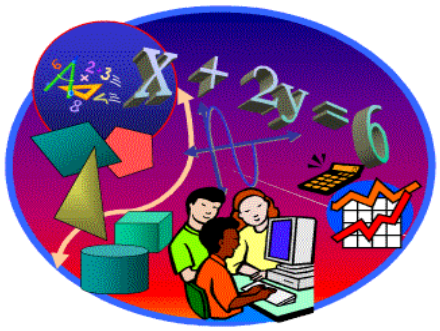
College- and Career-Readiness Standards for Mathematics



Exemplar Lesson Plan

"The Real World of Multiplication & Division"

3.OA.1

3.OA.2

3.OA.3

3.OA.4

MISSISSIPPI DEPARTMENT OF EDUCATION

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Mississippi College- and Career-Readiness Standards
Mathematics
Exemplar Lesson Plan

GRADE: 3	
Title: ***The Real World of Multiplication and Division!*** **Estimated Duration:** 3 days	**Real World Purpose:** • **Why do I need to learn about multiplication?** When a student learns the concepts and skills to multiply through manipulating the area model or using the properties of operations, he/she is able to relate repeated addition to multiplication. This leads the student to be able to work more efficiently with larger numbers that are required for real world situations. Fluency flourishes. • **Why do I need to learn about division?** When a student learns the concepts and skills to divide through partitioning objects into equal shares or realizing that division is an unknown factor problem, he/she is able to relate division to multiplication and, therefore, will be able to quickly master these facts which then lead to being able to solve real world problems in his/her life.

I Can:

- **3.OA.1:** Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 x 7.*
- **3.OA.2**: Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.*
- **3.OA.3:** Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.[1]
- **3.OA.4**: Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 x ? = 48, 5 = □ ÷ 3, 6 x 6 = ?.*

Prerequisite Skills:

- Solve one- and two-step addition and subtraction word problems. (1.OA.1 and 2.OA.1)
- Apply properties of operations as strategies to add and subtract. (1.OA.3)
- Understand subtraction as an unknown-addend problem. (1.OA.4)
- Skip-count by 2s, 5s, and 10s (know patterns). (1.OA.5 and 2.NBT.2)
- Know the meaning of the equal sign as "the same as". (1.OA.7)
- Find an unknown whole number in an addition or subtraction equation. (1.OA.8)

Materials/Resources:

- Base ten blocks
- www.georgiastandards.org
- **Checking for Understanding** by D. Fisher and N. Frey (2007)
- Sets of 50 to 100 counters
- Number lines
- Drawing paper
- Blocks/cubes
- **Attachments: (Total 5)**
- Hundreds chart
- Multiplication table
- http://coredistricts.org/
- Geoboards
- Linking cubes
- Cookie patterns

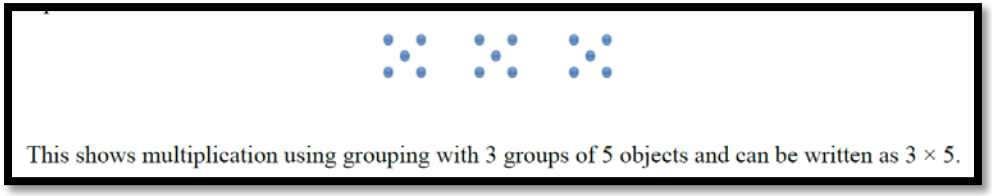
Key Vocabulary: (* = words defined in the MS CCR Mathematics

- Product
- Quotient
- Factor
- Multiplication
- Division
- Rectangle
- Equation
- Array
- X (multiplication symbol)
- ÷ (division symbol)
- Dividend
- Divisor
- Interpret
- Arithmetic patterns
- Properties of operations*
- Area model
- Division as an unknown-factor problem
- Inverse operations
- Whole numbers*
- Unitizing

Lesson Introduction

Student Exploration Activity: (Use Step 1 for Day 1, Step 2 for Day 2, and Step 3 for Day 3.)

Step 1: The teacher will distribute bags of 100 counters to students seated in groups of two. The teacher will read the following scenarios to students and ask them to model the situation using the counters. The example given next is a model to go by as the teacher instructs.



This shows multiplication using grouping with 3 groups of 5 objects and can be written as 3 × 5.

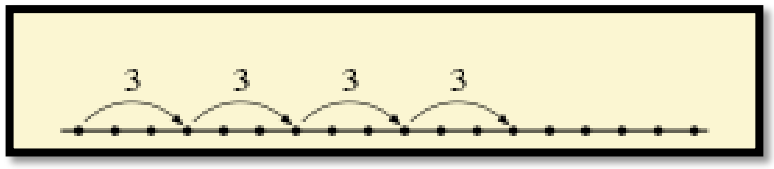
www.georgiastandards.org

(a) Fred and each of his two friends have 6 model cars. Model this situation for me. Tell me how many model cards they have in all. (1.OA.1 and 2.OA.1)—Students should show equal groups or arrays also known as the area model using knowledge from second grade, and they should be able to solve word problems.) They have 18 model cars in all. The teacher will ask students to write an equation to show the math—6 + 6 + 6 = 18. Students at this point will use repeated addition to solve this problem. This repeated addition will lay the foundation for the relationship between repeated addition and multiplication later in this lesson.

