Just In Time Quick Check

Standard of Learning (SOL) 6.5a

Strand: Computation and Estimation

Standard of Learning (SOL) 6.5a

The student will multiply and divide fractions and mixed numbers.

Grade Level Skills:

- Demonstrate/model multiplication and division of fractions (proper or improper) and mixed numbers using multiple representations.
- Multiply and divide fractions (proper and improper) and mixed numbers. Answers are expressed in simplest form.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

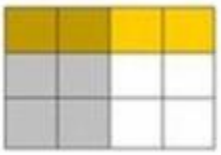
Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
  - Modeling Division of Fractions (Word) / PDF
  - Modeling Multiplication of Fractions (Word) / PDF
  - Multiply Fractions and Mixed Numbers (Word) / PDF
- VDOE Algebra Readiness Formative Assessments
  - SOL 6.5a (Word) / PDF
- VDOE Algebra Readiness Remediation Plans
  - Multiplying Fractions-Using Models (Word) / PDF
  - Division of Fractions: Investigating with Paper Folding (Word) / PDF
- VDOE Word Wall Cards: Grade 6 (Word) / PDF
  - Multiplying Fractions with Models
  - Fraction Division with Models
- VDOE Instructional Videos for Teachers
  - Area Model for Multiplying Fractions (Grades 6-8)
  - Models for Dividing Fractions (Grades 6-8)
- Desmos Activity
  - Multiplying Fractions with an Area Model

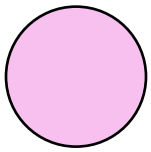
Supporting and Prerequisite SOL: 6.2a, 5.2a, 5.5a, 5.6b, 4.5a, 4.5b

SOL 6.5a - Just in Time Quick Check

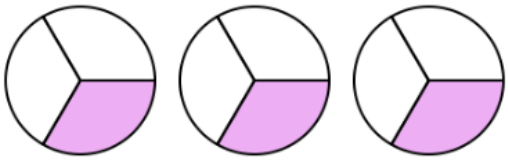
1. What multiplication expression does this model represent?



2. This circle represents one whole.



What multiplication sentence does this model represent?



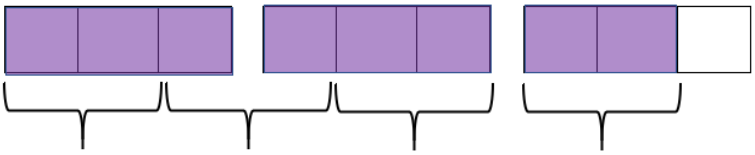
3. Solve. The answer must be in simplest form.

a) $\frac{4}{5} \times \frac{1}{4} =$

b) Find the product of $2\frac{1}{4}$ and $1\frac{2}{3}$.

4. This model represents a whole.

What division sentence does this model represent?



_____

5. Use models and/or numbers to solve. Write the quotient in simplest form.

a. $6 \div \frac{2}{3} =$ _____

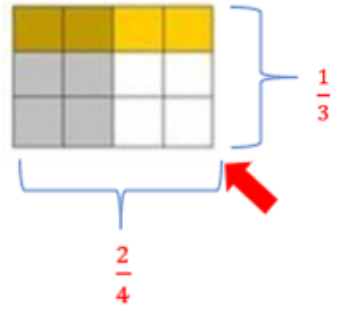
b. $\frac{8}{9} \div \frac{2}{3} =$ _____

c. $2\frac{1}{4} \div \frac{1}{2} =$ _____

SOL 6.5a - Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

1. What multiplication expression does this model represent?

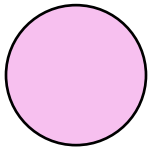


$$\frac{1}{3} \times \frac{2}{4} = \frac{2}{12} = \frac{1}{6}$$

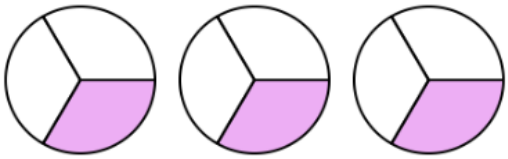
A common error that students make with this type of problem is not being able to find the fractions multiplied in the model. This is due to not understanding what the parts of the model represent. Real world examples will help them to see what each of the created rectangles represents. "My friend gave me two fourths of a pizza (gray). I ate one third of what was left (yellow). How much of a whole pizza did I eat?" Pointing out what to look for in the model helps clarify the two fractions. When students struggle, many times it is because they have trouble separating the different parts of the model.

