At-Home Math Connection

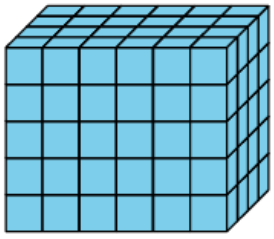
Grade 5 - Quarter 1

Dear Parents and Caregivers,

Below you will find a short description of the mathematics your child is working on this quarter. We recommend your child engage with the provided practice at home. Thank you for your continued support. Have fun with your mathematician(s)!

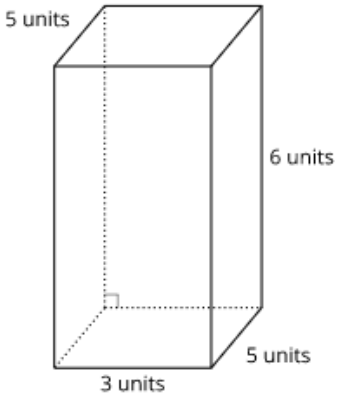
Quarter Focus:
Scholars find the volume of rectangular prisms and figures composed of two prisms. Scholars solve problems involving division of whole numbers with answers that are fractions (which could be in the form of mixed numbers). They develop an understanding of fractions as the division of the numerator by the denominator. They then solve problems that involve the multiplication of a whole number by a fraction or mixed number. Scholars use area concepts to represent and solve problems involving the multiplication of two fractions, and generalize that when they multiply two fractions, they need to multiply the two numerators and the two denominators to find their product.

Unit Cubes and Volume: Scholars learn to call the amount of space an object takes up volume. Volume is measured in cubes. For example, this prism has a volume of 120 cubes.



To find the volume of any prism, scholars can find the number of cubes in one layer and multiply that number by the number of layers. In this example, scholars might describe this prism as having 5 layers of 24 cubes. They can find the number of cubes by multiplying 5 and 24. So, 5 x 24 = 120

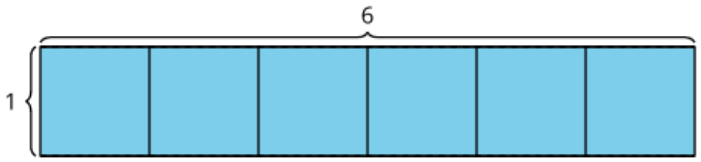
Expressions for Finding Volume: Scholars find the volume of a rectangular prism by multiplying the side lengths or by multiplying the area of the base by the height. For example they can multiply the length by width by height, or 3 x 5 x 6 or they can find the bottom area by multiplying 3 x 5 to get 15 and then multiplying 15 by 6. The volume of this rectangular prism is 90 cubic units.



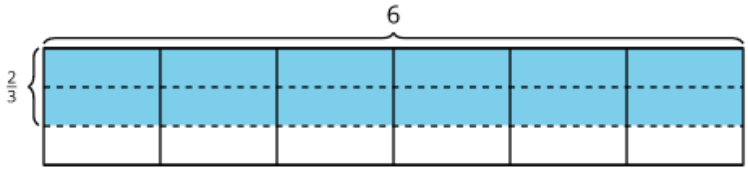
Fractions as Quotients: Scholars learn that fractions are quotients and can be interpreted as division of the numerator by the denominator. Through the context of first sharing 1, then sharing more than 1, then sharing a number of things with increasingly more people, students notice patterns. For example, scholars use the diagram below to show 4 objects being shared equally by 3 people, or $4 \div 3$, which can also be written as a fraction, $\frac{4}{3}$.

Fractions of Whole Numbers: Scholars make connections between multiplication and division and use visual representations that can show both operations. For example, the diagram above can also represent 4 groups of $\frac{1}{3}$ or $4 \times \frac{1}{3}$. Scholars discover ways of finding the product of a fraction and whole number that make sense to them and connect the product to the context and diagrams. They multiply a whole number by a fraction.

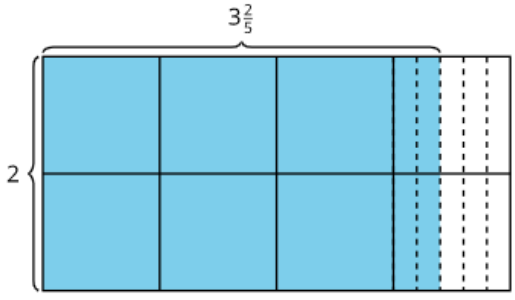
Area and Fractional Side Lengths: Scholars use what they know about the area of rectangles with whole number side lengths to find the area of rectangles that have one whole number side length and one fractional side length. The expression 6×1 represents the area of a rectangle that is 6 units by 1 unit.



In the same way $6 \times \frac{2}{3}$ represents the area $6 \times 2 \times \frac{1}{3}$ of a rectangle that is 6 units by unit.

