

## Just in Time Quick Check

### Standard of Learning 3.CE.2

#### **Strand:** Computation and Estimation

#### **Standard of Learning 3.CE.2**

**The student will recall with automaticity multiplication and division facts through  $10 \times 10$ ; and represent, solve, and justify solutions to single-step contextual problems using multiplication and division with whole numbers.**

*Students will demonstrate the following Knowledge and Skills:*

- a) Represent multiplication and division of whole numbers through  $10 \times 10$ , including in a contextual situation, using a variety of approaches and models (e.g., repeated addition/subtraction, equal-sized groups/sharing, arrays, equal jumps on a number line, using multiples to skip count).
- b) Use inverse relationships to write the related facts connected to a given model for multiplication and division of whole numbers through  $10 \times 10$ .
- c) Apply strategies (e.g., place value, the properties of multiplication and/or addition) when multiplying and dividing whole numbers.
- d) Demonstrate fluency with multiplication facts through  $10 \times 10$  by applying reasoning strategies (e.g., doubling, add-a-group, subtract-a-group, near squares, and inverse relationships).
- e) Represent, solve, and justify solutions to single-step contextual problems that involve multiplication and division of whole numbers through  $10 \times 10$ .
- f) Recall with automaticity the multiplication facts through  $10 \times 10$  and the corresponding division facts.
- g) Create an equation to represent the mathematical relationship between equivalent expressions using multiplication and/or division facts through  $10 \times 10$  (e.g.,  $4 \times 3 = 14 - 2$ ,  $35 \div 5 = 1 \times 7$ ).

#### Just in Time Quick Check

#### Just in Time Quick Check Teacher Notes

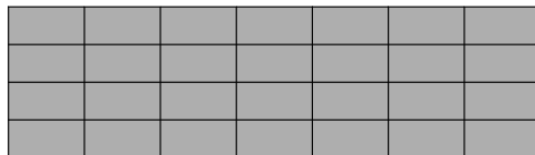
**Supporting and Prerequisite SOL:** 2.NS.1a-b

**Just in Time Quick Check 3.CE.2**

1. Represent  $5 \times 7$  two different ways. Use pictures and words to show your thinking.

2. Represent  $18 \div 3$  two different ways. Use pictures and words to show your thinking.

3. The model below shows  $4 \times 7 = 28$ . Write three math facts that are related to  $4 \times 7 = 28$ .



4. Two students were given the problem shown below. Each student solved the problem differently.

$$9 \times 6$$

- a) Student 1 said they would first solve the problem  $10 \times 6$  and then subtract 9 to figure out the product of 9 and 6.
- b) Student 2 said they would first solve the problem  $10 \times 6$  and then subtract 6 to figure out the product of 9 and 6.

Which student solved the problem correctly? Use pictures or words to explain your answer.

5. Identify the two division facts related to the problem shown below.

$$7 \times 6 = \underline{\quad}$$

$7 \div 6 = \underline{\quad}$	$6 \div 7 = \underline{\quad}$
$42 \div 7 = \underline{\quad}$	$42 \div 6 = \underline{\quad}$

6. Jason has 9 packages of muffins. Each package has 3 muffins. What is the total number of muffins in these packages? Represent this problem using pictures, numbers, or words, and then solve the problem.

7. There are 12 candies on the counter. Kendra will share the candies equally among 4 bags. How many candies will go in each bag? Represent this problem using pictures, numbers, or words, and then solve the problem.

8. Complete each equation.

$$7 \times 6 = \underline{\quad} \times 3$$

$$24 - 4 = 2 \times \underline{\quad}$$

$$48 \div 8 = 9 - \underline{\quad}$$

$$3 + 4 + 2 = \underline{\quad} \div 6$$

### 3.CE.2 Just in Time Quick Check Teacher Notes

#### Common Errors/Misconceptions and their Possible Indications

1. Represent  $5 \times 7$  two different ways. Use pictures and words to show your thinking.

*A variety of responses should be considered correct, including but not limited to:*

- *Models and/or contexts that represent five sets/groups/rows/jumps of seven OR seven sets/groups/rows/jumps of five; and*
- *Models and/or contexts that use a multiplicative comparison (e.g., Sue has 5 pencils and Joe has 7 times as many pencils as Sue; Joe has 7 pencils, and Sue has 5 times as many pencils as Joe).*

