Dividing Fractions

Name: _____

Hour:_____

Date: _____

Have you ever been with a group of your friends and shared a pizza or cookies or some other kind of food? Perhaps you looked for a way to share the food so that all portions were equal. For a similar type of situation, suppose a large supply of new math books were delivered to your school. The assistant principal hires you and a friend to assemble groups of 30 books to be delivered to each classroom. He asks you to figure out how many classroom sets you can make with the supply you have.

Mathematics can be used in such situations to help determine what an equal share is and how many rooms can receive a set of 30 books. In each of these situations, you can use the operation of division to help find an answer. As you explore the problem in this investigation, you will learn to decide when division is useful, and you will learn to make sense of division of fractions.

Fractions in Fund Raising

Sometimes problems involving fractions can be solved by using the operation of division. Reviewing the meaning of division in problems involving only whole numbers will help to develop ideas about when and how to divide fractions.

Sometimes the amounts given in a situation are not whole numbers but fractions. To deal with those problems, you need to understand what division of fractions means and how to calculate the quotients when a fraction appears as the divisor or the dividend or both. The following problems challenge you to use your understanding of division with whole numbers to make sense of situations involving fractions.

THINK ABOUT THIS!

Student groups at Grandville Middle School take a special trip each spring. But they must raise funds to support the trip. Write number sentences showing the calculations required to solve some of the problems that occurred in last year's plan for fund-raising. Then explain how you recognized what operations to use in each case.

➢ The 24 members of the school swim team planned to raise money by getting pledges for miles in a swim marathon. If the team goal is to swim 120 miles, how many miles should each swimmer swim?

➢ Members of the school band plan to sell 600 tubs of cookie dough in the fundraising project. There are 25 members in the band that sell. How many boxes should each member sell to reach the goal if all members sell the same number of boxes?

> There will be 390 students going on the field trip, and each school bus carries 30 students. How many buses will be needed?

> Fifteen students in one homeroom earned money for the trip by helping their teacher pick apples in her orchard. She gave them one bushel of apples to split equally. The students counted 125 apples in their bushel. How many apples should each student get?

Compare your number sentences and reasoning about these problems with the ideas of others. If there are different ideas for solving the problems, decide which are correct and why.

Problem of the day:

In preparing food for sale at a school fund-raising event, several students faced questions that involved fractions. Answer the questions and give written explanations or diagrams that show your reasoning. Write a number sentence that shows all calculations that you performed to find your solution.

A. Sophia plans to make small cheese pizzas to sell at the fund-raiser. She has 9 packages of mozzarella cheese. How many pizzas can she make if each uses:

1. 1/3 package of cheese?

2. 1/6 package of cheese?

3. ¼ package of cheese?

4. ¾ package of cheese?

B. A local coffee house donated twelve pounds of fresh-roasted gourmet coffee. The students running the fund-raiser decided to sell the coffee in small bags. How many bags can be made if each contains

    1. 1/5 pound?   2. 3/5 pound?

    3. 1/8 pound?   4. 5/8 pound?

Take it further:

1. Use ideas from your work on the questions about cheese pizzas and coffee bags to complete the following calculations:

    a. $12 \div \frac{1}{4} =$ b. $12 \div \frac{1}{3} =$

    c. $12 \div \frac{2}{3} =$ d. $15 \div \frac{5}{3} =$

    e. $18 \div \frac{5}{6} =$ f. $21 \div \frac{7}{1} =$

g. Explain in words why $8 \div \frac{1}{3} = 24$ and $8 \div \frac{2}{3} = 12$. How are these two calculations related? Why is the answer to $8 \div \frac{2}{3}$ exactly half of the answer to $8 \div \frac{1}{3}$?

2. Describe a procedure that seems to make sense for dividing any whole number by any fraction. Give examples to support your procedure.

3. Write a story problem that can be solved by the division of $12 \div \frac{2}{3}$, and explain why the calculation matches the story.