

Section 5-1: Ratios Teacher Notes

Objective: Students will be able to understand the concept of a ratio and use ratios to describe the relationship between two quantities.

Vocabulary:

Ratio - a comparison of 2 quantities (numbers)

How to Write a Ratio:

- | | | | |
|--------------------------|---------------|---|--|
| 1.) Using a fraction bar | $\frac{2}{3}$ | } | All three ways are read the same
"two to three" |
| 2.) Using a colon | 2 : 3 | | |
| 3.) Using the word "to" | 2 to 3 | | |

Examples

Simplify each ratio. Then write the ratio using a colon and the word "to."

	Simplify	:	"to"
1.) $\frac{12}{15}$	$\frac{4}{5}$	4 : 5	4 to 5
2.) $\frac{25}{75}$	$\frac{1}{3}$	1 : 3	1 to 3

There are 5 quarters, 6 dimes, and 4 pennies in the tip jar. Write each ratio as a fraction in simplest form.

3.) pennies to dimes 4 : 6 = 2 : 3	4.) dimes to pennies 6 : 4 = 3 : 2	5.) quarters to total coins 5 : 15 = 1 : 3
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Using a tape diagram.

6.) The ratio of your monthly allowance to your friend's monthly allowance is 5:3. The monthly allowances total \$40. How much is each allowance?

You:

--	--	--	--	--

Friend:

--	--	--

Since there are 8 parts, you know that 1 part represents $\$40 \div 8 = \5

Your part: $5 \cdot 5 = \$25$

Friend's part: $5 \cdot 3 = \$15$

7.) You separate 42 bulbs of garlic into two groups: one for planting and one for cooking. You will plant 3 bulbs for every 4 bulbs that you will use for cooking. How many bulbs will you plant and how many will you cook?

Planting:

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Cooking:

--	--	--	--

Since there are 7 parts, you know that 1 part represents $42 \div 7 = 6$ bulbs

Planting: $6 \cdot 3 = 18$ bulbs

Cooking: $6 \cdot 4 = 24$ bulbs

Section 5.2: Ratio Tables Teacher Notes

Objective: Students will be able to use ratio tables to find equivalent ratios and solve real-life problems.

Vocabulary:

- 1.) Ratio - a comparison of two quantities (numbers) by division
- 2.) Equivalent Ratios - two ratios that describe the same relationship

Completing Ratio Tables

Find the missing values in each ratio table. Then write the equivalent ratios.

1.)

Pens	1	2	3
Pencils	3	6	9

Equivalent Ratios: 1:3, 2:6, 3:9

2.)

Dogs	4	8	24
Cats	6	12	36

Equivalent Ratios: 4:6, 8:12, 24:36

Making a Ratio Table

3.) You are making sugar water for your hummingbird feeder. A website indicates to use 4 parts of water for every 1 part of sugar. You use 20 cups of water. How much sugar do you need?

Water	4	8	12	16	20
Sugar	1	2	3	4	5

You need 5 cups of sugar.

4.) For every 3 tickets you sell, your friend sells 4. You sell a total of 12 tickets. How many does your friend sell?

You	3	6	9	12
Friend	4	8	12	16

Your friend sells 16 tickets

5.) You are downloading songs to our iPod. The ratio of pop songs to rock songs is 5 : 4. You download 40 pop songs. How many rock songs do you download?

Pop	5	10	15	20	25	30	35	40
Rock	4	8	12	16	20	24	28	32

You downloaded 32 rock songs.

Section 5-3: Rates Teacher Notes

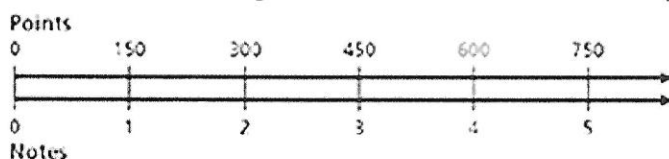
Objective: Students will be able to understand the concepts of rates and unit rates, write unit rates, and solve real-life problems.