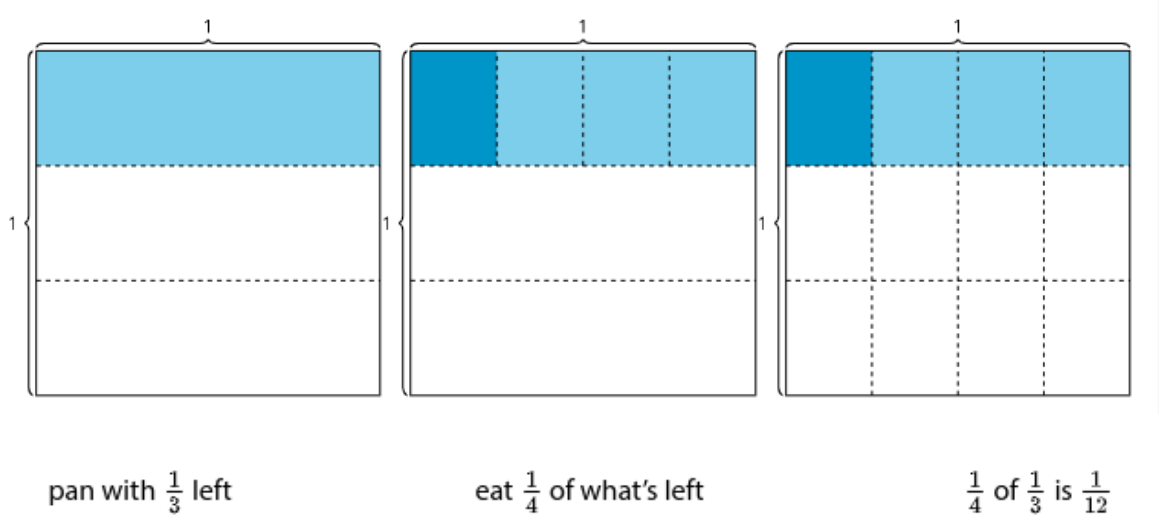


In addition, scholars see that the expressions $6 \times \frac{2}{3}$ as the same as $6 \times 2 \times \frac{1}{3}$ and $12 \times \frac{1}{3}$ can all represent the area of this same diagram. Scholars analyze diagrams where one side length is a mixed number, for example a rectangle that is 2 by $3\frac{2}{5}$. They decompose the shaded region to show the whole units and the fractional units.



To find the area represented by this diagram, scholars may see two rectangles: a rectangle that is 2 units by 3 units and a rectangle that is 2 units by $\frac{2}{5}$unit. While they may recognize that the area can be represented as 2 x $3\frac{2}{5}$, scholars who see the decomposed rectangle may write (2 x 3) + (2 x $\frac{2}{5}$) to find the area.

Fraction Multiplication: Scholars build on their knowledge of fraction multiplication developed in the previous unit by using area concepts to understand the multiplication of a fraction times a fraction. Scholars draw diagrams to represent the fractional area. For example, scholars learn that the diagrams below can represent the situation "Kiran eats macaroni and cheese from a pan that is $\frac{1}{3}$ full. He eats $\frac{1}{4}$ of the remaining macaroni and cheese in the pan. How much of the whole pan did Kiran eat?"



Scholars extend this conceptual understanding to multiply all types of fractions including fractions greater than 1 (for example, $\frac{7}{4}$). In each case, the scholars relate this multiplication to finding the area of a rectangle with fractions as side lengths. They notice that they can multiply the two numerators and the two denominators to find their product. This reasoning holds true for fractions greater than 1. For example, $\frac{3}{4}$x $\frac{7}{5}$ = $\frac{3\ x\ 7}{4\ x\ 5}$ = $\frac{21}{20}$

Writing Simple Expressions: Scholars learn that an expression names a number. An equation describes a relationship between two expressions. Often, expressions and other computations can be performed mentally or conclusions can be made about computations or comparisons without precise calculations. Scholars understand that parentheses indicate which operation to perform first. They write a given expression in words and evaluate a numerical expression without solving.

Example:

Write an expression that models "the sum of 8 and 7, multiplied by 2".

(8+7) x 2

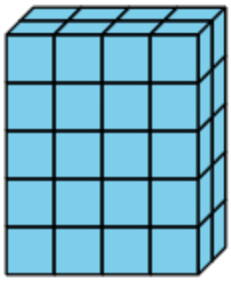
Curious about the Grade 5 Quarterly Assessment? *The assessment consists of 12 multiple choice questions worth 2 points each, 1 constructed response question worth 2 points, and 1 extended response question worth 3 points.*

Try it At Home!

Volume Practice:

Near the end of the unit, find the volume of these figures with your student.