(b) Shontay has 20 hair bows. She gives 5 to her friend, Amy. How many hair bows does Shontay have left? If Shontay wants to share her remaining hair bows with two of her friends equally among the three of them, how many hair bows will each one get? (1.OA.4, 1.OA.5, 1.OA.8, and 2.NBT.2)—Students should on the first question use an unknown addend, 5 + ? = 20. The answer is 15. Knowing multiples of five by skip counting will also assist students in answering both questions. The second question can be answered with repeated subtraction, 15 – 5 – 5 – 5 = 0 or skip counting by fives, 5, 10, 15. So, each of them will get five hair bows.

The teacher will observe students to ensure they are on track at this point. If not, the teacher will make a note of students needing intervention and will work with them in smaller groups.

Step 2: The teacher will introduce number lines and review skip counting to relate addition/multiplication and subtraction/division using the example below. The teacher will instruct students on how to write a multiplication equation and division equation using the equal sign to mean "the same as". (1.OA.7)

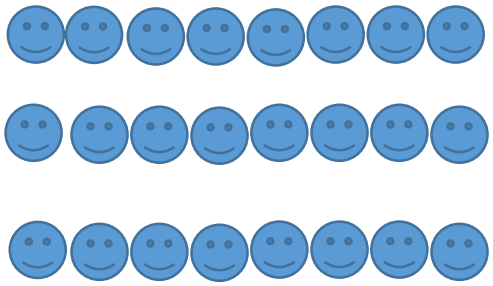


http://thinkmath.edc.org

(a) Sunshine Food Store has small bags of apples with 3 in each bag. Annalynn bought 4 bags of apples. How many apples did she buy in all? (Solution: 3 + 3 + 3 + 3 = 12 or 3 x 4 = 12) Annalynn bought 12 apples in all.
(b) Pedro has 12 toy fire trucks. He wants to store the fire trucks in boxes in sets of three. How many boxes will he need? (Solution: 12 – 3 – 3 – 3 – 3 = 0 or 12 ÷ 3 = 4) Pedro will need 4 boxes.

The teacher will allow students to explore several multiplication and division situations and have them model problems using these mathematical tools along with rectangular arrays (area models) and equations (covered in Step 1) to show their answers. Four problems are provided here to use.

(1) At Walker Elementary School, the school's beginner orchestra has 8 students in each row. There are 3 rows. How many students are in the beginner orchestra?



Solution: The student can draw an array to show 8 students in 3 rows for a total of 24 students. The equation would be 8 x 3 = 24. A number line should be drawn from 0 to 24 and students should use skip counting to find the total on the number line, 8 16, 24.

(2) Marcia has 30 sunflower seeds. She wants to make 5 equal groups to put into bags. How many sunflower seeds will be in each bag?

Solution: The students should draw 30 seeds and divide or partition the 30 seeds into 6 equal groups. The teacher will point out to students that if their drawings do not represent an array, they will need to adjust their drawings. The teacher will instruct students on how to take the whole, 30, with 5 equal groups or bags and evenly distribute the seeds one at a time on each row so that there are 5 rows of 6 seeds in each row. The teacher will also present the fact that an unknown factor problem may be written as 5 x ? = 30. A number line should be drawn from 0 to 30, and students should use skip counting to find the number of seeds in each group or bag, 5, 10, 15, 20, 25, 30. There will be 6 seeds in each of the 5 bags. The division equation would be written as 30 ÷ 5 = 6.

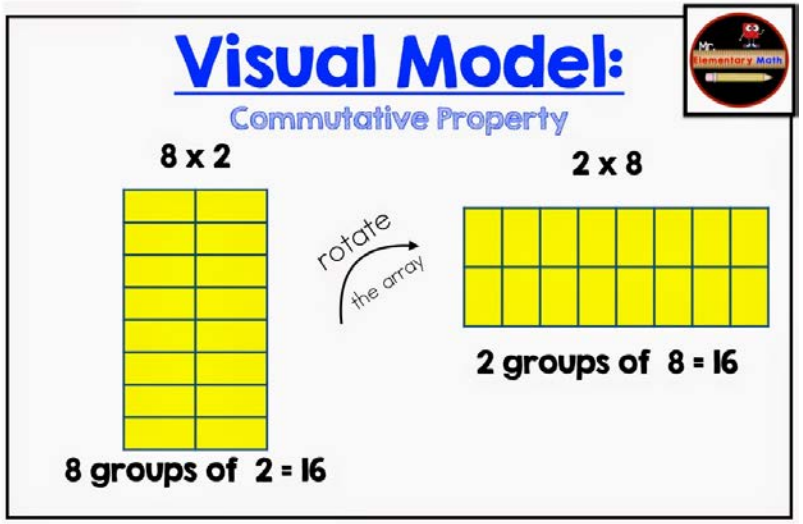
(3) There are 12 buttons total on 2 bunny costumes. If the costumes have the same number of buttons, how many buttons are on each costume?

Solution: Students should draw two rows of buttons and distribute the 12 evenly on each row to represent the 2 costumes. Students should also represent the problem as an unknown factor problem, 2 x ? = 12 and as a division equation 12 ÷ 2 = 6. There are 6 buttons on each costume. Students should draw a number line and show 0 to 12 and skip count by twos.

