



Dear Parents and Caregivers,

Thank you for the support you give to your child's learning. You are a vital partner in his/her education. The PTA has *Parents' Guides to Student Success* with the new Common Core Standards on its website. See <http://www.pta.org/4446.htm>. This year we are teaching these new standards, which better focus mathematics learning so students can be successful. Unlike previous standards, these have the energy of 46 states behind them and a nation striving to prepare our children for the jobs of the 21st century. You may see some unfamiliar strategies and emphases through the year. We will clarify some of them and explain some ways of thinking that help students make sense of numbers, develop underlying mathematical ideas, and help them understand the more familiar methods most adults were taught. We want to help you understand the work children will bring home. I welcome any questions you may have. This letter is about **ratio and proportion** in grade 6.

One of the most important mathematical ideas children learn in sixth grade is that of ratio and proportion. This mathematics is often used in daily life. You use ratio when you plan food events (make sure we have at least 2 hot dogs per person) or go to the grocery (is it cheaper to get 3 cans for \$1.29 or 5 for \$2.05). Rates or unit rates are special ratios that tell you how much for one. You use rate, when you fill up on gas (What's the per gallon price today?). Percent is another kind of ratio. How much will you save if an item is 40% off or if you must buy 2 items and the second one is 50% off?

Ratios define **relationships between amounts**. For example, use 3 cups of flour for every 2 cups of sugar.

Students can use a number of ways to solve problems involving ratio and rate. This is one path they may take from using a simple method (making a table) to a more efficient one (solving a proportion). Here are two problems:

Example 1: White paint and red paint are mixed in a ratio of 3 parts white to 2 parts blue. To keep the same proportion and color, how many quarts of red paint should be mixed with 24 qt. of white paint?

The picture shows four methods students might use to figure out how many quarts of red paint are needed.

Paint Mixture Strategies

T-table

White	3	6	12	24
Red	2	4	8	16

Draw and count

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xxx xxx xxx xxx xxx xxx
xx  xx  xx  xx  xx  xx
xxx xxx
xx  xx
  
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Bar model

Each box stands for 3.

$3 \times ? = 24$ (8) So need 8×2 or 16 units of red.

Proportion

$$\begin{array}{l} \times 8 \\ \frac{3}{24} = \frac{2}{?} \\ \times 8 \end{array} \qquad \frac{3}{24} = \frac{2}{16}$$

1. One student made a table and showed the basic ratio 3 white to 2 red. She then kept doubling those amounts in the table until she had 24 quarts of white paint. She could see she needed 16 quarts of red paint.
2. Another student who was not as organized in her thinking simply made tally marks to first show groups of 3 quarts of white paint until she had 24 quarts, then went back and drew 2 quarts of red for each 3 white and counted how many.
3. One student drew bars to show 3:2. Then he drew another bar where each box stood for 3 quarts of white paint. Since he had 8 groups of 3, he figured he needed 8 times 2 quarts of red to go with them.
4. The last student used proportion reasoning, which students will learn in seventh grade. They knew they needed 2 red for every 3 blue so asked, how many times 3 is 24? 8×3 is 24. The right amount of red will be found by also multiplying 2 by 8. It is all about keeping the same relationship between the two numbers.

Example 2: Punch for the school celebration requires 2 bottles of fruit punch to 1 bottle of lemon-lime soda to $\frac{1}{2}$ gallon strawberry sherbet to make 32 servings. How much of everything is needed to make 192 servings?

Using a Table

Fill in until you reach 192 servings.

Fruit punch	2	4	6	8	10	12
Lemon-lime soda	1	2	3	4	6	8
Sherbet	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Servings	32	64	96	128	160	192

Using a bar diagram

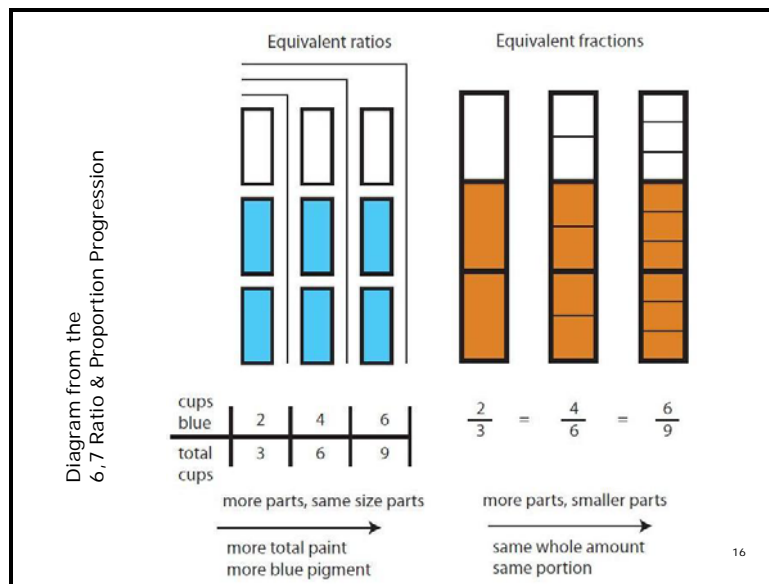
Needed 192

1 recipe 32

Thinking:

- How many 32s in 192? $192 \div 32 = 6$
- Multiply each ingredient by 6.
- Fruit punch $6 \times 2 = 12$ bottles
- Lemon-lime $6 \times 1 = 6$ bottles
- Sherbet $6 \times 1/2 = 3$ half gallons

Students may get confused as we talk about equivalent ratios because they have talked about equivalent fractions in earlier years. This picture shows the difference between an equivalent ratio and an equivalent fraction. For equivalent ratios you keep increasing the amounts that you have. For equivalent fractions, the amount is always the same, but you are dividing that amount into smaller or larger parts.



Family practice. Look for everyday situations in which your student can help figure out a proportion: cooking; mixing punch or paint; etc.