.50 per person 3.50 550.00 × 101 - 353.50 196.50 \$553.50 left	School stereo #0 196.00 - 0.00 on entertainment \$196.00 left	Table decorations = 25 \$96 -75 spent \$21 left	Lightshow & disco ball #100 \$171.00 -100.00 \$71.00 left

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“GOOD” WORK SPACE - This is a space for you to show your work for your answer. In an organized fashion present and explain the computations that led to your solution. The person assessing your work should be able to understand what you have done by looking at this – so make sure you are communicating clearly.

First plan:

For dinner:

- A potluck \$1.25 per person
- $1.25 \times 101 = \$126.25$ left from \$500.
- $\$423.75$ left

For Entertainment:

- Borrow the school stereo \$0
- \$0 spent from \$423.75
- \$423.75 left

For Decorations:

- streamers, confetti, helium balloons,
- table decorations \$125
- $35.75 + 125.00 = 298.00$ left from \$423.75
- \$98.75 left

Optional:

- arcade machine & Dance Revolution Rental -
- 70 total
- $298.75 + 210.00 = 28.75$ left

Second plan:

For dinner:

- Appetizers/snacks \$3.50 per person
- $3.50 \times 101 = 353.50$ spent from \$500
- \$196.00 left

For Entertainment:

- Borrow school stereo \$0
- \$0 spent from \$196.00
- \$196.00 left

For Decorations:

- Made decorations \$25
- $196.00 - 25 = 171.00$ left from \$196.00.
- \$171.00 left

Optional:

- lightshow and Disco ball \$100
- $171.00 - 100 = 71$ left from \$171.00
- \$71.00 left

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From my 2 plans, I like plan A. I like plan A because if there is a potluck dinner, there would be lots of different things to eat. I also like plan A because if there is a Karaoke and dancing, people can do different things depending on what people like to do.

I would present my plans to the Pac and Grade 5's by making a poster to show all of the information.

Numeracy Performance Standards, Grade 5 Prototype

EXCEEDS EXPECTATIONS

Teacher's Observations

The student thoroughly satisfies requirements for all parts of the task, using effective strategies and procedures.

- Shows understanding of relevant concepts; explanation is logical and complete.
- Uses appropriate strategies
- Uses effective estimation strategies
- Verifies (note that calculation error in rough work is corrected in final work)
- Accurate and precise
- Presents results and procedures clearly.
- Provides appropriate representation (minor flaw—total costs would be better represented as a third column in the table.)

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

HOW ARE YOU GOING TO GET STARTED TO SOLVE THE PROBLEM?

I'm going to find out exactly how much money I have to buy the things we're going to use. Then I will choose my ideas and show them in a list.

"ROUGH" WORK SPACE – This is a place for you to do your rough work. Do not erase anything. If you are unhappy with something cross it out. **TRY TO BE ORGANIZED!**

$$\begin{array}{r} \$4.50 \\ \times 101 \\ \hline \$454.50 \end{array}$$

$$\begin{array}{r} \$550.00 \\ + 454.50 \\ \hline 1004.50 \end{array}$$
 I have \$1004.50 to spend.

Item #1

Appetizers/snacks $\begin{array}{r} \$3.50 \\ \times 101 \\ \hline \$353.50 \end{array}$ in total

D.S. \$400

streamer, confetti, balloons + table decorations \$120

$$\begin{array}{r} 350.50 \\ 400.00 \\ + 120.00 \\ \hline 870.50 \\ + 100.00 \\ \hline \$970.50 \end{array}$$
 Light show or disco ball \$100

Total \$970.50

Item #2

Catered Dinner \$7.75

$$\begin{array}{r} \$7.75 \\ \times 101 \\ \hline \$782.75 \end{array}$$

School stereo \$0

Made decorations \$75

$$\begin{array}{r} \$782.75 \\ + 25.00 \\ \hline \$807.75 \\ + 150.00 \\ \hline \$957.75 \end{array}$$
 Karaoke Machine \$150

Total 957.

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“GOOD” WORK SPACE - This is a space for you to show your work for your answer. In an organized fashion present and explain the computations that led to your solution. The person assessing your work should be able to understand what you have done by looking at this – so make sure you are communicating clearly.

an #1

Total to spend = \$1004.50

Category	Option	Total Cost
Food	Appetizer/snaks	\$ 3.50 per person x 100 \$350.00
Entertainment	DJ.	400.00
Decorations	Streamers, confetti, balloons, table decorations	120.00
Optional	Light show	100.00
		\$973.50

an #2

Category	Option	Total cost
Food	Catered Dinner	\$7.75 per person x 101 782.75
Entertainment	School Stereo (B)	15.00
Decorations	Made decorations	150.00
Optional	Karaoke Machine	957.75

\$957.75

SOLUTION SPACE – In complete sentences answer the original task question(s). Explain and justify your final choice by giving specific details. Show that your solution will satisfy ALL of the conditions listed in the original task.

My two plans both were in the right price zone but I think plan 1 is the best one to use. I think this because a DJ. is a cool way to have music. also a disco ball would be really cool to watch. I think that the decorations wald really be a fun thing to have. Even though plan 2 has a catered dinner appetizer's and snacks are good to have because you can choose what you want and you can try new foods. I think kids and parent would enjoy it.