(4) The teacher has all the students in her class line up their book sacks with 5 book sacks in each row. When the students have finished lining them up, there are 4 equal groups of book sacks. How many students are in her class?

Solution: The students should draw an array with 5 book sacks of 4 rows for a total of 20 book sacks; therefore, there are 20 students in her class. The equation would be 4 x 5 = 20. A number line should be drawn from 0 to 20, and the students should skip count by fives to get 4 rows.

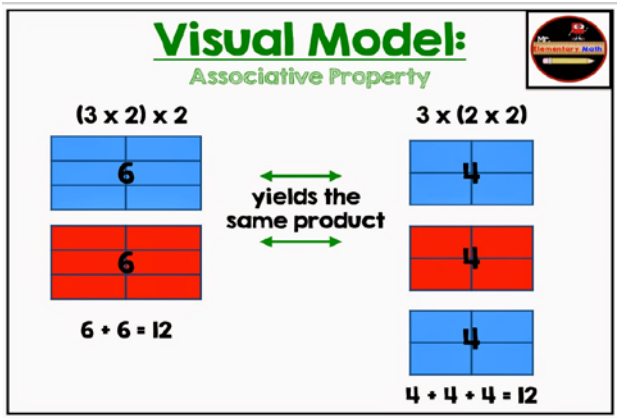
Step 3: The teacher will assist students to apply the properties of operations (commutative, associative, and distributive) to multiplication. The students do not have to formally know the names of these properties but should be able to use them as tools or strategies to help them to multiply. When models are used the teacher can easily illustrate the commutative property of multiplication.



www.demonstrations.wolfram.com

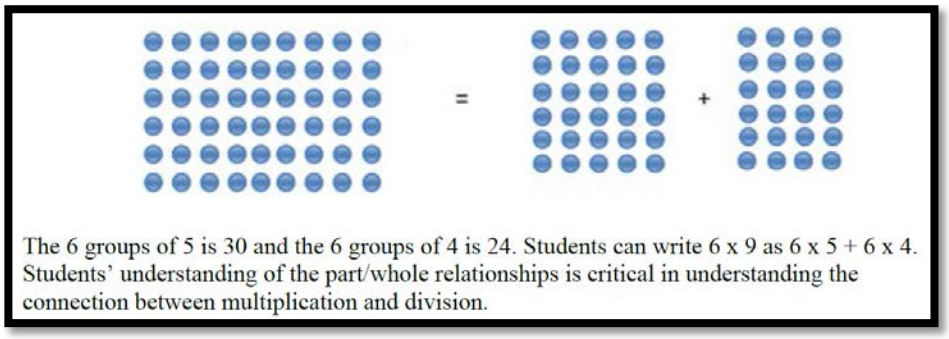
(a) The teacher will give students a few examples to model using counters, draw an array, write the equation, and then show the commutative property of multiplication by rotating the models. Examples to use are: 3 x 5; 4 x 2; and 6 x 4.

The associative property will be used when multiplying three factors such as 5 x 8 x 2. If students can group (5 x 2) and then multiply by 8 then they can easily multiply mentally as 5 x 2 = 10 and 10 x 8 = 80. The teacher will provide students with problems to practice here such as 4 x 4 x 5 = 4 (4 x 5) = 4 x 20 = 80 and 3 x 5 x 2 = 3 (5 x 2) = 3 x 10 = 30. The teacher may also use the model given next to explain the use of the associative property of multiplication.

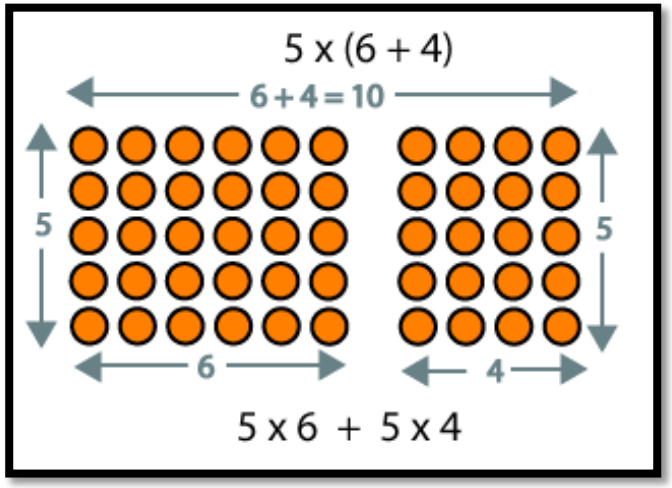


www.blogspot.com

The distributive property can be used as a tool by splitting arrays. This can assist students to use a fact they know to learn other facts that may be more difficult to remember. Students can split 6 x 9 into an array of 6 groups of 5 and 6 groups of 4 and then add the sums of the two groups. 6 (5 + 4) = (6 x 5) + (6 x 4) = 30 + 24 = 54



www.georgiastandards.org



www.education.vic.gov.au

The teacher will provide examples for students to use to apply the distributive property of multiplication. Examples are: 8 x 6 = 8 (3 + 3) = (8 x 3) + (8 x 3) = 24 + 24 = 48 and 7 x 7 = 7 (5 +2) = (7 x 5) + (7 x 2) = 35 + 14 = 49.