Students may have difficulty seeing the solution shown in the model. Again, real life application can give meaning to the shaded portions of the diagram and help students identify the product in the model. For the given example, the rectangles shaded only gray are the pizza left over that was not eaten. Giving a description for each part often helps students find the fractions and if needed, the solution.

2. This circle represents one whole.



What multiplication sentence does this model represent?



When students see this type of question, they can usually see that it has something to do with one third. What they struggle with is seeing what multiplication sentence is shown in the model. Many times, students expect there to be two fractions instead of having a whole number in the model. Using prior knowledge about "groups of" may help, especially when given real world context. For example, "You have three boxes of pizza and each box has 1/3 of a pizza left."

A concrete way is to show students the solution is to combine the pieces together to form a whole.

3. Solve. The answer must be in simplest form.

a. $\frac{4}{5} \times \frac{1}{4} =$

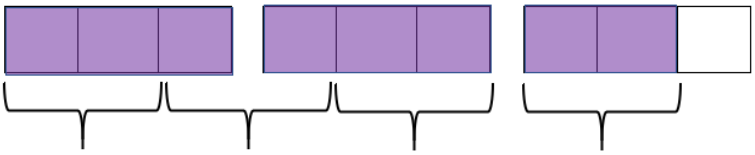
Students often find a common denominator like they did with addition and subtractions of fractions, and then multiply the numerators. Teachers may wish to pair area models when teaching computation to foster student discovery that they can find the product by multiplying the numerators and multiplying the denominators.

b. Find the product of $2\frac{1}{4}$ and $1\frac{2}{3}$.

A common mistake that students make with this type of question is that they may not know the meaning of product, so they perform the wrong operation. Reinforcing vocabulary is very important to make sure that students know what to do when given words instead of a symbol. When students are given two mixed numbers to multiply, they commonly multiply the whole numbers and then multiply the fractions. This process misses parts of both numbers that need to be multiplied. To reinforce this understanding, students can use the area model or an array to show the distributive property where each part is multiplied. Using models and a review of changing mixed numbers into their equivalent improper fractions may be helpful.

4. This model represents a whole.

What division sentence does this model represent?



$2\frac{2}{3} \div \frac{2}{3} = 4$ or it can be $2\frac{2}{3} \div 4 = \frac{2}{3}$

Students struggle to understand what this model is showing. Real world context can help students understand that it is a division problem, what the whole (dividend) is, what parts it is being broken into, and how many parts there are.

At first, students have difficulty understanding the dividend. Each rectangle is a whole, so the example shown starts with the dividend of $2\frac{2}{3}$. Giving students multiple mixed number models will help them find the amount you have to start (dividend), which helps them see what is being divided (divisor).

Secondly, there are "grouping" symbols below the model, dividing the original amount into parts. Students have a hard time seeing the parts that the dividend is being divided into, especially if the grouping symbol incorporates parts from more than one rectangle (whole). For the given example, students may think $2\frac{2}{3}$ divided by 2, since each group has 2 parts.

The modeled problem can be described as $2\frac{2}{3} \div \frac{2}{3} = 4$ *or it can be* $2\frac{2}{3} \div 4 = \frac{2}{3}$. *Reminding students of fact families helps them understand why both sentences are correct and where the numbers come from.*

For students who have difficulty understanding, provide an example that the whole rectangles are candy bars, and the groupings under the model are people taking a share of candy. For this example, you have $2\frac{2}{3}$ *candy bars, and each person receives* $\frac{2}{3}$ *of a candy bar, which is their share. Four people each receive a share of candy. Real world applications can help students make sense of the models.*

5. Use models and /or numbers to solve. Write the quotient in simplest form.

   a. $6 \div \frac{2}{3} =$ _____

   b. $\frac{8}{9} \div \frac{2}{3} =$ _____

   c. $2\frac{1}{4} \div \frac{1}{2} =$ _____

A common error when dividing fractions occurs when students multiply the fractions without changing the divisor to its reciprocal. Modeling can show students why multiplying by the reciprocal of the divisor is the same as dividing by the divisor (for example, dividing by 2 is the same as multiplying by one half). To solidify this understanding, teachers may wish to provide several models of a whole number divided by a unit fraction where students can easily see the divisor-reciprocal connection.

Students are encouraged to draw pictures or models to make sense of dividing by fractions. Using contexts of 6 pizzas divided by $\frac{2}{3}$, *or asking students "How many two-thirds can fit into 6 wholes?" can help students develop a conceptual understanding.*

When students have mixed numbers in a division question, many times they try to multiply or divide the whole numbers and multiply or divide the fractions. Encouraging students to estimate prior to starting the problem can help them make sure that their answer is reasonable.