LESSON 12

Understand Ratio Concepts

Dear Family,

This week your student is exploring ratio concepts. A **ratio** is a way of comparing quantities. Sometimes ratios compare a **part** and a **part**, and sometimes they compare a **part** and a **whole**.

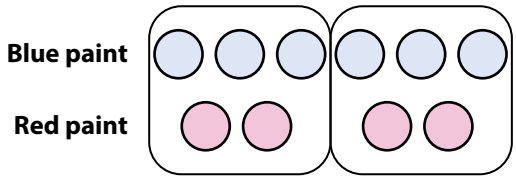
For example, when making a total of 3 cups of lemonade, you might say:

- The ratio of **cups of water** to **cups of lemon juice** is 2 to 1.
- The ratio of **cups of lemon juice** to total **cups of lemonade** is 1 to 3.

Your student will be modeling ratios like the one below.

> To make a purple paint, you can use 3 cups of blue paint for every 2 cups of red paint.

➤ **ONE WAY** to model a ratio relationship is to use a diagram.



➤ **ANOTHER WAY** is to use ratio language and symbols.

The ratio of cups of blue paint to cups of red paint is

3 to 2 or **3 : 2**

because there are **3 cups of blue paint** **for every** **2 cups of red paint**.

You can also change the order of the parts so that the amount of red paint is the first quantity in the ratio.

The ratio of cups of red paint to cups of blue paint is

2 to 3 or **2 : 3**

because there are **2 cups of red paint** **for every** **3 cups of blue paint**.

Both representations accurately compare the quantities of blue paint and red paint.

Use the next page to start a conversation about ratios.

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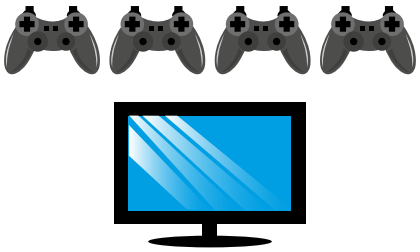
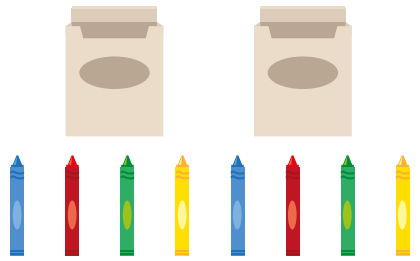
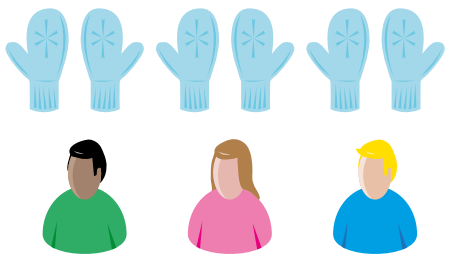
Activity Describing Ratios

➤ **Do this activity together to write sentences that describe ratios relationships.**

You can describe ratios using the language *for each* and *for every*.

- There are 2 red tulips *for each* yellow tulip.
- *For every* 1 yellow tulip, there are 2 red tulips.
- *For every* 4 red tulips, there are 2 yellow tulips.

Look at the models representing ratio relationships. Write two sentences using ratio language to describe each model.

RATIO	SENTENCES
	There are 4 game controllers for each screen.
	
	

? Do you notice any similarities or differences between two sentences used to describe a ratio relationship?

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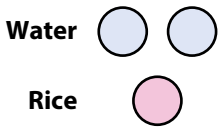
LESSON 13

Find Equivalent Ratios

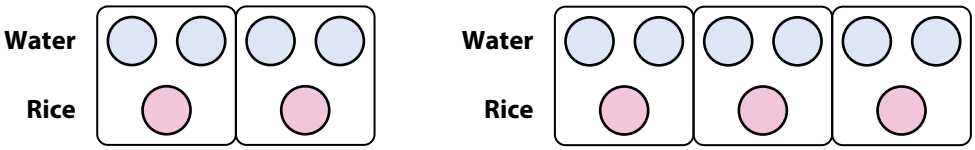
Dear Family,

This week your student is learning how to find equivalent ratios.

Equivalent ratios are ratios that express the same comparison. For example, a rice recipe might require 2 cups of water for every 1 cup of rice.



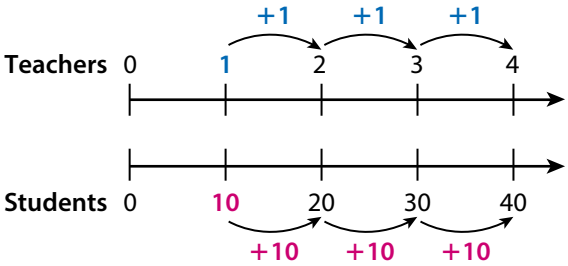
If you double the recipe, the ratio of cups of water to cups of rice is 4 to 2.
If you triple the recipe, the ratio of cups of water to cups of rice is 6 to 3.



