Math Lesson – The Food Bank

Outcomes or Learning Goals

The story *The Food Bank* invites students to think about how a food bank can support families in need by supplying food when needed. The related math problems address operational sense involving money, as well as the use of proportional reasoning.

Grade Level

MAT1LZ – Locally Developed Math grade 9
MAT2LZ – Locally Developed Math grade 10

Context & Rationale

The story *The Food Bank* explains how food banks support families in need, and compares a food bank to a bank in that food banks house food until families go in to withdraw the food needed. Many different families in a community use a food bank, not just new Canadians. The context also provides an opportunity for students to consider the benefits of engaging in volunteer work.

Related Topics/Units

- interpret, write and round decimal numbers with understanding in everyday money situations (Gr. 9)
- solve problems drawn from everyday situations involving money, demonstrating skill and understanding of the use of decimal numbers (Gr. 10)
- communicate information about money concepts/sense (Gr. 9, 10)
- write money values, using correct units (Gr. 9)
- enter decimal numbers correctly on a numerical key pad and read and interpret decimal numbers correctly from a display (Gr. 9)
- demonstrate the effective use of a calculator in operations with decimals (Gr. 9, 10)
- judge the reasonableness of calculations involving decimals, through estimation using mental mathematics, where appropriate (Gr. 9)
- verbalize their observations and reflections regarding money sense and ask questions to clarify their understanding (Gr. 9, 10)
- communicate, orally and in writing, the solutions to money problems and the results of investigations, using appropriate terminology, symbols and form (Gr. 9, 10)
- explain their reasoning used in problem solving and in judging reasonableness (Gr. 9, 10)
- develop, select, and apply problem-solving strategies while posing and solving problems (Gr. 9)
- solve problems drawn from everyday situations involving percent, ratio, and rate (Gr. 9, 10)
- communicate information about proportional reasoning (Gr. 9)
- round decimal values appropriately within a given context (Gr. 9, 10)
- calculate rates in activities drawn from their experiences (Gr. 9)
- solve problems involving rates (Gr. 9, 10)
- calculate and compare the unit costs of items found in everyday situations (Gr. 9, 10)

• communicate, orally and in writing, the solutions to proportional reasoning problems and the results of investigations, using appropriate terminology, symbols and form (Gr. 9)

Number Sense and Numeration Skills from the Ontario Mathematics Curriculum, Grades 1-8 (2005), that link well to this lesson and would support the needs of limited prior formal learning students are:

• add and subtract decimal numbers to hundredths, including money amounts, using concrete materials, estimation, and algorithms (Gr. 5)
• demonstrate an understanding of simple multiplicative relationships involving whole-number rates, through investigation using concrete materials and drawings (Gr. 5)
• represent relationships using unit rates (Gr. 6)

Additional References:

Big Ideas and Questioning K-12: Proportional Reasoning
http://www.edugains.ca/resources/LearningMaterials/ContinuumConnection/BigIdeasQuestioning_ProportionalReasoning.pdf

This Ministry resource identifies the key concepts in proportional reasoning across each division. Questions connected to each big idea are provided in the resource as a means for differentiating instruction while provoking and clarifying thinking.

Lesson Sequence

Part 1 Minds On/Prior Learning (15 minutes estimated for this section)	What to prepare
Activity 1. Number String Warm Up – This number encourages students to use multiplication facts they know as partial products to find the answers for more challenging problems (the distributive property). This string invites students to use their familiarity with quarters to support their multiplicative reasoning. Present one fact at a time, and record answers and thinking as students share their mental reasoning. 2 X 25 4 X 25 8 X 25 10 X 25 5 X 25 16 X 25 20 X 25 25 X 25 2. Remind students of the book they have read, *The Food Bank*.	Copies of the book *The Food Bank*