*Students who add the two digits and represent an addition expression may need instruction in the meaning of the operational symbol,  $\times$ . Using context to help students represent and make meaning of operations may be helpful. Sets of counters, number lines to skip count and relate to multiplication, and arrays/area models will aid students in solving problems involving multiplication and foster understanding of multiple representations. Students should represent the model used as a drawing and/or equation to find the solution. Encourage students to solve these problems in different ways to show the same idea, to explain their thinking verbally, and to represent their thinking with an expression or equation.*

*Students who are unable to represent the expression in more than one way may benefit from experiences that include not only solving and representing problems involving equal groups, where the whole is unknown or the size of the group is unknown, but also problems involving multiplicative comparison.*

*Refer to the Grade 3 Instructional Guide for examples of the different types of models and the variety of problem types with which students should have experience at this grade level.*

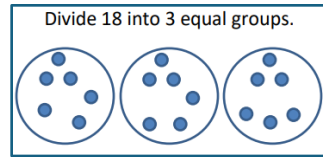
2. Represent  $18 \div 3$  two different ways. Use pictures and words to show your thinking.

*Students may be unable to represent the expression in more than one way, or their work may be more representative of multiplication than division. Students are often unable to interpret  $18 \div 3$  as the number of objects in each group when 18 objects are partitioned equally into 3 groups, or as a number of groups when 18 objects are partitioned into equal groups of 3 objects each. In each of these instances, students would benefit from using manipulatives to solve practical division problems and representing that work with a model or picture. Problem solving contexts that provide experience partitioning quantities into equal shares, creating equal groups, and using number charts or number lines to model repeated subtraction are encouraged. Refer to the Grade 3 Instructional Guide for examples of the different types of models and the variety of problem types with which students should have experience.*

As with multiplication, a variety of responses should be considered correct, including but not limited to:

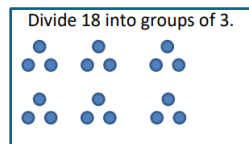
- *Equal shares: There are 18 circles. There are 3 groups. There are 6 circles in each group.*

$$18 \div 3 = 6$$



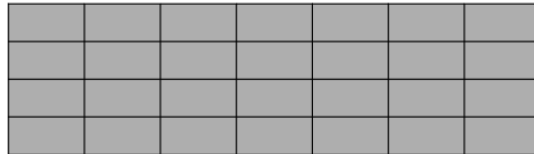
- *Equal groups: There are 18 circles. There are 3 circles in each group. There are 6 groups.*

$$18 \div 3 = 6$$



- *Repeated subtraction:  $18 - 3 - 3 - 3 - 3 - 3 - 3 = 0$  or  $18, 15, 12, 9, 6, 3, 0$*

3. The model below shows  $4 \times 7 = 28$ . Write three math facts that are related to  $4 \times 7 = 28$ .



*A common error is for students to include facts that are not accurate and state that they are related to the given multiplication fact, such as  $4 \div 28 = 7$ ,  $7 \div 28 = 4$ ,  $7 \div 4 = 28$ , and/or  $4 \div 7 = 28$ . These errors may indicate an understanding that division is the inverse operation of multiplication but a lack of understanding of how those operations are related. Using physical models to generate and represent related facts and writing the corresponding equations for the physical models may help students develop conceptual understanding for the inverse relationship that exists between multiplication and division. Students may also benefit from creating story problems that correspond to the related multiplication and division facts, as context may help students make meaning of mathematical operations.*

4. Two students were given the problem shown below. Each student solved the problem differently.

$$9 \times 6$$

- a) Student 1 said they would first solve the problem  $10 \times 6$  and then subtract 9 to figure out the product of 9 and 6.
- b) Student 2 said they would first solve the problem  $10 \times 6$  and then subtract 6 to figure out the product of 9 and 6.

Which student solved the problem correctly? Use pictures or words to explain your answer.