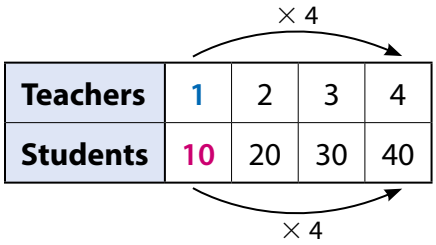
Your student will be learning how to solve problems like the one below.

> On a school field trip, there must be 1 teacher for every 10 students. If 40 students attend the field trip, how many teachers are needed?

➤ **ONE WAY** to find the number of teachers is to use addition.



➤ **ANOTHER WAY** is to use multiplication.



Using either method, 4 teachers are needed for the field trip.

Use the next page to start a conversation about ratios.

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Activity Thinking About Ratios Around You

➤ **Do this activity together to investigate ratios in the real world.**

Have you ever watched a movie on TV and wondered why long black bars appear on the top and bottom of the screen? This happens because the ratios of width to length for TVs and movie screens are not equivalent!

Most TVs have 16 in. of width for every 9 in. of height. Most movie screens have 21.51 in. of width for every 9 in. of height. Without the long black bars, movies watched on TV might look stretched too tall.

? Where else do you see equivalent or non-equivalent ratios in the world around you?

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LESSON 15

Understand Rate Concepts

Dear Family,

This week your student is exploring rates. You may be familiar with rates such as *miles per hour, words per minute,* or *price per pound.*

A **rate** is a ratio that compares the number of units of one quantity to 1 unit of another quantity. You can write two rates to represent a given ratio relationship.

Ratio of cost to pounds of apples
$4 for every 2 pounds

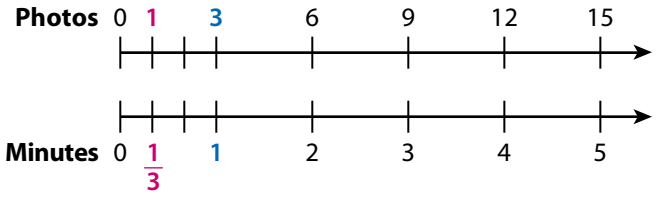
Rate per pound	**Rate per dollar**
$2 for every 1 pound	0.5 pound for every $1
$2 per pound	0.5 pound per dollar

Your student will be modeling rates for ratio relationships like the one below.

> A computer uploads 15 photos every 5 minutes.

➤ **ONE WAY** to model the two rates for a ratio relationship is to use a double number line.

The double number line shows the number of photos uploaded in **1 minute** and the number of minutes needed to upload **1 photo**.



➤ **ANOTHER WAY** is to use a table of equivalent ratios.

Divide both quantities in the ratio 15 : 5 by 5 to make the second quantity **1**.

Then divide both quantities in the ratio 3 : 1 by 3 to make the first quantity **1**.

	Photos	**Minutes**	
	15	5	
÷ 5	3	1	÷ 5
÷ 3	1	$\frac{1}{3}$	÷ 3

Both models show that you can think of the uploading rate as 3 photos per minute or as $\frac{1}{3}$ minute per photo.

Use the next page to start a conversation about rates.

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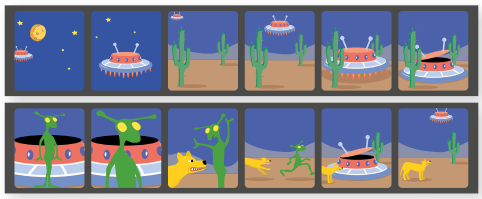
Activity Thinking About Rates in the World Around You

➤ **Do this activity together to investigate rates in the real world.**

When making a movie, directors must consider how many frames per second they want audiences to see. The rate *frames per second* represents how many images flash across the screen in one second.

Many movie directors use 24 frames per second because this makes the movie scenes look smooth. Have you ever noticed some movie scenes look very choppy? It may seem like the camera is shaking, but this choppiness is actually caused by the movie director choosing 12 frames per second instead of 24!

24 frames per second



12 frames per second

? Where else do you see rates in the world around you?

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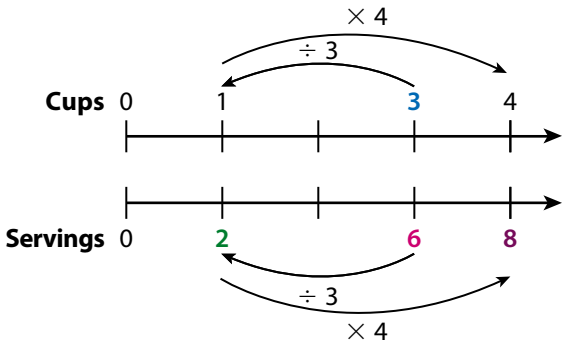
LESSON 16

Dear Family,

This week your student is learning how to solve problems that involve rates. Using **unit rates** can help you find equivalent ratios or compare ratios.