The teacher will assist and encourage students to use correct vocabulary words as they work. The vocabulary word, unitizing, is when students are able to count groups not just individual objects. The students are able to see the whole number of groups of a number of objects to make the connection between repeated addition or skip counting (in second grade) and multiplication (in third grade). (MP.6)

Lesson Activities

Day 1

1. The teacher will instruct students that multiplication is a means to determine a total amount of items when there are a specific number of groups with the same number of items in each group. The teacher will instruct students that multiplication will require them to think in terms of groups of items rather than individual items. The teacher will instruct students that the multiplication

symbol is an "x" and means groups of and a problem such as 3 x 5 means 3 groups of 5 in each group. The teacher will give an example such as Sara had 3 packs of pencils. There were 5 pencils in each pack. How many pencils does Sara have? (There are 3 groups of 5 which is 3 x 5 = 15.) The teacher will pose the question, "Who can describe another situation where there would be 3 groups of 5?"

2. The teacher will show a container of 20 counters. The teacher will direct the students to arrange the counters into equal groups. The teacher will write the different ways students find to arrange 20 counters into equal groups. (MP.1, MP.4, MP.5, and MP.6) The teacher will inform students that in a multiplication problem one number represents the number of groups and the other one represents the number of items in each group. (Groups may be 2 x 10, 10 x 2, 4 x 5, or 5 x 4. The factors 1 x 20 or 20 x 1 will not be used since it would be counting by ones and would not be an efficient way to group to get a total. The teacher will address all issues students may have and check for understanding.)

3. The teacher will distribute sets of 50 counters to students in groups of four. The teacher will distribute the ***What's My Product?*** recording sheet (Attachment #1). The teacher will give students a number of counters to use as a group (12, 18, 27, 45, 48, and 50. Students will count that number of counters out, use as a total group, and then rearrange the tiles into different groupings that are equal. The students will record all combinations they find for each product. (MP.1, MP. 3, MP.5, MP.6, and MP.7) The teacher will use questioning to check students understanding and work such as "How many ways was your group able to organize the number of counters in each set of counters?"; "Can you explain your picture and number sentence in words your group used on your recording sheets?"

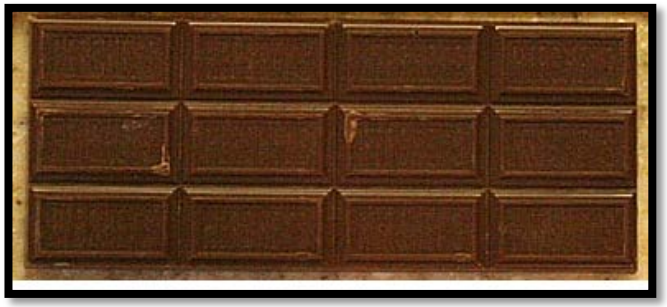
4. The teacher will ask the students to describe the word, inverse. The teacher will accept all correct, plausible answers. The teacher will instruct students that division is the inverse of multiplication and that division is partitioning a total group of items into a number of groups with an equal number in each group. The teacher will instruct students that there are three ways to look at division (partitioning a total number of items into equal groups, repeated subtraction, and as the inverse of multiplication). The teacher will direct students in activities that will help them to make connections between concrete models and their corresponding number sentences in the following work on Day 1. The teacher will ensure students understand the vocabulary of division—quotient (the answer to a division problem; one part representing the number in each of the equal groups partitioned), dividend (the total number of items being divided up or partitioned), and the divisor (the one that is "doing" the dividing; the part

representing the number of groups). *The parts (divisor and quotient) may be used interchangeably as described in Standard 3.OA.2. The teacher will discuss this with students as the next activity is completed and as shown at the beginning of Day 2.

5. The teacher will guide students to complete the activity, ***Stuck on Division***, (Attachment #2) to practice the concept of division using various amounts of linking cubes called for on the activity sheet. At the end of this activity, the teacher may allow students to peruse a multiplication table.

Day 2

1. The teacher will use partition models and measurement models (repeated subtraction) to help students connect multiplication facts with division facts. Partition models focus on facts such as there are 12 sections of a candy bar on the table. There are 3 children. How many sections of the candy bar would each child get if they were shared equally? Measurement models (repeated subtraction) focus on the question of how many groups you can make such as there are 12 sections of a candy bar on the table, if each child gets 4 sections of the candy bar, how many children will get 4 sections of the candy bar?



www.waynesthisandthat.com

Partition Model: 12 ÷ 3 = 4
Measurement Model: 12 ÷ 4 = 3

Students need many opportunities to explore the fact that multiplication and division are inverse operations.

The teacher may bring literature into this lesson by reading, incorporating, and having students model the mathematics developed in reading books such as *The Doorbell Rang* by Pat Hutchins or *Divide and Ride* by Stuart J. Murphy.

2. The teacher will have students in groups of 3 or 4 to complete the activity, ***The Doorbell Rang***, (Attachment #3) using the cookie pattern attached with the activity. (The teacher will make as many copies of the pattern page of cookies as needed for the groups of students using them.) The teacher will precut 48 "cookies" for each group to use. The teacher will instruct the students to follow the directions at the top of the activity page and use the "cookies" to help them solve the problems. The teacher will assess students as they work giving assistance as needed. (All mathematical practices will be used in this activity.)

