Math Lesson – Greeting Cards

Outcomes or Learning Goals

This Math lesson helps students develop the mathematical skills to develop financial planning and goal setting. It also will address reading and interpreting money values, data collection and data monitoring.

Grade Levels 7 – 10

MAT1L

MAT2L

Context & Rationale

This lesson supports the ERGO Financial Literacy series book **Greeting Cards.** This book tells the story of a fundraising initiative to raise funds to build community wells in Africa. Like the book, this math lesson is primarily intended for small to medium English Literacy Development class settings. It is important for students to become familiar with setting financial goals and creating a plan to achieve that goal. It is also an important job skill to know how to collaborate and work together as a team. A fundraising project provides students with a meaningful real life opportunity to practice all these skills. This lesson addresses the numeracy skills needed to address such projects.

Related Topics/Units

The story **Greeting Cards** relates the story of how successful and committed fundraising has the power to effect change. The Math section of the story supports issues of project management, collaboration and planning. Mathematically, this primarily concerns data management and numeracy. This math lesson is an entry to a broader project of a class taking on a similar scope of fundraising.

Expectations

- Solve problems drawn from everyday situations involving money (Gr. 9), demonstrating skill and understanding of the use of decimal numbers (Gr. 10)
- Use literacy skills (reading, writing, listening and speaking) to obtain and communicate information about money sense
- 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)
- Solve problems requiring estimating and calculating the cost of projects that require the purchase of multiples of the same item (e.g. 18 sheets of Bristol board and 9 glue sticks) (Gr. 9)
- Verbalize their observations and reflections regarding money sense and ask questions to clarify their understanding (e.g. talk about their own and other students' solutions to problems) (Gr. 9)
- Solve problems involving the accomplishment of a particular goal, including investigating, planning, gathering, and organizing data and making relevant calculations (Gr. 10)
- Develop, select, and apply problem-solving strategies while posing and solving problems (Gr. 9)
- Explain their reasoning used in problem solving and in judging reasonableness (Gr. 9, 10)

Expectations in Follow up Work:

- Solve problems drawn from everyday situations involving percent, rate (Gr. 9)
- Communicate information about proportional reasoning (Gr. 9)
- Solve problems involving percentages in practical situations (e.g. discount, sales tax) by converting to decimals and using a calculator (Gr. 9)

- Solve problems involving rates (e.g. you make $7/h. How long will you have to work to make a purchase worth $150?) (Gr. 9)
- Solve problems involving the calculation of rates drawn from a variety of everyday contexts and from familiar social issues (Gr. 10)
- Calculate rates in activities drawn from their experiences (Gr. 9, 10)

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)

Expectation in Follow Up Work:

- demonstrate an understanding of simple multiplicative relationships involving whole-number rates, through investigation using concrete materials and drawings (Gr. 5)
- divide whole numbers by simple fractions and by decimal numbers to hundredths, using concrete materials (Gr. 7)

Lesson Sequence

Part 1 Minds on/Prior Learning (10 - 15 minutes)	What to Prepare
### Activity Remind students of the book they have read, **Greeting Cards.** Ask them to - Describe experiences they have had with water. It could be something they have appreciated about it, or a time in their lives when their health was affected by it – either a lack of or contaminated water. In the latter cases, ask what would have helped them in this difficult time - Ask them to look at the book and identify as many things as possible the group needed to think about to do their fundraising	- Copies of the book **OPTIONAL:** photos from around the world showing the interaction of people and water
### Assessment For Learning - Observe for engagement and interest in topic - For each student identify from prior activities: - Number fact skills - Multiplication fact skills - Multiplication by 10, 100 - Mental division of tens, hundreds (e.g. 900/3=300) - Understanding of % - Ability to multiply using % on a calculator	

Part 1 Minds on/Prior Learning (10 - 15 minutes)	What to Prepare
### Part 2 – Work on it (25 – 30 minutes) Work in small groups - 2-3 per group. Look at the image page showing their budget. The picture shows the costs they had for supplies and materials. It also shows their way to calculate the costs. What are other ways to calculate the cost? Do they yield the same answer? Did they miss anything? As a class try to generate as many different mathematical questions and other ways to calculate the amount as you can about their card fundraiser.	**Before beginning work:** • Provide chart paper for group drawing and scribbling, also to prepare their share out. **Note:** • Engagement • Complexity of questions • Similarity • Any discussion of overhead or startup costs
### Assessment • Note the complexity of the questions • Are the questions appropriate? • Can the questions be answered using information in the book? • Are the estimates of question elements that are not given reasonable • In working out answers, have they used appropriate mathematical procedures? • Have they used them correctly (i.e. number facts are correct) • Are they using reasonableness as a strategy to confirm answers? • Confirm/observe for Math competencies noted in warm-up exercise • Assess which of the follow-up questions can be reasonably used	

