



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 7 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 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.

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Sell off!

Context:	This task deals with sales and discounts. It involves operations with decimal numbers and calculations of tax and sale price. It asks students to examine different offers and to pick one that results in the greatest discount, giving their reasoning for their decision. They are asked to compare pricing for several items and to consider the impact of the offers. It poses a challenge problem to extend the learning. Numbers in the problem have been chosen so that students will not need to use a calculator.
Grade:	7
PLO's:	A2 - Demonstrate an understanding of the addition, subtraction, multiplication, and division of decimals (for more than 1-digit divisors or 2-digit multipliers, the use of technology is expected) to solve problems [ME, PS, T] A3 - Solve problems involving percents from 1% to 100% [C, CN, PS, R, T]
Process:	
Before	Pose the following problem at the end of a unit involving percentages and operations with decimals. To situate the learning, you might want to generate a list of promotional offers that students have encountered in the past.
During	Encourage students to include all their thinking and all their calculations. It is important that students record their strategies for solving the problems and comparing the results. Calculators are not allowed for this task.
After	Have students ensure their work is complete, including numbers, words and any diagrams or tables that may help to illustrate how they solved the problem(s).

Numeracy Performance Standards, Grade 7 Prototype

Sell off!

Your school's Student Council is selling hoodies, t-shirts and toques with the school logo as a fundraiser.

The Student Council is offering several discounts to get people to buy. If **you buy any 2 different items**, which of the following is a better deal? How do you know? How much do you save with each offer?

What's the most you can save? What's the least?

Prices:

	 Fresh Promotions	
Hoodies are \$25.	T-shirts are \$15.	Toques are \$10.

Promotions

OFFER 1:	Buy one, get one, half price. (The second item must be of lesser value.)
OFFER 2:	15% off any order.
OFFER 3:	Buy a Student Savings card for \$10, save 40% the total clothing order.

Bonus savings time!

Numeracy Performance Standards, Grade 7 Prototype

As a special bonus, today the Student Council is offering an additional 10% off the total cost of your order!

You also have to pay 5% sales tax.

Which would you rather have calculated first – the sales tax or the discount?

Why?

Show all your work and explain your reasoning.

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NOT YET WITHIN EXPECTATIONS

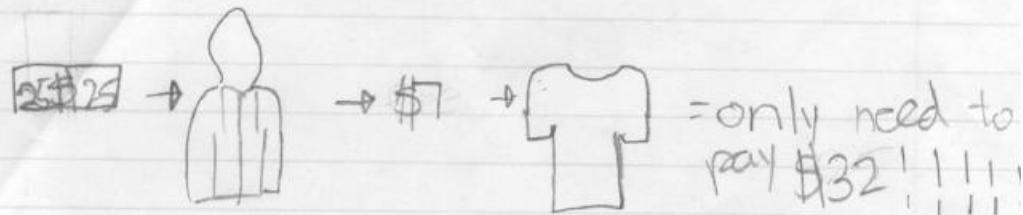
Teacher's Observations

	NYM	MM	FM	Ex
OVERALL Snapshot				
Concepts Connections				
Prob-Solving Reasoning				
Procedures				
Representation Commun				

- Does not meet basic requirements of the task.
- Does not apply concepts and procedures needed
- Does not use appropriate strategies
- Does not explain procedures and results clearly; key information is missing

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Offer 1 has a better deal I think because you buy a shirt and you get one. You buy a hoodie for \$32 and you get another one for ~~free~~ free but you can't get a hoodie any more then get a T-shirt wear a t-shirt inside and outside it's a hoodie if you just wear a hoodie you will freeze. If you pick the first one you only need to pay 32 bucks.



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MEETS EXPECTATIONS (MINIMAL LEVEL)

Teacher's Observations

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

- Satisfies basic requirements for parts of the task; one important aspect is missing.
- Shows partial understanding of relevant concepts.
- Uses some appropriate strategies.
- Verifies some results
- Partially explains procedures/results.