3. The teacher will use ***Field Day Blunder*** (Attachment #4) as a formative assessment of students' progress. Each student will be given this activity sheet, and each student will work independently. The students may use drawing paper, blocks, or other manipulatives that may help them solve the problems.

   Key for ***Field Day Blunder***: (1) There could be 2 three-people sacks and 9 two-people sacks. The equations would be 2 x 3 = 6 and 9 x 2 = 18 and 6 + 18 = 24. (2) There could be 4 three-people sacks and 6 two-people sacks. The equations would be 4 x 3 = 12 and 6 x 2 = 12 and 12 + 12 = 24. (3) There could be 6 three-people sacks and 3 two-people sacks. The equations would be 3 x 6 = 18 and 2 x 3 = 6 and 18 + 6 = 24. Accept all plausible drawings that illustrate the correct choices. Accept all plausible explanations for their favorite arrangement.

   *The teacher may need to work one combination with the students and allow students to find the other two.
   Points: Each problem has three sections—use numbers, pictures, and words to communicate your reasoning. Give students two points for each section correct for a total of 18 points. Proficient: 13-18 points; Basic: 7-12 points; Minimal: 0-6 points

Day 3

1. The teacher will **review** multiplication by instructing two students to hold out their hands, palms facing up. The teacher will place 2 unit cubes (base ten block ones units). The teacher will place 2 units into each hand. The teacher will ask the students how the number of units could be found that are in all four hands. The teacher will lead the students to skip count by 2s. The teacher will write this as a repeated addition number sentence, 2 + 2 + 2 + 2 = 8. The teacher will remind students that a quicker way would be to use the multiplication they have learned, 4 x 2 = 8 which means four groups of two is the same as eight. (MP.1, MP.2, and MP.6)

2. The teacher will continue to allow students to work in groups of six to model multiplication facts using the following factors—5 x 6, 3 x 4, 2 x 5, 6 x 6, and others students use on their own. The teacher will remind students that each factor should be less than ten. The students will use the base ten blocks (unit cubes) to model the factors and then combine the answer to "trade in" unit cubes for rods (tens base ten block) to relate to place value. The teacher will also encourage students to use the properties of operations when multiplying as needed.

3. The teacher will **review** division by presenting a group of unit cubes to the class that will divide evenly such as 24. The teacher will ask 3 students to hold out their hands with palms up. The teacher will distribute the cubes one by one to each palm until there are no more. The teacher will ask the class how many palms (groups) there are. The class should respond that there are 6 groups. The teacher will then ask how many are in each group. The class should respond that there are 4 in each group. The teacher will then say and write the equation on the board—24 ÷ 6 = 4 and the inverse of that is 6 x 4 = 24 or six groups of four.

4. The teacher will model another division problem. The teacher may use 30 unit cubes and ask 3 different students to hold out their palms. The teacher will distribute the cubes one by one to each palm until there are no more. The teacher will ask the class how many palms (groups) there are. The class should respond that there are 6 groups. The teacher will then ask how many are in each group. The class should respond that there are 5 in each group. The teacher will remind the students that when dividing the groups must be equal groups. The teacher will say and write the equation on the board—30 ÷ 6 = 5 and the inverse of that is 6 x 5 = 30 or six groups of five.

5. The teacher will provide the following problems as practice for students: (a) Sajah and his 8 friends toasted 81 pumpkin seeds from their pumpkin. How many seeds will each person get if they share the pumpkin seeds equally? Clearly explain your thinking using

words, numbers, and pictures. Each person will get 9 pumpkin seeds. (b) Breanne and her 5 friends toasted 96 pumpkin seeds from their pumpkin. How many seeds will each person get if they share the pumpkin seeds equally? Clearly explain your thinking using words, numbers, and pictures. Each person will get 16 pumpkin seeds. (MP.1, MP.2, MP.3, MP.4, MP.6, and MP.7) *These problems are related to science so the teacher may pull in appropriate science information here. (Adapted from www.georgiastandards.org)

Lesson Closure

1. **Think-Pair-Share**: (Day 1) The teacher closes the lesson by posing these three essential questions to the class: (1) What is the relationship between multiplication and division? ; (2) How is multiplication related to addition?; and (3) How is division related to subtraction? She will ask them to think about the questions for 30 seconds and then pair with another student and share their thoughts with each other.

2. **Whip Around:** (Day 2) Have all students stand. The teacher randomly calls on a student to answer a multiplication problem such as 2 x 3 is how much. The student may answer or send the problem to another student of their choice. The student must sit down if he/she passes the problem. Once all students are seated but one (or time runs out), the activity is finished.

3. **Gallery Walk:** (Day 3) Prepare one chart for each pair/group of students and write the following question on it—"Thinking about what you have learned today, describe how the distributive property of multiplication can help you memorize multiplication facts?" Have

Essential Questions:

- What is the relationship between multiplication and division?
- How can the properties of operations make it easier to multiply with larger numbers?
- How is multiplication related to addition?
- How is division related to subtraction?
- How can you describe various patterns?
- What are addition or multiplication patterns?
- What are the properties of addition and multiplication?
- What are ways that I can multiply?
- What are the multiples of ten?
- How can multiplication products be displayed on a hundreds chart?
- What is an area model?

pairs/groups write their responses on the chart. Post all charts on the wall and have students participate in a Gallery Walk to review all responses.	

