

# Math 6 - Act. 01: Dividing Fractions

## Summary

This lesson will help students understand what the division of fractions truly means.

## Main Core Tie

Mathematics Grade 6

[Strand: THE NUMBER SYSTEM \(6.NS\) Standard 6.NS.1](#)

## Materials

- fraction pies
- rulers
- pencil and paper

## Background for Teachers

When dividing fractions, students will have a better understanding if they think of how many times the divisor will "fit" into the dividend. The reason we use reciprocals when dividing fractions is to make the divisor one.

## Intended Learning Outcomes

Represent mathematical situations.

## Instructional Procedures

### Invitation to Learn

:

Ask the question, "What does it mean to divide 8 by 4?" Have students draw a representation of what it means. Encourage the students to share their representation. Ask students to then draw a model to show what  $\frac{3}{4}$  divided by  $\frac{1}{4}$  means.

### Instructional Procedures:

The students will typically look at the above division problem as dividing 8 into 4 parts. Help them to see that you can look at the problem in another way; how many fours are in 8. This works the same for  $\frac{3}{4}$  divided by  $\frac{1}{4}$ . How many  $\frac{1}{4}$ 's are in  $\frac{3}{4}$ ?

Give each student a fraction pie. Instruct the students to layout before them the disk equivalent to  $\frac{1}{2}$ . Ask the students to demonstrate what  $\frac{1}{2}$  divided by  $\frac{1}{4}$  would be. (How many  $\frac{1}{4}$  are in  $\frac{1}{2}$ ). Have the students do five or six similar problems in which the first number is bigger. Be sure that they are very comfortable with this way of thinking before moving on to the next step. They should always use the language of how many dividends are in the divisor.

Next have the students lay out a disk equivalent to  $\frac{1}{4}$ . Ask them to demonstrate  $\frac{1}{4}$  divided by  $\frac{1}{8}$ . Then ask them what they think  $\frac{1}{4}$  divided by  $\frac{1}{2}$  would be? Help them to see that there is only  $\frac{1}{2}$  of the  $\frac{1}{2}$  in  $\frac{1}{4}$ .  $\frac{1}{4}$  divided by  $\frac{1}{2} = \frac{1}{2}$ . Do similar problems until the students are comfortable with the concept. Help them to see that when dividing fractions, sometimes the quotients are larger than the dividend or the divisors.

Next give each student a ruler. Present to the students  $5\frac{1}{2}$  divided by  $\frac{1}{2}$ . Ask the students to demonstrate the answer using their rules. (How many  $\frac{1}{2}$  inches are in  $5\frac{1}{2}$  inches). Instruct them to estimate, then find the exact answer. Guide them through several examples of dividing mixed numbers.

Give the students several written problems and have them estimate what they think the answers would be. Working in groups, and then having the groups report on their procedures would

develop opportunities for more math talk.

Ask the students to develop story problems for several division of fraction expressions.

Encourage the students to share their different examples.

Ask the students if they would like to learn a short cut for dividing the fractions. Demonstrate the following two ways of representing  $\frac{1}{4}$  divided by  $\frac{1}{2}$ :

Explain, "It is difficult to think about dividing by  $\frac{1}{2}$ . But, it is easy to divide by 1. Is there a way that we can change the  $\frac{1}{2}$  to a 1?" Guide the students to the understanding that the divisor can be multiplied by  $\frac{2}{1}$ , its reciprocal. Help them to see that they must multiply the dividend and the divisor by  $\frac{2}{1}$  to get the correct answer.

### Curriculum Integration

This perspective of division works very well with decimals also.

### Extensions

#### Possible Extensions/Adaptations:

The following are several real world situations in which division of decimals is used. Have the students explain to one another how they would solve these situations. Then have them write equations for their procedures.

You need \$69.99 to purchase a new video game. You decided to sell boxes of chocolates to kids at your school to earn the money. You buy 15  $\frac{1}{2}$  lbs of chocolate for \$ 35.00. The clerk suggested that you package the chocolates in either  $\frac{1}{4}$ ,  $\frac{1}{3}$ ,  $\frac{1}{2}$  or  $\frac{3}{4}$  lb boxes. Determine how many boxes of chocolates you could fill for each of the fractions. Select which size you think would sell the best. How much would you charge for each box of chocolates? Be sure that you make enough to pay for the chocolate and your game. Do you think students would buy the chocolates for the price you are asking?

You decide to make sock bags for your friends for Christmas. You find in the closet 5  $\frac{1}{4}$  yards of cloth. You need  $\frac{3}{4}$  of a yard to make one bag. How many bags could you make?

You get a job installing tires on cars in an assembly line. You get paid \$5.00 for each set of tires you install. It takes you  $\frac{1}{4}$  of an hour to put on a set of tires. If you work for 8  $\frac{1}{2}$  hours, how much would you expect to make?

#### Homework & Family Connections:

Have the students use manipulatives to explain to their parents or siblings what division of fractions means.

Assign students to measure the amount of food in a box (cereal, rice, noodles etc.). Have them determine how many batches they could make if a recipe calls for  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{2}{3}$ , or  $\frac{3}{4}$  cups of their selected food. Have them write a math sentence using division of fractions to represent what they did.

Assign students to measure the length of their bedroom. Then have them determine how many  $\frac{3}{4}$  foot tiles they would need to lie tiles across the length of the room. Have them write a math sentence using division of fractions to represent what they did. They could also find how many 1  $\frac{1}{2}$  foot dressers they could line up, or how many  $\frac{1}{3}$  foot candy bars, or 3  $\frac{1}{2}$  ft wide beds, etc.

### Assessment Plan

As students respond and explain their response to you and fellow students, assess their understanding. Their journal entry would be another opportunity for assessment.

### Authors

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