For example, a pastry recipe uses 3 cups of flour for every 6 servings. Suppose you have 4 cups of flour. Dividing **6** by **3** finds the number of servings you can make per cup, or the **unit rate**. Then, multiply the unit rate by 4 to find that you can make **8** servings.



Your student will be learning how to solve problems like the one below.

City A receives 21 inches of snow in 12 hours. City B receives 27 inches of snow in 15 hours. Which city has a heavier snowfall rate?

➤ **ONE WAY** to find and compare rates is to use tables of equivalent ratios.

Divide to find the **unit rate** for inches of snow in 1 hour for each city.

City A	
Inches	**Hours**
21	12
1.75	1

÷ 12 ÷ 12

City B	
Inches	**Hours**
27	15
1.8	1

÷ 15 ÷ 15

➤ **ANOTHER WAY** is to use equations to find the unit rates.

Inches per hour for City A

$\begin{matrix}\text{inches} \rightarrow \\ \text{hours} \rightarrow\end{matrix} \frac{21}{12} = 21 \div 12 = \mathbf{1.75}$

Inches per hour for City B

$\begin{matrix}\text{inches} \rightarrow \\ \text{hours} \rightarrow\end{matrix} \frac{27}{15} = 27 \div 15 = \mathbf{1.8}$

Since $1.8 > 1.75$, City B receives more snow per hour than City A.

Using either method, City B has the heavier snowfall rate.

Use the next page to start a conversation about unit rates.

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Activity Exploring Unit Rates

The peregrine falcon, one of the world's fastest birds, has been known to fly at a speed of 4 miles per minute.

➤ **Do this activity together to explore patterns in unit rates.**

Each table below represents a ratio and two unit rates.

What patterns do you notice in each table?

TABLE 1

Miles	Minutes
8	2
4	1
1	$\frac{1}{4}$

TABLE 2

Pounds	Dollars
4	2
2	1
1	$\frac{1}{2}$

TABLE 3

Inches	Hours
5	2
$\frac{5}{2}$	1
1	$\frac{2}{5}$

? What patterns do you notice between all three tables?

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LESSON 18

Dear Family,

This week your student is learning how to use percents to solve problems.

Similar strategies can be used to solve two types of problems:

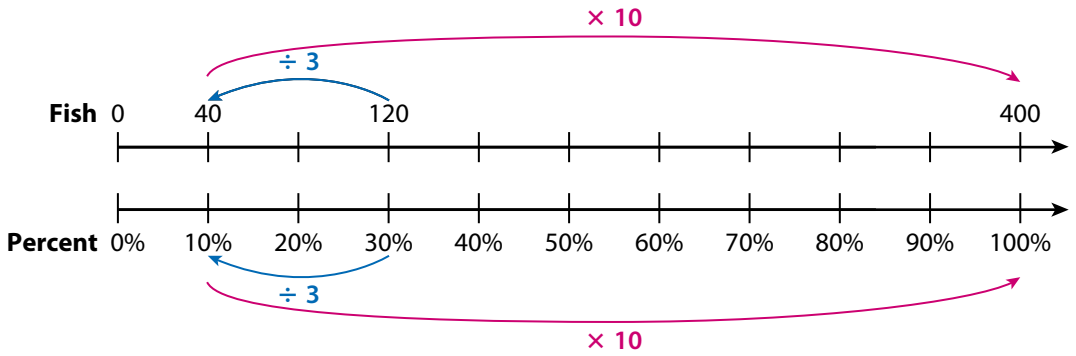
- A shirt costs $20 and is marked 40% off. How much money will you save?
- A shirt is on sale for 40% off. You will save $8. What was the original price?

Your student will be learning to solve problems like the one below.

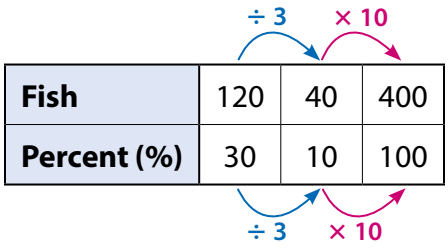
> At an aquarium, 30% of the fish are freshwater fish. There are 120 freshwater fish. How many fish are at the aquarium?

➤ **ONE WAY** to find a whole amount when you know a part and the percent is to use a double number line.

You know that 120 is 30% of the whole. First, **divide by 3** to find 10%. Then, **multiply by 10** to find 100%.



➤ **ANOTHER WAY** is to make a table of equivalent ratios.



Fish	120	40	400
Percent (%)	30	10	100

Using either method, there are 400 fish at the aquarium.

Use the next page to start a conversation about percents.

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Activity Thinking About Percents Around You

➤ **Do this activity together to investigate percents in the real world.**

Do you ever read the sports page or listen to the news and wonder how they figure out the standings for the teams? They use percents!

Percents can help you compare the teams, especially if they have not played the same number of games.

? Where else do you see percents in the world around you?

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