

PROPORTIONAL REASONING LEARNING CONTRACT (page 1 of 3)**Non-Negotiable Tasks—Building Knowledge and Skills**

Work in a small group and complete all questions.

1. Look at the Proportion Cards (Appendix B). Sort them into two stacks according to whether they are proportional or not. Explain your thinking.

2. Use 30 cubes to build two structures that are proportional. How do you know they are proportional?

3. A cookie recipe requires 250 mL of flour to make 24 cookies. How much flour would be required to make 36 cookies? 48 cookies? 60 cookies?
Use a ratio table.

4. Follow the directions on the Geometer's Sketchpad® file to make a proportional figure. Draw at least five rectangles. Draw a diagonal through each rectangle. Measure the diagonal and the perimeter to the nearest millimetre. Make a T-chart of the diagonal and perimeter. Graph the length of the diagonal against the perimeter. Describe the graph.



PROPORTIONAL REASONING LEARNING CONTRACT (page 2 of 3)**Negotiable Tasks—Solving Problems**

Work with a partner to complete at least one of these activities.

1. Here is a new way to find out how tall your friend is. Stand a few metres away from your friend. Hold a pencil in front of you so that it looks like you are covering your friend from head to toe. These are the two ratios:

$$\frac{\text{Height of pencil}}{\text{Distance from your eye to the pencil}} = \frac{\text{Height of friend}}{\text{Distance from your eye to your friend}}$$

If the pencil is 20 cm tall, the distance from your eye to the pencil is 40 cm and the distance from your eye to your friend is 2,300 cm, how tall is your friend? Now, use the actual measurements and find your friend's real height. Using this method, prove that a 200 cm person can fit through the front door of your school.

2. Two triangles have one angle the same measure. Do they always have proportional sides? Construct several triangles that have one angle in common, using one of the following tools: a protractor, a Geoboard or The Geometer's Sketchpad®. Measure the sides to find out if they are proportional. If they are not always proportional, when are they?

3. Choose a readily available car. Make and record at least 10 measurements that would help you build a model of that car from Plasticene or draw a scale drawing of it. State the scale and why you chose that scale.

4. It takes 0.75 kg of materials to make a shirt. Cotton costs \$6.00 per kg. Rayon costs \$3.00 per kg. Here are the possible ratios of cotton to rayon in a shirt: 1:1, 3:2, 7:3, and 8:2. What are the costs of each type of shirt?



PROPORTIONAL REASONING LEARNING CONTRACT (page 3 of 3)**Optional Tasks—Thinking About Ratio and Proportion**

You may work with a partner and choose one or more of these tasks to complete.

1. What is the Golden Ratio? Conduct an Internet search and answer this question using words and diagrams. What are some examples of the Golden Ratio in art, architecture and nature?

2. Music and pitch: Why are ratios important in music? Search the Internet or the library to find out. What are some examples?

3. Go to the Ministry-licensed site www.explorelarning.com. Go to Browse Mathematics Gizmos 6–8. Select Number and Operations, then Ratios, Proportions and Percents. Go to the Gizmo “Estimating Population Size” and follow the directions.

4. Read the book *If the World Were a Village: A Book About the World's People* by David Smith or watch the video *If the World Were a Village of 100 People* on YouTube. If your school were proportional to the world, how many people of each background should there be? Does your school appear to match the story proportionally?

5. Read *If You Hopped Like a Frog* or *If Dogs Were Dinosaurs* by David M. Schwartz, and examine some of the explanations at the end of the book. Pose a problem that uses proportional reasoning to compare two items. Explain the proportional thinking behind your comparison using the end material in the book as a model.

Resources:

Smith, David (2002). *If the World Were a Village: A Book About the World's People*. Toronto, Ontario: Kids Can Press.

Schwartz, David M. (2005). *If Dogs Were Dinosaurs*. New York, NY: Scholastic Press.

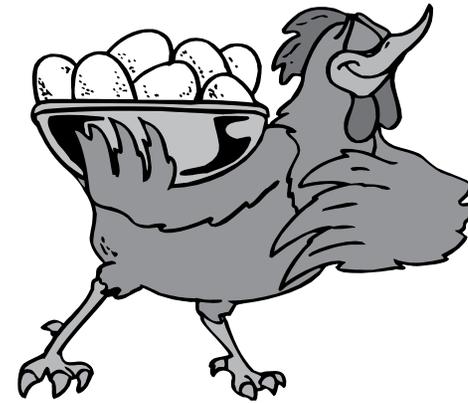
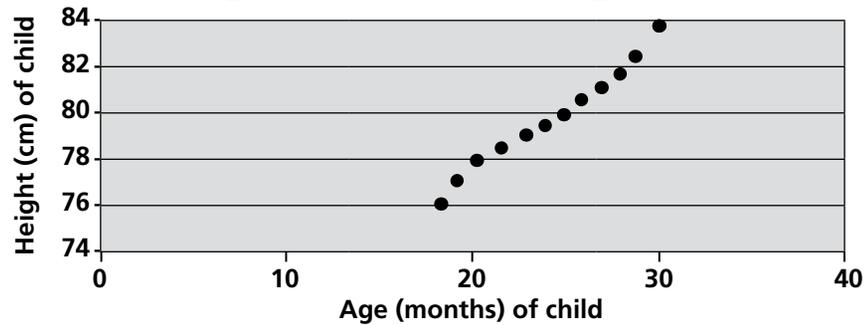
Schwartz, David M. (1999). *If You Hopped Like a Frog*. New York, NY: Scholastic Press.