Assessment For the class in general, assess fluency of multiplication facts, and ability to use strategies such as doubling, halving, 10 x facts, 100 x facts, and partial products. You may be able to assess the computational fluency of a number of individual students are they share the answers to facts and explain their thinking	
Part 2 – Work On It (30 minutes estimated for this section)	
Work in small groups - 2 per group. 1. Food banks often encourage people to donate the following non-perishable food items: peanut butter, macaroni and cheese mix, pasta, canned soup, tuna, beans and cereal. a) Someone chose to donate 5 jars of peanut butter. If each jar of peanut butter costs $5.89, how much would it cost? b) If someone wanted to donate a box of 24 cans of soup, how much would it cost? Each can costs $1.39. c) If you could buy a package of 12 macaroni and cheese for $18.00, what would be the unit price of each box? Try to solve the problem different ways. Explain your thinking. d) Tuna costs $3 a can. How much would 16 cans of tuna cost? Solve the problem in s variety of ways. Rather than assigning a cost to the food items, as the problems are written above, students could look up prices in weekly flyers. Encourage students to estimate, and record their estimates, before calculating the actual answers. Ask students to explain how they arrived at their estimate. **Alternate Task** 2. How much would it cost to feed a family of four for a week if they had to buy their food at the grocery store rather than using the Food Bank? Use the checklist in the Appendix to select food for the week, and then total up the cost using prices in the flyers. **Activities During Work Period** • Students work with partners and record question, work/thinking, and answer on chart paper. • Teacher visits partners to clarify the question they are answering and to see if they have a strategy to start/continue working on the problem. • Teacher thinks about which solutions to share in the third part of the	Blank paper for students to record thinking and solution. Weekly grocery store flyers (optional for Problem 1)

lesson, and the order in which they will be shared. Solutions selected should show a variety of strategies (and hopefully will include the ratio table).	
Assessment For each student, observe and document: - use of multiplicative reasoning - computational strategies and fluency - clear representation of the problem and communication of thinking	
Part 3 – Conclude & Share Solutions (20 minutes estimated for this section)	
Activity The solutions selected (2-4) are shared, starting with the simplest strategy and moving to the most complex. Consider which tools/models/algorithms would best support the learning of the class. Also, consider clarity of communication when selecting solutions and order in which to share. As students share their work, encourage them to discuss *how* they solved the problem. You may wish to question the students to focus attention on a particular aspect of their solution, rather than inviting the student to share their entire process/solution. Invite other students to ask questions of the presenters. At the end of the sharing, highlight key learning by recording it on the whiteboard or on chart paper. The key learning may be connected to a model or strategy used to solve the problem, or to the problem itself.	
Assessment For each student, continue to observe and document: - use of multiplicative reasoning - computational strategies and fluency - clear representation of the problem and communication of thinking Based on your assessment for learning data, do students need additional opportunities to: - acquire basic multiplication facts - develop mental computational skills - use a variety of strategies & tools to solve problems involving rate - communicate thinking and reasoning Select problems for future exploration based on student learning needs.	

Follow up Problems/Learning Opportunities

1. Based on the cost of food needed to feed a family of four for a week, calculate the cost of feeding a family of six (or *n* family members).
2. What would it cost to feed a family of *n* for a month?
3. Make up your own similar problem involving creating a food budget for a family.

It is important for students to have computational fluency when monitoring their finances. Consider teaching ten-minute mini-lessons involving number strings as frequently as possible. The mini-lessons support students in learning basic facts and mental math computational skills through conceptual understanding and thinking.

For additional mini-lessons involving number strings refer to:
Minilessons for Extending Addition and Subtraction, by Catherine Twomey Fosnot.
Minilessons for Early Multiplication and Division, by Catherine Twomey Fosnot.
Minilessons for Extending Multiplication and Division, by Catherine Twomey Fosnot.

Appendix

FAMILY CODE:		
Diet Restrictions: NO PORK: _____ Vegetarian: _____		
Food Item	Needed?	Cost
Kraft Dinner		
Soup (canned) Chicken		
Soup (canned) Mushroom		
Soup (canned) Tomato		
Soup (canned) Vegetable		
Soup (dry) Chicken		
Soup (dry) Mr. Noodle		
Soup (lg cans)		
Can Pasta		
Tuna		
Salmon		
Pasta Sauce		
Dry Pasta		
Pork and Beans		
Can Fruit (only if no fresh)		
Can Vegetable		
Can/Box Potato (only if no fresh)		
Fresh/Frozen/Can Meat		
Peanut Butter		
Jam		
Powdered/Canned Milk		
Cereal		
Oatmeal pkg _____ individual _____		
Juice		
Tea or Coffee – Perk / Instant		
Snacks		
Jello / Pudding / Pudding Cups		
Baby Products: (mark below)		