Vocabulary:

- 1.) Rate - a ratio that compares two quantities measured in different units
- 2.) Unit Rate - Compares a quantity to one unit of another quantity
- 3.) Equivalent Rates - Have the same unit rate

Writing a Rate

1.) The double number line shows the rate at which you earn points for successfully hitting notes in a music video game. Write a rate that represents the situation.



Rates: 150 points for 1 note, 300 points for 2 notes, 450 points for 3 notes...

Finding Unit Rates

2.) Mrs. Bollinger drove 220 miles in 4 hours. How many miles did she drive in one hour?

$$\text{Drive 220 miles in 4 hours: } \frac{\text{miles}}{\text{hour}} = \frac{220}{4} = 55 \text{ miles/hour}$$

2.) A Japanese bullet train travels 558 miles in 3 hours. How far does it travel in every hour?

	Divide by 3	
	↩ ↪	
Miles	558	186
Hours	3	1

3.) A chef buys 6 pounds of salmon for \$51. How much will the chef pay for 8 more pounds of salmon?

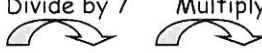
	Divide by 6	Multiply by 8	
	↩ ↪	↩ ↪	
Find Unit Rate: $\frac{51}{6} = \$8.50$	Cost	51	8.5
	Salmon	6	1
		68	8

Multiply: $8.50(8) = \$68$

4.) You earn \$35 for washing 7 cars. How much do you earn for washing 4 cars?

Find Unit Rate: $\frac{35}{7} = \$5.00$

Multiply: $5(4) = \$20$

Divide by 7 Multiply by 4


Money	35	5	20
Cars	7	1	4

Section 5-4: Comparing and Graphing Rates Teacher Notes

Objective: Students will be able to graph ordered pairs to compare ratios and rates, and solve real-life problems.

Vocabulary:



- 1.) Rate - a ratio that compares two quantities measured in different units
- 2.) Unit Rate - Compares a quantity to one unit of another quantity

Why do we compare unit rates? To find the better buy
To find out who/what is faster

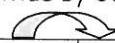
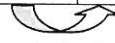
Comparing Unit Rates with Tables

1.) Which bag of dog food is the better buy? Use ratio tables to find and compare the unit costs.

20-Pound Bag

		Divide by 20
		
Cost (dollars)	17.20	0.86
Food (pounds)	20	1
		
	Divide by 20	

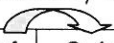

30-Pound Bag

		Divide by 30
		
Cost (dollars)	25.20	0.84
Food (pounds)	30	1
		
	Divide by 30	



The 20-pound bag costs \$0.86 per pound and the 30-pound bag costs \$0.84 per pound. Since \$0.84 is less than \$0.86, the 30-pound bag is the better buy.

2.) Which package of Gatorade is the better buy? Use ratio tables to find and compare the unit costs.

