

**Unit 4: Part B – Multiplying and Dividing Fractions
Grade 5**

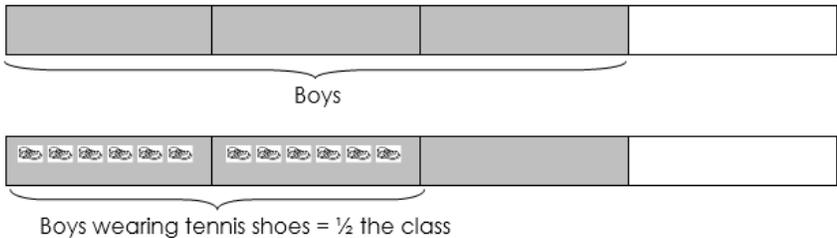
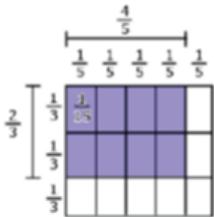
Dear Parents or Guardians,

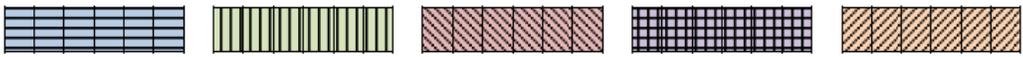
Our class is wrapping up their latest math unit called Adding, Subtracting, Multiplying and Dividing Fractions (*for Part B of the unit we only focused on multiplying and dividing fractions*). This is a critical area of practice in 5th grade mathematics. In this unit, students have multiplied and divided fractions and whole numbers. They have analyzed patterns and relationships with fractions to see how patterns can be used to estimate the answers when solving for different operations. This work can be challenging to students.

For Part B only, students should be able to:

- Explain that a whole number multiplied by a fraction greater than 1 yields a product greater than the given number whereas, a whole number multiplied by a fraction less than 1 yields a product less than the given number
- Interpret division of a unit fraction by a whole number and division of a whole number by a unit fraction
- Solve real world word problems for all operations that involve fractions

It is important that your child knows how to apply the standards in daily situations. Below is a chart that will help your child master this unit.

| Standard | Examples |
|---|---|
| <p>Multiplying a Fraction by a Whole Number or Fraction</p> | <p>Three-fourths of the class is boys. Two-thirds of the boys are wearing tennis shoes. What fraction of the class are boys wearing tennis shoes?</p> <p>This question is asking what is $\frac{2}{3}$ of $\frac{3}{4}$ what is $\frac{2}{3} \times \frac{3}{4}$? In this case you have $\frac{2}{3}$ groups of size $\frac{3}{4}$. (A way to think about it in terms of the language for whole numbers is by using an example such as 4×5, which means you have 4 groups of size 5.)</p>  |
| <p>Finding the Area of a Rectangle with Fractional Side Lengths</p> | <p>In solving the problem $\frac{2}{3} \times \frac{4}{5}$, students use an area model to visualize it as a 2 by 4 array of small rectangles each of which has side lengths $\frac{1}{3}$ and $\frac{1}{5}$. They reason that $\frac{1}{3} \times \frac{1}{5} = \frac{1}{15}$ by counting squares in the entire rectangle, so the area of the shaded area is $(2 \times 4) \times \frac{1}{15} = \frac{8}{15}$. They can explain that the product is less than $\frac{4}{5}$ because they are finding $\frac{2}{3}$ of $\frac{4}{5}$. They can further estimate that the answer must be between $\frac{2}{5}$ and $\frac{4}{5}$ because of is more than $\frac{1}{2}$ of $\frac{4}{5}$ and less than one group of $\frac{4}{5}$.</p>  |

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| Interpret Multiplication as Scaling (Resizing) | $22/3 \times 8$ must be more than 8 because 2 groups of 8 is 16 and $22/3$ is almost 3 groups of 8. So the answer must be close to, but less than 24. $3/4 = (5 \times 3)/(5 \times 4)$ because multiplying $3/4$ by $5/5$ is the same as multiplying by 1 |
| Real World Problems Involving the Multiplication of Fractions | <p>There are $21/2$ bus loads of students standing in the parking lot. The students are getting ready to go on a field trip. $2/5$ of the students on each bus are girls. How many busses would it take to carry only the girls?</p> <p>Student Answer $21/2 \times 2/5 = ?$ I split the $21/2$ 2 and $1/2$. $21/2 \times 2/5 = 4/5$, and $1/2 \times 2/5 = 2/10$. Then I added $4/5$ and $2/10$. Because $2/10 = 1/5$, $4/5 + 2/10 = 4/5 + 1/5 = 1$. So there is 1 whole bus load of just girls.</p> |
| Dividing Unit Fractions | <p>You have $1/8$ of a bag of pens and you need to share them among 3 people. How much of the bag does each person get?</p> <p>Student Answer I know that my answer will be less than $1/8$ since I'm sharing $1/8$ into 3 groups. I multiplied 8 by 3 and got 24, so my answer is $1/24$ of the bag of pens. I know that my answer is correct because $(1/24) \times 3 = 3/24$ which equals $1/8$.</p> |
| Whole Numbers Divided By Unit Fractions | <p>Create a story context for $5 \div 1/6$. Find your answer and then draw a picture to prove your answer and use multiplication to reason about whether your answer makes sense. How many $1/6$ are there in 5?</p> <p>Student Answer The bowl holds 5 Liters of water. If we use a scoop that holds $1/6$ of a Liter, how many scoops will we need in order to fill the entire bowl? I created 5 boxes. Each box represents 1 Liter of water. I then divided each box into sixths to represent the size of the scoop. My answer is the number of small boxes, which is 30. That makes sense since $6 \times 5 = 30$.</p>  <p>$1 = 1/6 + 1/6 + 1/6 + 1/6 + 1/6$ a whole has $6/6$ so five wholes would be $6/6 + 6/6 + 6/6 + 6/6 + 6/6 = 30/6$.</p> |
| Real World Problems Involving the Division of Fractions | <p>How many $1/3$ cup servings are in 2 cups of raisins?</p> <p>Student Answer I know that there are three $1/3$ cup servings in 1 cup of raisins. Therefore, there are 6 servings in 2 cups of raisins. I can also show this since $2 \div 1/3 = 2 \times 3 = 6$ servings of raisins.</p> |