Standards for Mathematical Practice

- ✓ Make sense of problems and persevere in solving them.
- ✓ Reason abstractly and quantitatively.
- ✓ Construct viable arguments and critique the reasoning of others.
- ✓ Model with mathematics.
- ✓ Use appropriate tools strategically.
- ✓ Attend to precision.
- ✓ Look for and make use of structure.
- ✓ Look for and express regularity in repeated reasoning.

Supplemental Activities

Intervention	**Enrichment**
• The teacher may allow students who struggle with multiplication and division to use manipulatives throughout the lesson including geoboards, arrays using counters, linking cubes, etc. • On Day 1, Bullet 3 the teacher may use smaller numbers for the struggling learner. • On Day 2, Bullet 2 the teacher may use 24 cookies instead of 48 cookies.	• Allow students that need enrichment to use a prime number of counters (29, 31, 47, etc.) and ask them to count the number of counters through grouping. Even though prime numbers are above grade level, the advanced learner can extend his/her thinking to create equal groups with an amount left over. Students can count by the groups and then add the left over amount to come back to the total. • Students may on Day 2, Number 2 write their own division problem using the "cookies" as contexts for their problem.

• On Day 3, Bullet 5 the teacher may use direct instruction and work with students needing intervention in a small group setting.	• The teacher may on Day 2, Number 3 have advanced learners determine different combinations of sacks and helmets when there are 36 helmets. • ***Skittles Cupcake Combos***: I love Skittles and cupcakes! I decided to bake some cupcakes. I put a bag of Skittles, 45 in all, into my batter and baked a dozen cupcakes. Each cupcake had at least three Skittles and no more than five. What are the different possible combinations of Skittles in each of the cupcakes? (1) Draw pictures to show all the ways you can arrange the Skittles. (2) Label and write matching number sentences for each arrangement. www.georgiastandards.org Plausible Solution: There could be 9 cupcakes with 4 Skittles each and 3 cupcakes with 3 Skittles each. 9 x 4 = 36 3 x 3 = 9 36 + 9 = 45 Skittles Accept all plausible answers to include pictures and number sentences/equations.

Performance Based Assessment Task

Cookies

Cookie Monster is baking cookies and wants to give some cookies away so that he can stop eating them all. He plans to share the cookies with his friends. He needs your help with baking and putting them in bags.

Part A—Baking

1. When Cookie Monster bakes his cookies, he puts them on the sheet in neat rows and columns. What are **two** different ways that Cookie Monster could arrange his cookies on the cookie sheet if each sheet holds 12 cookies, or a dozen? Draw the two cookie sheets.

2. Cookie Monster baked 4 dozen cookies. There are 12 cookies in a dozen. Figure out how many cookies he baked. Explain how you found your answer using pictures, number sentences and/or words.

Part B—Bagging

3. Cookie Monster wants to share some cookies with his friends, so he puts them into small bags. If he baked 2 dozen cookies and has 8 bags, how many cookies will go into each bag? Explain how you found your answer using pictures, number sentences and/or words.

Rubric for Performance Based Assessment Task—Possible/Plausible student responses: **15 points total**

Cookies
Scoring Guide

Baking and Bagging Cookies Credit for specific aspects of performance should be given as follows:	Points	Total Points
1. Student's drawing correctly shows the arrangement of 12 in two different arrays.	1 point 1 point	2 points
2. 48 cookies (correct answer) Student work (this may include a correct process but incorrect arithmetic)	1 point 1 point	2 points
3. 3 cookies (correct answer) Student work (this may include a correct process but incorrect arithmetic)	1 point 1 point	2 points
4. 9 bags (correct answer) Student explanation in words or drawing (this may include a correct process but incorrect arithmetic)	1 point 1 point	2 points
5. He needs 5 cookie sheets 6. He can have 30 bags of 2, 20 bags of 3 or 15 bags of 4 (or any other correct combination) 7. A letter that explains the best way of selling the cookies to earn the most money (most students will respond with 30 bags will make the most money, but any logical solution will be accepted).	1 point 1 point per 3 points for solution/explanation	7 points
	Total Points	15 points

4. If Cookie Monster baked 72 cookies and packed 8 in each bag, how many bags would he need? Explain how you found your answer using pictures, number sentences and/or words.

Part C—Constructed Response

Cookie Monster wants to sell his cookies at the Sesame Street Bake Sale. He will bake cookies and put them into bags to sell to his customers. He needs some help with how to do this. Use the following information to answer Cookie Monster's questions.

- 12 cookies fit on a sheet.
- He has enough batter to bake 60 cookies.
- Each bag must have an equal share of cookies and have more than one cookie in it.
- Each bag will cost $2.

5. How many cookie sheets will Cookie Monster need?

6. Give Cookie Monster 3 options for putting the cookies in bags.

_____ bags with _____ cookies in each bag

_____ bags with _____ cookies in each bag

_____ bags with _____ cookies in each bag

7. Write to Cookie Monster and tell him how to bag the cookies so that he can make the most money from the bake sale. (ELA connection) This performance based assessment task may also be found in Attachment #5 ***Cookies.*** Task available at http://coredistricts.org/	

Attachment #1

Mississippi College- and Career-Readiness Standards
Mathematics
Exemplar Lesson Plan

What's My Product?