8-Bottle Case

		Divide by 8
		
Cost (dollars)	5.44	0.68
Bottles	8	1
		
	Divide by 8	

12-Bottle Case

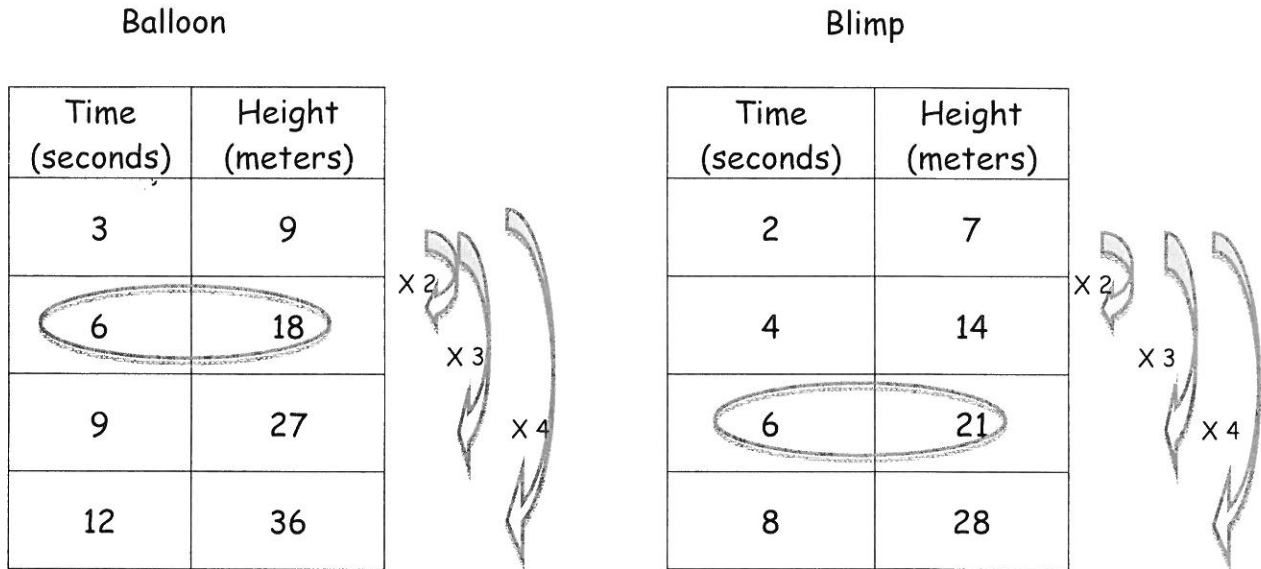
		Divide by 12
		
Cost (dollars)	7.92	0.66
Bottles	12	1
		
	Divide by 12	

The 8-bottle case costs \$0.68 per bottle and the 12-bottle case costs \$0.66 per bottle. Since \$0.66 is less than \$0.68, the 12 bottle case is the better buy.

Graphing Values from Ratio Tables

3.) A hot-air balloon rises 9 meters every 3 seconds. A blimp rises 7 meters every 2 seconds.

a.) Complete the ratio table for each aircraft. Which rises faster?

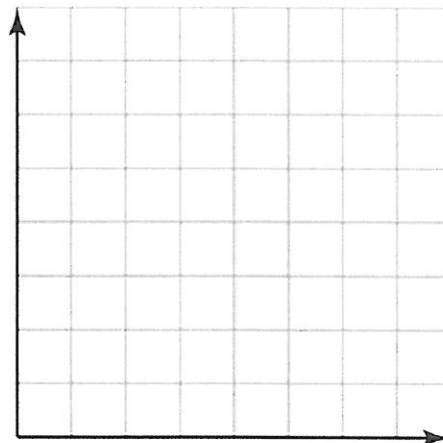


Every 6 seconds, the balloon rises 18 meters and the blimp rises 21 meters. So, the blimp rises faster.

b.) Graph the ordered pairs (time, height) from the tables in part (a). What can you conclude?

Write the ordered pairs:

- | | |
|----------------|--------------|
| Balloon: (3,9) | Blimp: (2,7) |
| (6,18) | (4,14) |
| (9,27) | (6,21) |
| (12,36) | (8,28) |



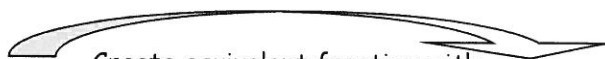
Both graphs begin at (0,0). The graph for the blimp is steeper, so the blimp rises faster than the hot-air balloon.

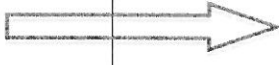

Section 5-5: Percents Teacher Notes

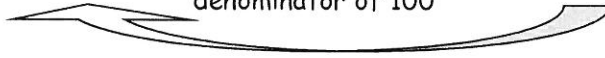
Objective: Students will be able to convert between fractions and percents.

Vocabulary:

- 1.) Percent - a ratio of part to whole where the whole is 100. It is the number of parts per hundred.