Standards and Sample Problems:

5.NF.4 - Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

5.NF.4a - Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.)

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5.NF.4a Sample Problem: The home builder needs to cover a small storage room floor with carpet. The storage room is 4 meters long and $\frac{3}{5}$ of a meter wide. How much carpet do you need to cover the floor of the storage room? Explain how you arrived at your answer.

5.NF.4b - Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

5.NF.4b Sample Problem: Sara wants to put new carpet in her bedroom. The part of the room she wants carpet in is 5 yards long and $\frac{4}{5}$ yards wide. How much carpet will she need for her bedroom?

Draw a grid below and explain how you found your answer.

5.NF.5 - Interpret multiplication as scaling (resizing).

5.NF.5 Sample Problem: When Angela solved the problem $\frac{1}{3} \times \frac{2}{3}$ she got an answer of $\frac{2}{9}$. This confused Carissa. She thought the answer was incorrect because she always thought multiplication results in a product larger than the factors. Use what you know about multiplying fractions to explain why Angela's answer is correct.

5.NF.6- Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

5.NF.6 Sample Problem: Mrs. Gallagher is making a cake for her son's birthday. She realizes that only $\frac{1}{2}$ of the friends are coming, so she wants to make a smaller cake. The original recipe calls for $3\frac{1}{2}$ cups of flour. Write an expression that could be used to solve the problem. Explain how you could determine if your answer is reasonable once you solve the equation.

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5.NF.3 - Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret $3/4$ as the result of dividing 3 by 4, noting that $3/4$ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size $3/4$. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?

5.NF.3 Sample Problem: Holly feeds her Rabbit $2/3$ cup of carrots each morning. She is going away for spring break for 4 days, and has asked a friend to take care of her rabbit. Holly will purchase packages of carrots before she leaves. Each package contains 2 cups of cabbage.

How many packages of cabbage should she buy for the rabbit sitter so the rabbit won't run out of food while she is gone?

5.NF.7 - Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

5.NF.7a - Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(1/3) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.

5.NF.7a Sample Problem: Create a model below to show the division problem that is represented. Explain your answer.

Show model to represent 5 divided by $1/4$

5.NF.7b - Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.

5.NF.7b Sample Problem: Write a division word problem that is represented by the model and write the equation below. Explain your answer.

Equation: _____

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Word problem:

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5.NF.7c - Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem.

5.NF.7c Sample Problem: The local park has a 2 mile nature trail. To promote "Keeping the Park Clean" the park staff strategically placed trash cans every $\frac{1}{3}$ mile along the nature trail. How many trash cans have been placed along the 2 mile nature trail? Draw a picture to show your thinking.

How can I study?

Students: Please remember, cramming the night before an assessment is not the best way to study! Reviewing the material in small chunks nightly helps you tremendously. Most importantly, you will be less stressed, and will feel confident on assessment day!

- Review interactive notebooks
- Ask your parent to create a practice test
- Teach the material to your parents/siblings/friends/pets!
- Review your quizzes from this unit and rework missed problems!
- Create an informational poster or PowerPoint
- Create a practice test or quiz for a friend, and check their work!
- Re-watch Study Jams and Brain Pops we viewed during the unit
- Go back and practice the IXL skills that were done for homework, and try to earn a higher score!
- Check out any of the posted resources on the **Weebly** (www.fourthgradenpes.weebly.com)
- Create flashcards to carry around with you so you can study when you are not at home

In our math class students spend time discussing and sharing their reasoning and solutions. It is important that children solve problems in ways that make sense to them. Encourage your child to **explain** their mathematical thinking and solutions with math vocabulary at home.

Happy learning!

Ms. Getzfred and Ms. Densmore