Name_____ Date_____

What's My Product?

Directions: Arrange counters into equal groups. Complete the table below with your arrangements.

Groups	# of Tiles/Counters in Each Group	Multiplication Fact	Total

Source: www.georgiastandards.org

Mississippi College- and Career-Readiness Standards
Mathematics
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Stuck on Division

Name _____ Date _____

Stuck on Division
Task Sheet

Use 12 connecting cubes to complete this task.

1. Begin with 12 cubes and remove the same number of cubes over and over again until there are none left. Remember, you must remove the *same number* each time. Make a model of your idea with the cubes.

2. Use the first row of the "Stuck on Division" recording sheet to
   a. write about what you did
   b. draw a diagram of your model
   c. write a subtraction number sentence that describes your model

3. Find a way to separate your cubes into equal groups. How can you show the dividend, divisor, and quotient with your cubes?

4. Use the second row of the "Stuck on Division" recording sheet to
   a. write about what you did
   b. draw a diagram of your cube groups
   c. write a division number sentence

5. Now think of a multiplication fact whose product is twelve. Can you make groups of cubes that prove that division is the opposite of multiplication?

6. Use the third row of the "Stuck on Division" recording sheet to
   a. write about what you did
   b. draw a diagram of your cube groups
   c. write the fact family for your diagram

7. Compare your answers with your friends. Did everyone have the same answers? How can you tell whose solutions are correct?

Source: www.georgiastandards.org

Mississippi College- and Career-Readiness Standards
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Name _____ Date _____

Stuck on Division
Recording Sheet

Division is…	Diagram	Number Sentence
Repeated subtraction		
Separating a whole into equal groups		
The opposite of multiplication		

Source: www.georgiastandards.org

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The Doorbell Rang

Directions: Read each problem. Use your group's cookies to help find the answer. Write the division number sentence for each one.

1. Sam's mom baked 15 cookies. Sam, Charlie, and Henry shared the cookies. If the three boys shared the cookies equally, how many cookies did each boy receive?

2. Two girls want to share a batch of cookies. They baked 18 cookies. If the girls share them equally, how many cookies will each girl get?

3. Lilly wants to invite some friends over to eat cookies. She has 24 cookies and wants everyone to get 3 cookies. How many friends can she invite if she is not going to eat any cookies?

4. Alex baked 48 cookies for Halloween. He put 3 cookies in each bag. How many bags can he make?

Source: www.georgiastandards.org

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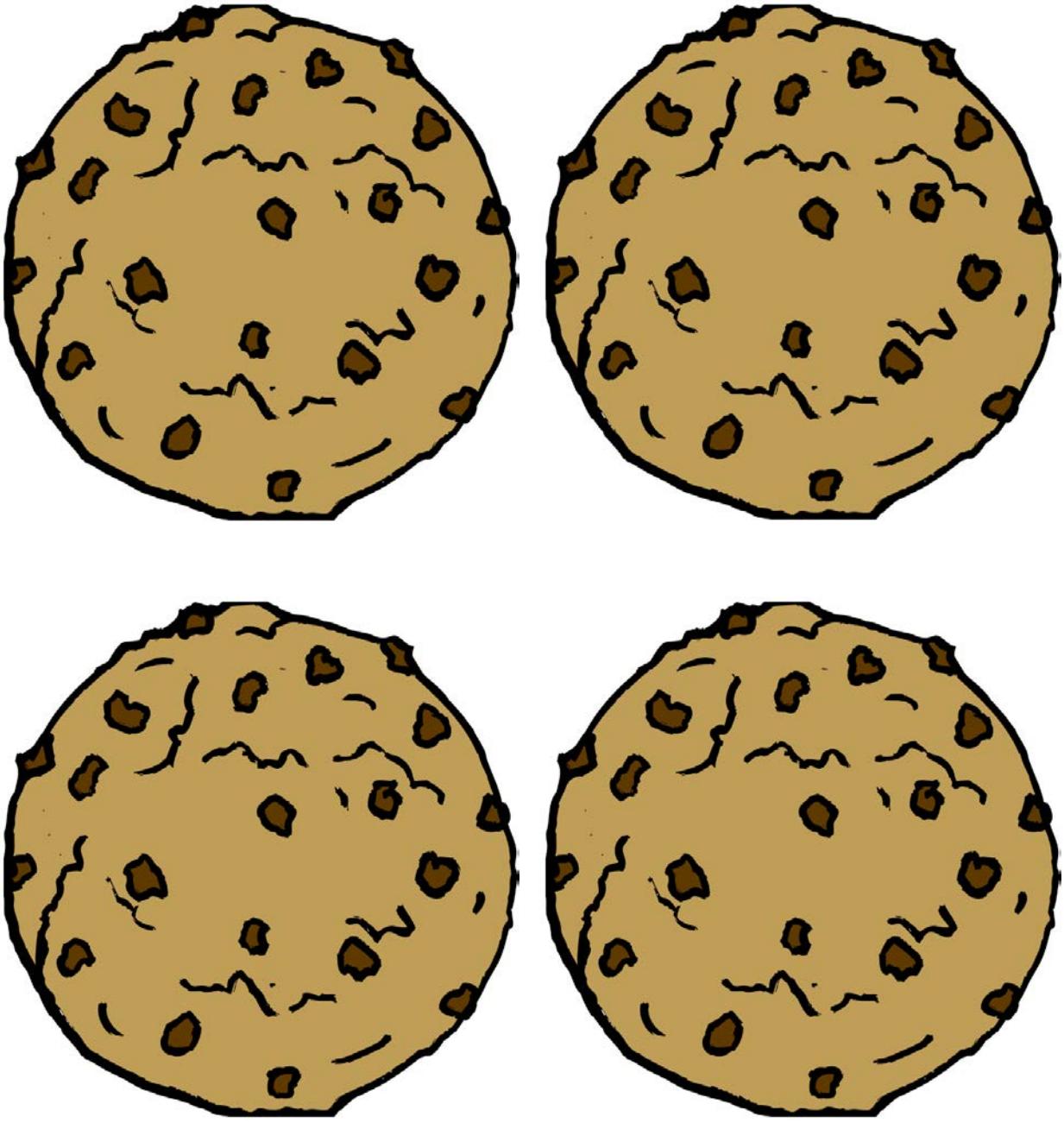
Cookie Pattern