PROPORTION CARDS (page 1 of 5)



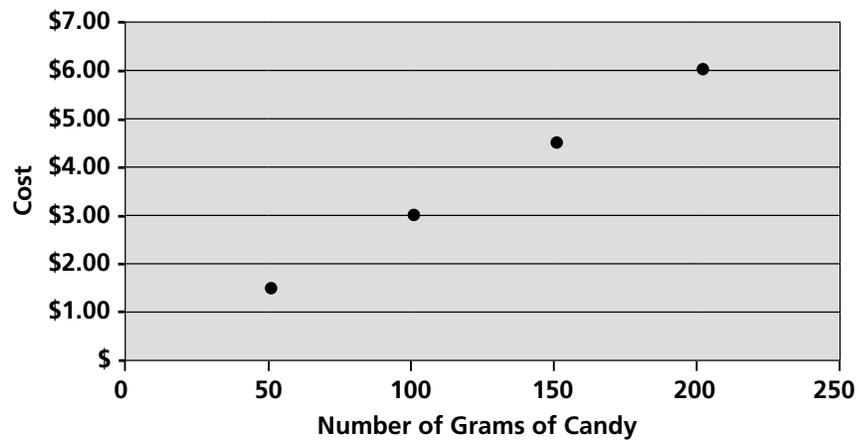
Age (months) vs. Height (cm)



Two eggs
make three slices
of French toast



PROPORTION CARDS (page 2 of 5)

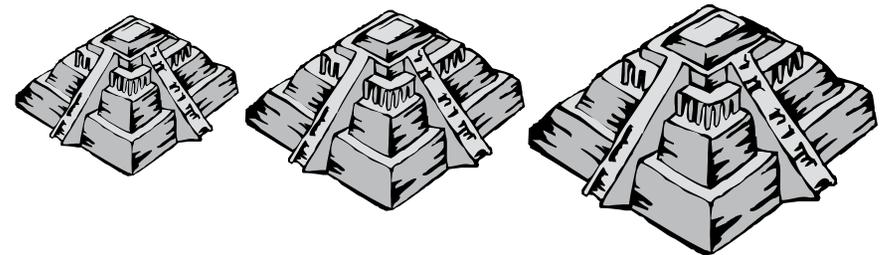


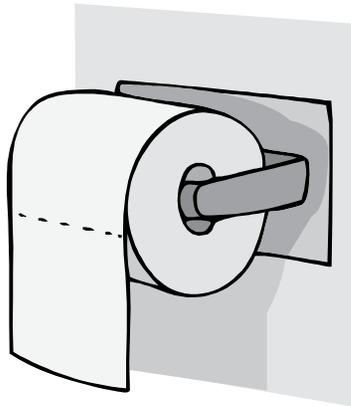
$$80 \text{ km/h} = 50 \text{ mph}$$



PROPORTION CARDS (page 3 of 5)

Josh gets \$12.00
for every lawn he cuts



PROPORTION CARDS (page 4 of 5)

You can find the number of squares left on the toilet paper roll by measuring its diameter.



Number of Puffs	Diameter of Balloon
2	4 cm
4	8.5 cm
6	15 cm
8	24 cm



PROPORTION CARDS (page 5 of 5)

Hours Worked	Pay
2	\$15.00
4	\$30.00
6	\$45.00
8	\$60.00



LEARNING CONTRACT AND PRESENTATION CHECKLISTS

Name: _____

Learning Contract Checklist (AFL)

Categories/Mathematical Processes	Criteria and Indicators	√
Thinking	The student:	
Problem Solving	Selects, sequences and uses mathematical tools and strategies to solve problems	
Reasoning and Proving	Demonstrates/explains that proportions involve multiplicative comparisons	
Communication	The student:	
Communicating	Explains strategies with group members while problem solving	
	Explains proportional reasoning/talks about strategies used in a variety of contexts without using rules and formulas	
Application	The student:	
Selecting Tools and Computational Strategies	Selects and applies the appropriate computational strategies to solve problems involving proportional reasoning	

Presentation Checklist

Categories/Mathematical Processes	Criteria and Indicators	√
Thinking	The student:	
Reasoning and Proving	Uses models effectively to demonstrate conclusion	
Communication	The student:	
Communicating	Clearly presents, explains and justifies solutions	
	Explains correct use of computational strategies and notation	



RATIO AND PROPORTION EXIT CARD

Name: _____

- Two weeks ago, the heights of two flowers were measured at 8 cm and 12 cm respectively. Today, they are 11 cm and 15 cm tall. Which flower grew at a faster rate?
- The angles of a triangle are in the ratio of 3:4:5. What is the measure of the largest angle?
- On the line below, place a check mark (✓) to indicate your understanding of ratio and proportion.

No clue Getting there Could teach the class



Name: _____

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