*When students can think flexibly and apply more than one strategy, solving problems will become more fluent. It is important for students to understand the concept of multiplication in terms of groups. In this problem,  $9 \times 6$  may be thought of as 9 groups of 6. Although some students may be able to automatically recall the product, it is important that students have a deeper understanding of multiplication and be able to apply a variety of strategies.*

*It is a common misconception for students to use a related problem with friendly numbers when multiplying but not understand how to compensate for that problem to determine the actual product. Students should understand that 10 groups of 6 is just one more group of 6, so a group of 6 would need to be removed. There are a variety of models that can be used to demonstrate this concept. An array model showing 9 rows of 6 compared to 10 rows of 6 or a number line modeling 9 jumps of 6 compared to 10 jumps of 6 can also be used to show the relationship between these two facts.*

5. Identify the two division facts related to the problem shown below.

$$7 \times 6 = \underline{\quad}$$

$7 \div 6 = \underline{\quad}$	$6 \div 7 = \underline{\quad}$
$42 \div 7 = \underline{\quad}$	$42 \div 6 = \underline{\quad}$

*When solving multiplication facts, it is important for students to be able to identify the corresponding division facts. When exploring the concept of multiplication, students should understand and be able to identify the inverse relationship between multiplication and division.*

*A common misconception for some students is to select a division problem that has the same numbers as the given multiplication problem. If students select  $7 \div 6$  and/or  $6 \div 7$ , then students may need additional time to explore the relationship between multiplication and division. Using manipulatives such as counters to create equal groups or modeling on a number line are two ways to explore this relationship. Being able to apply inverse relationships will allow students to use multiplication as a strategy when solving division problems.*

6. Jason has 9 packages of muffins. Each package has 3 muffins. What is the total number of muffins in these packages? Represent this problem using pictures, numbers, or words, and then solve the problem.

*Some students may see the phrase “total” and choose to add  $9 + 3$  instead of multiplying  $9 \times 3 = 27$  or  $3 \times 9 = 27$ . Other students may use their knowledge of the relationship between 9 and 3 and divide  $9 \div 3$  instead of using the context of the problem to determine which operation to use to solve. These students would benefit from creating a pictorial model to represent the situation and to solve the problem. Providing opportunities for students to share different models that represent a problem situation, and the associated number sentences used to represent thinking, may help students develop problem-solving strategies as they make meaning for both multiplication and division. Students will also benefit from additional experiences with the variety of problem types for multiplication and division described in the Grade 3 Instructional Guide.*

7. There are 12 candies on the counter. Kendra will share the candies equally among 4 bags. How many candies will go in each bag? Represent this problem using pictures, numbers, or words, and then solve the problem.

*A common error is for students to subtract and find  $12 - 4 = 8$  instead of  $12 \div 4 = 3$  or  $12 \div 3 = 4$ . These students would benefit from using concrete materials to first act out the problem and then to represent this action with a model or picture. Note that while most students will likely use  $12 \div 4 = 3$  to represent this situation, others may use different equations, which would also be considered correct:*

- $12 \div 3 = 4$  12 candies, with 3 candies per bag, takes 4 bags
- $4 \times 3 = 12$  4 bags with 3 candies per bag is 12 candies
- $3 \times 4 = 12$  3 candies in each of 4 bags is 12 candies

*As students explain how they found their answer, they will reveal the strategies they used. Students who used repeated subtraction may accurately understand what the question is asking but may not be comfortable with division facts. Opportunities for students to discuss different representations are*

*encouraged, as these experiences will help students develop flexible strategies for problem solving and conceptual understanding for the inverse relationship between multiplication and division. Students will also benefit from more opportunities to interpret the variety of problem types described in the Grade 3 Instructional Guide, to represent their solutions with models and equations, to explain their thinking to others, and to consider other students' strategies and representations.*

8. Complete each equation.

$$7 \times 6 = \underline{\quad} \times 3$$

$$24 - 4 = 2 \times \underline{\quad}$$

$$48 \div 8 = 9 - \underline{\quad}$$

$$3 + 4 + 2 = \underline{\quad} \div 6$$

*Some students may have difficulty finding the missing number to balance each equation. A common error is for students to solve the left side of the equation, then put the value of the left side as the missing number on the right side of the equation. In the first example, students may solve  $7 \times 6$ , obtain 42, and place the product of 42 as the missing factor, not realizing that  $42 \times 3$  does not equal  $7 \times 6$ . Similarly, in the fourth example, students may add  $3 + 4 + 2$  to get 9 and put 9 as the missing number on the right side of the equation. These errors may indicate that students view the equal sign as meaning "the answer is" rather than understanding that the equal sign denotes the relationship between two equal quantities. Ask students to model the equation using manipulatives to determine if the equation is balanced or not balanced. To check their work, it may also be helpful to have students solve the right side of each equation as if the missing factor was 42 (example 1) or 9 (example 4).*