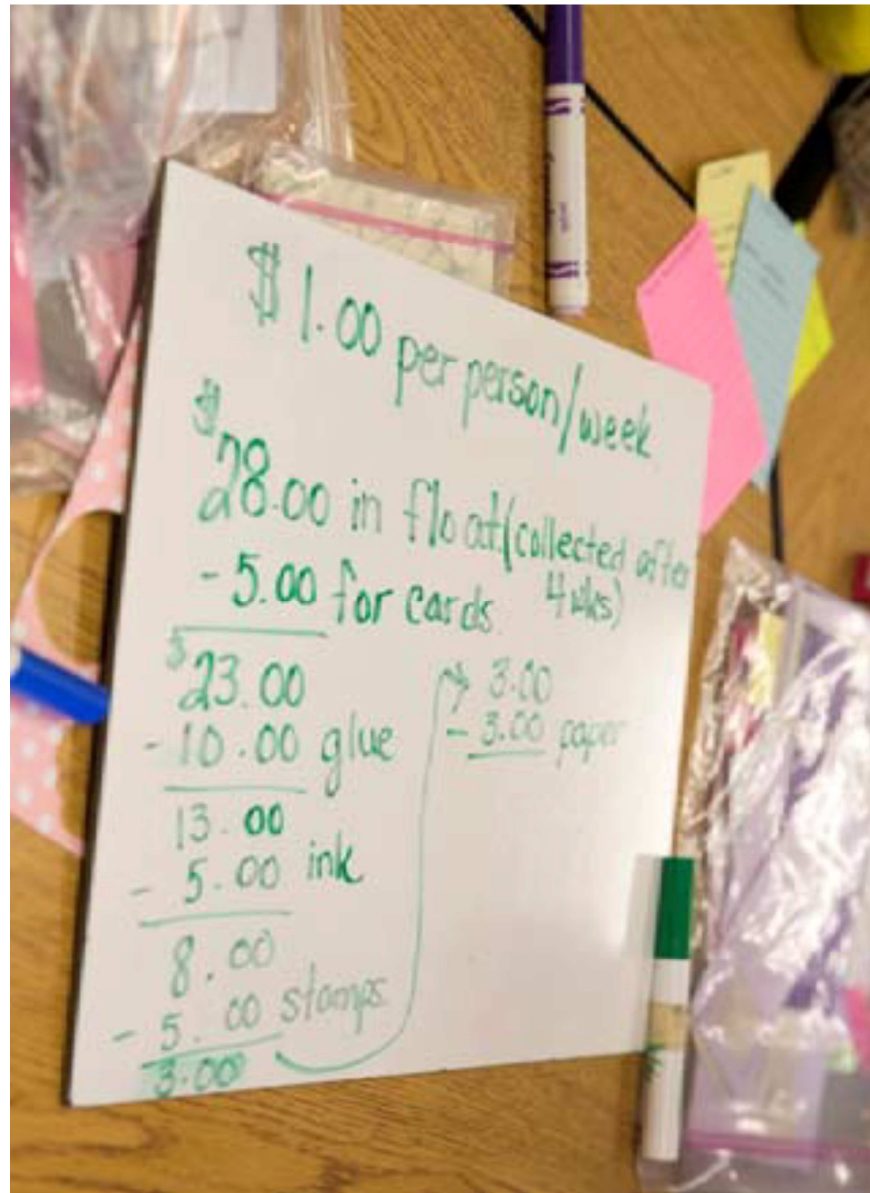|	
Part 3 – Conclude and Share Solutions **(20 minutes or carry to the next class)**	

## Activity 	
 	
Each group prepares and rehearses a brief presentation on their work as follows:
 	
• Plan and rehearse your presentation. This should include
    • How you figured out your question
    • How you answered it
• Deliver your presentation
• Respond to questions about it	

## Follow up The question sheet is meant to be modified by the teacher according to class needs. There is likely a lot more here than can be used.	
## Assessment For each student – record notes on these skills: • Number fact skills • Multiplication fact skills • Multiplication by 10, 100 • Mental division of tens, hundreds, (e.g. 900/3=300) • Understand of % • Ability to multiply using % on a calculator • Ability to express mathematics problem solving orally • to express mathematics problem solving orally • Ability to show their work	

A Successful Fundraiser!

The questions that follow are designed to have students use math and data to anticipate both costs and time, with the intention of using math to develop reasonable workable plans.

Given that they made $60 the first time out, had costs of .20¢/card, and sold them for $2 each:

1. How did they raise the money for the supplies?
2. What other ways could they raise money for the supplies?
3. They made $60 on 30 cards, but each card cost .20¢ to make. How much profit did they actually make on all the cards?
4. How much profit do they make on one card?
5. How many cards would they need to sell to make a total of $92?
6. How many cards would they need to sell to make a profit of $92?
7. What is the % of cost they have for each card?
8. Use the % of the raw material cost to calculate how much it would cost them to make
   a. 50 cards
   b. 80 cards
   c. 110 cards
   d. 200 cards
9. Estimate how much time it takes to make one card. Explain your reasoning
   a. Calculate how much time each week you could spend making cards while still keeping a balance in your life between studies, relaxation, family obligations and personal care
   b. Given your calculation in a), assume your friends are similar. How long would it take you to make 50 cards? 80? 250? Include in your calculation how long it would take to 'burn out' and need to take a break from doing it
   c. 'Economy of scale' means that people can make production faster per item if you make many more of the item all at one time. Given your answer in #9, how could production be speeded up to make 50 or even 100 cards?
   d. Given your calculations of your own time, how many students are needed to produce 200 cards in one week?
   e. If you had a team of 5 students, how many cards could you produce in one day? Use the information you calculated above, and compare your answer with another student
10. What are the different ways that they could earn more money. (There are 3 main ways – AND: increase cost per unit, reduce supplies cost, sell more units)
11. Explain how more money can be made using each of these 3 ways
12. Someone came up with the idea of selling cards in groups of 5
    a. How much should a package of 5 cards be?
    b. Show and explain how selling packages of 5 could generate more money
13. Which way or ways to earn more money are shown if you sold packages of 5? Explain and show the math

Reflect .....

Describe how you contributed to your group when you worked out the math questions to ask. What did you do well? What did you contribute? What skills did you show?

- How do you think your group did and why?
- What math skills did you already have that were useful for this activity?
- What math skills do you need to develop to do this work?
- In the follow up work, which questions were easy? Challenging? Too difficult?
- What Math skills do you need to learn to do the 'challenging' questions easier?