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Offer 1:

$$\begin{aligned} \text{T-shirts} &= \$15 \\ \text{Toques} &= \$10 = 50\% \text{ off} = \$5 \\ &= \$20 \end{aligned}$$

Offer 2:

$$\begin{array}{rcl} \text{T-shirt} &= \$15 = 15\% \text{ off} = \$12.75 & 85^{\circ} \\ \text{Toques} &= \$10 & \times 15 \\ & & 425 \\ \begin{array}{r} 12.75 \\ +10.00 \\ \hline \$22.75 \end{array} & & \begin{array}{r} 1.85 \\ 12.75 \end{array} \end{array}$$

$$= \$22.75$$

Offer 3:

$$\begin{array}{rcl} \text{T-shirt} &= \$15 & 25 \\ \text{Toque} &= \$10 & \times 360 \\ & & 15.00 \\ & & +1000 \\ = \$25.00 & & 25.00 \end{array}$$

$$\text{Offer 1} = \text{saved } \$5$$

$$\text{Offer 2} = \text{saved } \$2.25$$

$$\text{Offer 3} = \text{saved } \$0$$

Numeracy Performance Standards, Grade 7 Prototype

FULLY MEETS EXPECTATIONS

Teacher's Observations

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

- Satisfies requirements for all parts of the task; reaches and explains a reasonable solution
- Applies concepts and procedures needed
- Explanations are logical and complete
- Generally accurate (one recording error)
- Explains results clearly

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BC.15

Sell off!

T-shirts and Toques

OFFER 1: \$20
OFFER 2: \$22.75
OFFER 3: \$25

The offer 1 is the best deal. I know because I calculated all of the deals. You save \$5 with offer 1, \$2.25 with offer 2 and \$0 with offer 3. The most you can save is \$5. The least is \$0.

BONUS SAVINGS TIME!
Offer 1: \$18.90

The sales tax because then I could just easily minus the discount

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EXCEEDS EXPECTATIONS

Teacher's Observations

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

- Thoroughly satisfies all requirements
- Shows thorough understanding; explanation shows insight re: order in which discount and tax are calculated
- Accurate and precise
- Explains results and procedures clearly

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T-shirts & Toques

$$\#1 \quad 15 + 10 \div 2 = 20$$

$$\#2 \quad 15 \times \frac{10}{20} = \frac{9}{4} \$2.25 \quad 15 - 2.25 = \$12.75$$

$$10 \times \frac{10}{20} = \frac{3}{2} = \$1.50 \quad 10 - 1.5 = \$8.50$$

$$8.50 + 12.75 = \$21.25$$

$$\#3 \quad 15 + 10 = 25 \times \frac{9}{20} = \$10 \quad 15 + 10 = \$25 \quad 25 - 10 = \$15 \quad 15 + 10 = \$25$$

$$15 + 10 = 25$$

$$\#1 \quad 25 - 20 = \$5 \text{ save } \$5$$

$$\#2 \quad 25 - 21.25 = \$3.75 \text{ save } \$3.75$$

$$\#3 \quad 25 - 25 = \$0 \text{ save } \$0$$

#1 is a better deal. The most could save \$5 the least is \$0.

Bonus Savings

$$\text{time } \#1 \quad \$20 \times \frac{10}{100} = \$2 \quad 20 - 2 = \$18 \quad 18 \times \frac{1}{10} = \frac{9}{10} = \$0.90$$

$$18 + 0.90 = \$18.90 \text{ total}$$

(discount first)

$$\$20 \times \frac{1}{10} = \$2 \quad \$20 + 1 = \$21 \quad 21 \times \frac{10}{100} = \frac{21}{10} = \$2.10$$

$$21 - 2.10 = \$18.90 \text{ (tax first)}$$

\$18.90 (discount first) and \$18.90 (tax first) have the same price, but usually we calculate discount first at sales.