1.



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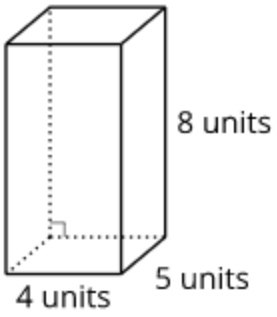
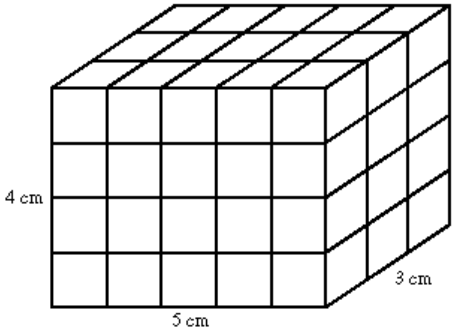


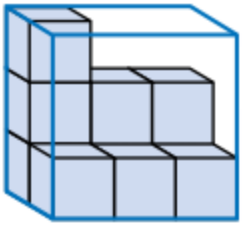
Questions that may be helpful as they work:

- How are the 2 problems the same? How are they different?
- Can you explain or show me how you found the volume?
- How did you know you needed that number or piece of information?

3. Find the volume of the shape below by figuring out 1 layer and multiplying it by how many layers there are and then use the formula to check.



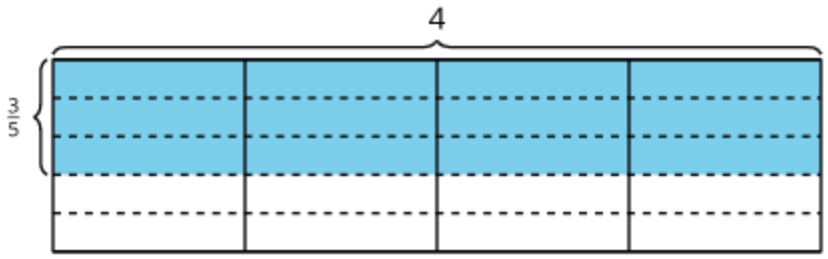
4. Eli is stacking unit cubes in a box. He partially fills the box, pauses, and says, "The volume of this box is 18 cubic units." Explain how Eli found the volume of the box.



Fraction Multiplication Practice:

Near the end of the unit, ask your student the following questions:

1. Write as many expressions as you can that represent this diagram:



Use a model to find the product of the following expressions.

2. $\frac{3}{4} \times \frac{4}{6}$

3. $\frac{7}{8} \times \frac{2}{5}$

Use a model to solve the following problems.

4. A postage stamp has a width of $\frac{3}{4}$ inch and length of $\frac{3}{2}$ inches. What is the area of the stamp in square inches?

5. Brent is designing a poster that has an area of 1 square foot. He is going to paste a photo collage on a section of the poster that is $\frac{1}{3}$ foot wide and $\frac{3}{5}$ foot long. What part of a square foot will the photo collage cover?

Fractions As Division Practice

Solve the following problems using a strategy of your choice.

1. Five pounds of birdseed is used to fill 4 identical bird feeders. What fraction of the birdseed will be needed to fill each feeder?

2. An ice-cream shop uses 4 pints of ice cream to make 6 sundaes. How many pints of ice cream are used for each sundae?

Writing Simple Expressions Practice

1. How would you write the following expression in words (3 x 4)+10 ?

   _____

2. Write an expression that models "subtract 5 from 20, then divide by 3".

   _____

Answer Key

Volume:

1. 40 cubic units	2. 160 cubic units
3. 60 cubic units	4. The base of the prism is 6 cubic units. The prism has 3 layers. Three layers of 6 cubic units is 18 cubic units. 6 + 6 + 6 = 18 OR 6 x 3 = 18 OR other appropriate representation.

Fraction Multiplication:

1. $4 \times \frac{3}{5}$ or $4 \times 3 \times \frac{1}{5}$ or other appropriate answer	2. $\frac{12}{24}$ or $\frac{1}{2}$
3. $\frac{14}{40}$ or $\frac{7}{20}$	4. $\frac{9}{8}$ or $1\frac{1}{8}$ Square units
5. $\frac{3}{15}$ square feet	

Fractions As Division:

1. $\frac{5}{4}$ or $1\frac{1}{4}$	2. $\frac{4}{6}$ or $\frac{2}{3}$

Writing Simple Expressions:

1. The product of 3 multiplied by 4, plus 10.	1. (20 - 5) ÷ 3

~*Adapted from:* Illustrative Math Family Materials, Howard County Public School District, Kansas Department of Education - Flip Book, Number Talks - by: Sherry Parrish, Teaching Student-Centered Mathematics - by: John A. Van de Walle, et al.