Just In Time Quick Check

Standard of Learning (SOL) 4.16

Strand: Patterns, Functions, and Algebra

Standard of Learning (SOL) 4.16

The student will recognize and demonstrate the meaning of equality in an equation.

Grade Level Skills:

- Write an equation to represent the relationship between equivalent mathematical expressions (e.g., $4 \times 3 = 2 \times 6$; $10 + 8 = 36 \div 2$; $12 \times 4 = 60 - 12$).
- Identify and use the appropriate symbol to distinguish between expressions that are equal and expressions that are not equal, using addition, subtraction, multiplication, and division (e.g., $4 \times 12 = 8 \times 6$ and $64 \div 8 \neq 8 \times 8$).

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
  - 4.16- Reasoning About Equations Using Equality (Word) / (PDF Version)
- VDOE Word Wall Cards: Grade 4 (Word) | (PDF)
  - Equality
  - Inequality
  - Expression
- VDOE Rich Mathematical Tasks
  - 4.16 Equality Possibilities Task Template (Word) / (PDF Version)
  - 4.16 Equality Possibilities Student Version of Task (Word) / (PDF Version)
  - 4.16 Equality Possibilities Anchor Papers (Word) / (PDF Version)
  - 4.16 Equality Possibilities Anchor Papers Scoring Rationales (Word) / (PDF Version)

Supporting and Prerequisite SOL: 4.4d, 4.5c, 3.17, 2.17

SOL 4.16 - Just in Time Quick Check

1. The teacher wrote the equation 10 + 4 = ☐ + 5 on the board.

   Sarah said the missing number is 14. Is Sarah correct or incorrect? What reasoning do you think Sarah was using?

2. Create three different expressions that each make this equation true when placed in the blank:

   15 – 3 = _____

   Use a different operation (+, −, ×, ÷) in each expression you create.

3. Choose each number sentence that is true. Justify your reasoning using words, pictures, and/or symbols.

   36 ÷ 6 = 3 x 2

   11 x 4 ≠ 3 x 9

   7 x 2 = 30 – 14

   10 + 8 ≠ 36 ÷ 2

4. Fill in the blanks to show if the expressions are equal (=) or not equal ($\neq$).

   7×6 _____ $6 + 7$

   2×6 _____ 3×4

   $20 \div 2$ _____ 5×2

   $35 - 19$ _____ $20 + 15$

5. Complete each equation.

   $7 \times 6 = \_\_\_ \times 3$

   $7 + 12 + 3 = 2 \times \_\_\_$

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Common Errors/Misconceptions and their Possible Indications

1. The teacher wrote the equation 10 + 4 = ☐ + 5 on the board. Sarah said the missing number is 14. Is Sarah correct or incorrect? What reasoning do you think Sarah was using?

   A student may agree that Sarah's answer is correct because they view the equal sign as meaning "the answer is" rather than understanding that the equal sign denotes the equivalence between two quantities. It might be helpful to ask the student to model the equation using manipulatives to determine if the equation is balanced or not balanced. In addition, it may be helpful for the student to solve the right side of the equation as if the missing number was 14 to show that the left side of 14 is not equivalent to the right side of 14 + 5.

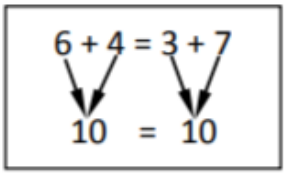
2. Create three different expressions that each make this equation true when placed in the blank:

   15 – 3 = _____

   Use a different operation (+, −, ×, ÷) in each expression you create.

   A student may have difficulty determining three equations using different operations. Some students may immediately want to simplify and solve the problem instead of creating an equation. If students do this, then they may not understand that an equation represents the relationship between two expressions.

   If students only create addition equations, they likely need exposure to various equations that use other operations. Encourage students to use manipulatives and to share how they made their decision. This allows students to go beyond doing the arithmetic and to think about the equality relationships between the expressions in an equation. If needed, use a visual to illustrate correct and incorrect responses to ensure that the student has a concept of equality, such as a balance scale or the example below.



3. Choose each number sentence that is true. Justify your reasoning using words, pictures, and/or symbols.

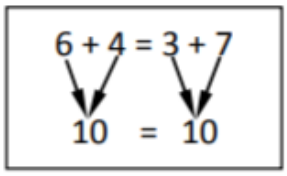
$36 \div 6 = 3 \times 2$

$11 \times 4 \neq 3 \times 9$

$7 \times 2 = 30 - 14$

$10 + 8 \neq 36 \div 2$

A common misconception some students may have is to think that they are looking for the same numbers on each side of the equation, rather than the same value. This may indicate that a student does not understand that even though each side of the equation uses different operations or numbers, the values can still be the same. Encourage the student to use manipulatives and to be able to share how they made their decision. This allows students to go beyond simply doing the arithmetic and to think about the equality relationships between the expressions in an equation. If needed, use a visual to illustrate correct and incorrect responses to ensure that the student has a concept of equality, such as a balance scale or the example below.



Another misconception some students may have is struggling with the concept that a number sentence having the not equal symbol can be true. Encourage students to solve both sides of the number sentence and show their thinking on paper. It may be helpful to have students write the words underneath the symbols, then read aloud the number sentence using the words in place of the symbols. For example: 11 times 4 equals 44 and 3 times 9 equals 27. 44 is not equal to 27 so 11 times 44 is not equal to 3 times 9. This is a true statement. Sentence frames may benefit some students by providing structure that can help students to voice their thinking mathematically.

4. Fill in the blanks to show if the expressions are equal (=) or not equal ($\neq$).

7×6 _____ $6 + 7$

2×6 _____ 3×4

$20 \div 2$ _____ 5×2

$35 - 19$ _____ $20 + 15$

A common misconception that some students have is to think that expressions are not equal to each other if the operations are different for each expression. Students often confuse operations when representing expressions that are equivalent, especially using the same digits. They may think that the expressions are all not equal because the numerals are in a different order. Have students simplify each side independently of each other and compare the two values when deciding if the expressions are equal or not equal.

5. Complete each equation.

   7 x 6 = ___ x 3

   7 + 12 + 3 = 2 x ___

   It is common for some students to have a lack of understanding of how to balance the equation by solving the side without the missing number first. Students may also immediately solve 7 x 6, obtain 42, and place the product of 42 as the missing factor. This means a student may view the equal sign as meaning "the answer is" rather than understanding that the equal sign denotes the relationship between two equal quantities. Ask the student to model the equation using manipulatives to determine if the equation is balanced or not balanced. Have the student solve the right side of the equation as if the missing factor was 42.

   Similarly, the second equation may confuse students because it contains more than two addends. Students may correctly complete the addition using the three addends but then think that they need three factors on the right to make the problem have the same number of terms. These students would benefit from practice determining what number is missing by reasoning or thinking about how the expression on the left is related to the expression on the right. Manipulatives would work well with a visual explanation.