 Create equivalent fraction with a denominator of 100; Then write numerator with % symbol

Fractions	Percents
$\frac{1}{5} \times \frac{20}{20} = \frac{20}{100}$	 20%
$\frac{6}{50} \times \frac{2}{2} = \frac{12}{100}$	 12%


 Write as a fraction with a denominator of 100

Fraction Equivalent of common percents:

10% =	20% =	25% =	30% =
40% =	50% =	60% =	70% =
75% =	80% =	90% =	100% =

Writing Fractions as Percents

- 1.) Write $\frac{3}{50}$ as a percent. $\frac{3}{50} = \frac{6}{100} = 6\%$
- 2.) Write $\frac{13}{20}$ as a percent. $\frac{13}{20} = \frac{65}{100} = 65\%$
- 3.) Write $1 \frac{1}{5}$ as a percent. $\frac{6}{5} = \frac{120}{100} = 120\%$

Writing Percents as Fractions

- 4.) Write 35% as a fraction in simplest form. $35\% = \frac{35}{100}$
 $= \frac{7}{20}$
- 5.) Write 100% as a fraction in simplest form. $100\% = \frac{100}{100}$
 $= 1$
- 6.) Write 174% as a fraction in simplest form. $174\% = \frac{174}{100}$
 $= 1 \frac{74}{100}$
 $= 1 \frac{37}{50}$

Multiply by 100
Put % at end

Decimals	Percents
0.15×100	15%
2.35×100	235%

Divide by 100
Remove % symbol

Writing Decimals as Percents

- 1.) Write 0.35 as a percent. $0.35 \times 100 = 35\%$
- 2.) Write 0.2 as a percent. $0.2 \times 100 = 20\%$
- 3.) Write 1.18 as a percent. $1.18 \times 100 = 118\%$

Writing Percents as Decimals

- 4.) Write 35% as a decimal. $35 / 100 = 0.35$
- 5.) Write 4% as a decimal. $4 / 100 = .04$
- 6.) Write 174% as a decimal. $174 / 100 = 1.74$

Section 5-6: Solving Percent Problems Teacher Notes

Objective: Students will write and solve percent equations.

Vocabulary:

- 1.) Percent - a ratio of part to whole where the whole is 100. It is the number of parts per hundred.

How to Solve Percent Problems Using Equations:

- 1.) Translate the problem into an algebraic equation:
 - a. "is" means = (equal)
 - b. "of" means \cdot (multiply)
 - c. "what", "what number", or "what percent" is the unknown, represent the unknown with a variable
- 2.) Solve the equation. **(Make sure you turn percents into decimals or fractions!!!)**

Examples

Write an equation, then solve.

<p>1.) 25% of 40 is what number?</p> $.25 \cdot 40 = x$ $.25 \cdot 40 = 10$	<p>2.) 60% of 150 is what number?</p> $.6 \cdot 150 = x$ $.6 \cdot 150 = 90$
<p>3.) 40% of what number is 30?</p> <p>Equation: $.40 \cdot x = 30$</p> $\frac{.40x}{.40} = \frac{30}{.40}$ <p>Answer: $x = 75$</p>	<p>4.) 25% of what number is 21?</p> <p>Equation: $.25 \cdot x = 30$</p> $\frac{.25x}{.25} = \frac{30}{.25}$ <p>Answer: $x = 120$</p>
<p>5.) The price of an <u>old version of a computer game</u> is 40% of the price of the original version. The original version cost \$48. What is the cost of the <u>old version</u>?</p> <p>$40\% = 0.4$</p> <p style="text-align: center;">_____ % of _____ is _____.</p> <p>Equation: $.40 \cdot 48 = x$</p> <p>Answer: $x = \\$19.20$</p>	
<p>6.) In a parking lot, 16% of the cars are blue. There are 4 blue cars in the parking lot. How many total cars are in the parking lot?</p> <p style="text-align: center;">_____ % of _____ is _____.</p> <p>Equation: $\frac{.16 \cdot x}{.16} = \frac{4}{.16}$</p> <p>Answer: $x = 25$ cars</p>	