Attachment #4

Mississippi College- and Career-Readiness Standards
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Field Day Blunder

Mrs. Nelson's third grade class was very excited about the upcoming field day events. Each third grade class was given a helmet and a sack for the upcoming sack race. Once the sack race was complete, Mrs. Nelson's class moved on to the next race. As the students rushed to the next event, they left all of their helmets and sacks in a big pile. Christopher and Megan were left to match the helmets with the sacks. Some of the sacks were for 2 people, and some were for 3 people. There were 24 helmets in all. Christopher and Megan were able to match all of the helmets to their sacks. How many 2- and 3-person sacks could there be? Use numbers, pictures and words to communicate your reasoning.

1. Draw pictures to show all the ways you can arrange the sacks and helmets.
2. Label and write matching number sentences for each arrangement.
3. Choose your favorite arrangement and explain why you think it would be the best arrangement so that every student has a helmet and a sack.

Source: www.georgiastandards.org

Mississippi College- and Career-Readiness Standards
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Cookies

PART A - Baking

1. When Cookie Monster bakes his cookies, he puts them on the sheet in neat rows and columns. What are two different ways that Cookie Monster could arrange his cookies on the cookie sheet if each sheet holds 12 cookies, or a dozen? Draw the two cookie sheets.

2. Cookie Monster baked 4 dozen cookies. There are 12 cookies in a dozen. Figure out how many cookies he baked. Explain how you found your answer using pictures, number sentences and/or words.

Source: http://coredistricts.org/

Mississippi College- and Career-Readiness Standards
Mathematics
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Cookies

PART B - Bagging

3. Cookie Monster wants to share some cookies with his friends, so he put them into small bags. If he baked 2 dozen cookies and has 8 bags, how many cookies will go into each bag? Explain how you found your answer using pictures, number sentences and/or words.

4. If Cookie Monster baked 72 cookies and packed 8 in each bag, how many bags would he need? Explain how you found your answer using pictures, number sentences and/or words.

Source: http://coredistricts.org/

Mississippi College- and Career-Readiness Standards
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Cookies

PART C

Cookie Monster wants to sell his cookies at the Sesame Street Bake Sale. He will bake cookies and put them into bags to sell to his customers. He needs some help with how to do this. Use the following information to answer Cookie Monster's questions.

- 12 cookies fit on a sheet
- He has enough batter to bake 60 cookies
- Each bag must have an equal share of cookies and have more than one cookie in it
- Each bag will cost $2

5. How many cookie sheets will Cookie Monster need?

6. Give Cookie Monster 3 options for putting the cookies in bags.

_____ bags with _____ cookies in each bag

_____ bags with _____ cookies in each bag

_____ bags with _____ cookies in each bag

7. Write to Cookie Monster and tell him how to bag the cookies so that he can make the most money from the bake sale.

Source: http://coredistricts.org/

Attachment #5

Mississippi College- and Career-Readiness Standards
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Cookies

Rubric

Baking and Bagging Cookies Credit for specific aspects of performance should be given as follows:	Points	Total Points
1. Student's drawing correctly shows the arrangement of 12 in two different arrays.	1 point 1 point	2 points
2. 48 cookies (correct answer) Student work (this may include a correct process but incorrect arithmetic)	1 point 1 point	2 points
3. 3 cookies (correct answer) Student work (this may include a correct process but incorrect arithmetic)	1 point 1 point	2 points
4. 9 bags (correct answer) Student explanation in words or drawing (this may include a correct process but incorrect arithmetic)	1 point 1 point	2 points
5. He needs 5 cookie sheets 6. He can have 30 bags of 2, 20 bags of 3 or 15 bags of 4 (or any other correct combination) 7. A letter that explains the best way of selling the cookies to earn the most money (most students will respond with 30 bags will make the most money, but any logical solution will be accepted).	1 point 1 point per 3 points for solution/explanation	7 points
	Total Points	15 points

Source: http://coredistricts.org/