

# GRADE 6 MATH: GROCERY SHOPPING AND THE QUILT OF A MATH TEACHER

## UNIT OVERVIEW

This unit contains a curriculum-embedded Common Core-aligned task and instructional supports. The task is embedded in a 2–3 week unit on expressions.

## TASK DETAILS

**Task Name:** Grocery Shopping and The Quilt of a Math Teacher

**Grade:** 6

**Subject:** Math

**Depth of Knowledge:** 3

**Task Description:** There is a combination of two tasks that will be administered as this culminating assessment. The “Grocery Shopping” task will assess students’ knowledge of representing equivalent expressions and being able to justify this through the use of the distributive property. The second task is “The Quilt of a Math Teacher”. This task will assess students’ knowledge of formulating an algebraic expression based on a real-life situation, while addressing Mathematical Practice standards as well.

### **Standards:**

- 6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.
- 6.EE.2a Write expressions that record operations with numbers and with letters standing for numbers.
- 6.EE.2b Identify parts of an expression using mathematical terms (*sum, term, product, factor, quotient, coefficient*); view one or more parts of an expression as a single entity.
- 6.EE.2c Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order.
- 6.EE.3 Apply the properties of operations to generate equivalent expressions.
- 6.EE.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

**This Project is Due Monday October 28<sup>th</sup>, 2019!**

## EXPRESSIONS AND EQUATIONS

Apply and extend previous understandings of arithmetic to algebraic expressions.

Evidence shows student has met or exceeded the learning

Evidence shows misunderstanding, misconceptions, or

<b>4.0</b>	<b>Advanced grade level performance</b>
3.5	Mastered grade level, some advanced grade level performance
<b>Score 3.0</b>	<p><b>Mastered grade level expectations by:</b></p> <ul style="list-style-type: none"> <li>• <b>6.EE.1</b> Write and evaluate numerical expressions involving whole-number exponents.</li> <li>• <b>6.EE.2</b> Write, read, and evaluate expressions in which letters stand for numbers.             <ul style="list-style-type: none"> <li>○ <b>6.EE.2.a</b> Write expressions that record operations with numbers and with letters standing for numbers. <i>For example, express the calculation "Subtract y from 5" as <math>5 - y</math>.</i></li> <li>○ <b>6.EE.2.b</b> Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. <i>For example, describe the expression <math>2(8 + 7)</math> as a product of two factors; view <math>(8 + 7)</math> as both a single entity and a sum of two terms.</i></li> <li>○ <b>6.EE.2.c</b> Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). <i>For example, use the formulas <math>V = s^3</math> and <math>A = 6s^2</math> to find the volume and surface area of a cube with sides of length <math>s = \frac{1}{2}</math>.</i></li> </ul> </li> <li>• <b>6.EE.3</b> Apply the properties of operations to generate equivalent expressions. <i>For example, apply the distributive property to the expression <math>3(2 + x)</math> to produce the equivalent expression <math>6 + 3x</math>; apply the distributive property to the expression <math>24x + 18y</math> to produce the equivalent expression <math>6(4x + 3y)</math>; apply properties of operations to <math>y + y + y</math> to produce the equivalent expression <math>3y</math>.</i></li> <li>• <b>6.EE.4</b> Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). <i>For example, the expressions <math>y + y + y</math> and <math>3y</math> are equivalent because they name the same number regardless of which number <math>y</math> stands for.</i></li> </ul>

2.5	Basic understanding secure, progressing toward mastery
<b>Score 2.0</b>	<p><b>Basic understanding achieved such as:</b></p> <ul style="list-style-type: none"> <li>• Recognize and recall specific terminology such as:             <ul style="list-style-type: none"> <li>○ Exponent <b>6.EE.1</b></li> <li>○ Evaluate <b>6.EE.1</b>, <b>6.EE.2</b></li> <li>○ Difference <b>6.EE.2</b></li> <li>○ Algebraic Expression <b>6.EE.2</b></li> <li>○ Substitute <b>6.EE.2</b></li> <li>○ Equivalent Expressions <b>6.EE.3</b>, <b>6.EE.4</b></li> <li>○ Commutative Property <b>6.EE.3</b></li> <li>○ Associative Property <b>6.EE.3</b></li> <li>○ Distributive Property <b>6.EE.3</b></li> </ul> </li> <li>• Perform basic processes and recognize and recall the accuracy of basic solutions and information such as:             <ul style="list-style-type: none"> <li>○ Explain the meaning of a number raised to a power. <b>6.EE.1</b></li> <li>○ Identify parts of an algebraic expression by using correct mathematical terms. <b>6.EE.2</b></li> <li>○ Recognize when an expression is representing a sum and/or difference of terms versus a product and/or quotient of terms. <b>6.EE.2</b></li> <li>○ Create a visual model to show two expressions are equivalent <b>6.EE.3</b></li> <li>○ Solve a simple one variable expression to determine the result. <b>6.EE.4</b></li> </ul> </li> </ul>
1.5	Basic understanding, with some assistance
1.0	<b>Basic understanding, only with assistance</b>
0.5	Some basic understanding, only with assistance

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Ms. Napolitano

Project #2

**Directions: Answer all of the questions completely.**

**1. Mrs. Alexander's Offer**

Mrs. Alexander is offered a job with a computer company that will pay her \$100,000. Represent the salary using exponential form.

Answer: \_\_\_\_\_

**2. Weight Loss**

Mr. Baily, a scientist who likes to express numbers with exponents, used a table to represent the number of pounds he lost in the past four months.

Month	1	2	3	4	5
Weight lost in pounds	3	$3 \times 3$	$3 \times 3 \times 3$	$3 \times 3 \times 3 \times 3$	_____

- a) Mr. Baily asked his students to write an exponential expression to represent the total number of pounds lost within four months. Marcus wrote the expression  $3^4$  and John wrote  $4^3$ . Who was correct?

Answer: \_\_\_\_\_

- b) Justify your answer with a detailed explanation.

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- c) If the pattern continued, how many pounds would Mr. Baily lose within the fifth month? Write your answer in exponential form.

Answer: \_\_\_\_\_

## Grocery Shopping

The table below shows the prices of different items at A and B Supermarket.

Items	Prices
Pack of Oreos	\$3
1 lb of ham	\$7
1 gallon of milk	\$4
1 pumpkin pie	\$5
24 oz. box of cereal	\$7



Mr. D buys 3 packs of Oreos and 3 pounds of ham.

1. Write two equivalent expressions to represent the total amount Mr. D will pay for the items he buys.

Expressions: \_\_\_\_\_ and \_\_\_\_\_

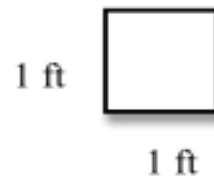
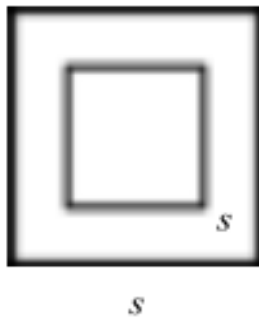
2. Explain how Mr. D can use the distributive property to calculate the total amount he has to pay.

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## The Quilt of a Math Teacher

Mrs. Mothes is making a quilt in the shape of a square for her younger sister. The border of the quilt is made of 1-foot by 1-foot patches. She asks one of her students, Maria, to use the picture of the quilt below to write an expression to illustrate the number of patches needed to border the square quilt with side length  $s$ .



The square quilt has side length  $s$ .  
(Not drawn to scale.)

Patch (Not drawn to scale.)

Maria writes:  $(s + s + s + s) + (1 + 1 + 1 + 1)$

**Part A:** Is Maria's expression correct? Explain your reasoning.

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**Part B:** Mrs. Mothes asks four other students (Samantha, Jerry, Nadia, and Joseph) to generate expressions that are equivalent to Maria's expression.

1. Samantha's expression:  $4s + 4$

2. Jerry's expression:  $4(s + 1)$

3. Nadia says the correct expression is  $4s + 1$

4. Joseph writes:  $2s + 2(s + 2)$

How many of the students wrote a correct or an incorrect expression? Justify your answer with a detailed explanation.

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## Task 1: Popping Off With Algebra

Let  $h$  represent the number of hours Shaunda spent on homework last week.

### Part A

Zack spent  $\frac{1}{2}$  as much time on his homework as Shaunda, plus an additional 3 hours. Write an expression for the number of hours he spent on his homework.

Expression: \_\_\_\_\_

### Part B

Identify the number of terms, coefficient and constant in the expression above.

Number of terms: \_\_\_\_\_ Coefficient: \_\_\_\_\_ Constant: \_\_\_\_\_

### Part C

Shauna spent 12 hours doing her homework. How many hours did it take Zack to complete his homework?

Show your work.

Zack: \_\_\_\_\_ hours

## Task 2: Dogging Algebra

Franklin, a pit bull, weighs  $p$  pounds. For Part A, write an expression for the weight in pounds of each of the dogs. Each expression should include the variable  $p$ .

### Part A

- Tatu, a pug, weighs 49 pounds less than Franklin: \_\_\_\_\_
- Mia, a Chihuahua, weighs  $1/17$  as much as Franklin: \_\_\_\_\_
- Lucy, a Great Dane, weighs twice as much Franklin, minus 15 pounds: \_\_\_\_\_

### Part B

Set up a chart or organizer to represent the weights of the four dogs.

### Part C

Franklin weighs 68 pounds. How much do Tatu, Mia, and Lucy weigh? Show or explain how you found this.

Tatu: \_\_\_\_\_ pounds; Mia: \_\_\_\_\_ pounds; Lucy: \_\_\_\_\_ pounds



