Program Information			
	[Lesson Title] ***Ratios and Proportions***	**TEACHER NAME** **Kathleen McDonnell**	**PROGRAM NAME** **Parma City School District**
	[Unit Title] ***Ratios and Proportional Relationships***	**NRS EFL(s)** **3 – 4**	**TIME FRAME** **180 minutes**

Instruction

ABE/ASE Standards – Mathematics

Numbers (N)		Algebra (A)		Geometry (G)		Data (D)	
Numbers and Operation		Operations and Algebraic Thinking		Geometric Shapes and Figures		Measurement and Data	
The Number System		Expressions and Equations		Congruence		Statistics and Probability	
Ratios and Proportional Relationships	**N.3.31** **N.3.32** **N.4.9**	Functions		Similarity, Right Triangles. And Trigonometry		**Benchmarks identified in *RED* are priority benchmarks. To view a complete list of priority benchmarks and related Ohio ABLE lesson plans, please see the Curriculum Alignments located on the Teacher Resource Center (TRC).**	
Number and Quantity				Geometric Measurement and Dimensions			
				Modeling with Geometry			

Mathematical Practices (MP)

X	Make sense of problems and persevere in solving them. (MP.1)	☐	Use appropriate tools strategically. (MP.5)

	X	Reason abstractly and quantitatively. (MP.2)	X	Attend to precision. (MP.6)
	☐	Construct viable arguments and critique the reasoning of others. (MP.3)	☐	Look for and make use of structure. (MP.7)
	X	Model with mathematics. (MP.4)	☐	Look for and express regularity in repeated reasoning. (MP.8)

LEARNER OUTCOME(S)

- Students will write and reduce ratios.
- Students will write and solve proportions.
- Students will solve real world problems using proportions.
- Students will complete a worksheet on ratios and proportions with 80% accuracy.

ASSESSMENT TOOLS/METHODS

- Formative: Walk around the room checking in with students to see if they are solving problems correctly.
- Ask individual students to show their proportion set-ups and to explain why incorrect set-ups produce unreasonable answers.
- Complete practice problems from Common core basics: Building essential test readiness skills (Mathematics) in class. Compare answers with a teacher prepared answer guide.
- Summative: *Ratio Word Problems worksheet* and *Proportion Word Problems worksheet*

LEARNER PRIOR KNOWLEDGE

- Ability to apply multiplication and division skills.
- Knowledge of reducing fractions.
- Basic use of calculators for multiplication and division.

	INSTRUCTIONAL ACTIVITIES	RESOURCES
	1. Teacher will begin lesson by collecting data from students: a. Make up simple ratios, e.g., number of women in class to the number of men, number wearing eye glasses to the total number in class, left handed to right handed, etc. 2. Teacher will demonstrate how to reduce ratios. Students will practice reducing ratios by finding common divisors. 3. Have students read and complete Lesson 7.1 Ratios and Rates from Common core basics: Building essential test readiness skills (Mathematics) a. Review student answers to questions and problems on pgs. 216 – 217. 4. Teacher will demonstrate proportions are two equal ratios. a. Use examples like "4 out of 5 dentists recommend sugarless gum. At dental convention of 150 dentists, how many would recommend sugarless gum." 5. Have students read and complete Lesson 7.3 Solve Proportions from Common core basics: Building essential test readiness skills (Mathematics) a. Review student answers to questions and problems on pgs. 228 – 229.	Projector, ability to project Computer Internet access White/chalk board *Common core basics: Building essential test readiness skills* (Mathematics). (2015). Columbus, OH: McGraw-Hill Education. Student copies of *Ratio Word Problems worksheet* (attached) Student copies of *Proportion Word Problems worksheet* (attached)

	6. Summative assessment: a. Students will complete student copies of *Ratio Word Problems worksheet* (attached) and *Proportion Word Problems worksheet* (attached) then check answers.	
	DIFFERENTIATION • Walk students through several examples as a large group using explicit instruction. • Pair students (allow higher level students to help others solve problems). • Give extra assistance to students who have difficulty solving problems.	
Reflection	**TEACHER REFLECTION/LESSON EVALUATION** This lesson works well with various levels of students. Proportions are the first step in solving percent problems. Students who score less than 80% on the summative evaluation need more practice with proportions. (Percent problems will be solved mainly by using proportions so the students will get the additional practice with proportions.)	
	ADDITIONAL INFORMATION	

 Name_____

Proportion Word Problems

Date_____ Period____

Answer each question and round your answer to the nearest whole number.

1) If you can buy one can of pineapple chunks for $2 then how many can you buy with $10?

2) One jar of crushed ginger costs $2. How many jars can you buy for $4?

3) One cantaloupe costs $2. How many cantaloupes can you buy for $6?

4) One package of blueberries costs $3. How many packages of blueberries can you buy for $9?

5) Shawna reduced the size of a rectangle to a height of 2 in. What is the new width if it was originally 24 in wide and 12 in tall?

6) Ming was planning a trip to Western Samoa. Before going, she did some research and learned that the exchange rate is 6 Tala for $2. How many Tala would she get if she exchanged $6?

7) Jasmine bought 32 kiwi fruit for $16. How many kiwi can Lisa buy if she has $4?

8) If you can buy four bulbs of elephant garlic for $8 then how many can you buy with $32?

9) One bunch of seedlees black grapes costs $2. How many bunches can you buy for $20?

10) The money used in Jordan is called the Dinar. The exchange rate is $3 to 2 Dinars. Find how many dollars you would receive if you exchanged 22 Dinars.

11) Gabriella bought three cantaloupes for $7. How many cantaloupes can Shayna buy if she has $21?

12) Jenny was planning a trip to the United Arab Emirates. Before going, she did some research and learned that the exchange rate is 4 Dirhams for every $1. How many Dirhams would she get if she exchanged $5?

13) Castel bought four bunches of fennel for $9. How many bunches of fennel can Mofor buy if he has $18?

14) If you can buy one fruit basket for $30 then how many can you buy with $60?

Answer each question. Round your answer to the nearest tenth. Round dollar amounts to the nearest cent.

15) Asanji took a trip to Mexico. Upon leaving he decided to convert all of his Pesos back into dollars. How many dollars did he receive if he exchanged 42.7 Pesos at a rate of $5.30 = 11.1 Pesos?

16) The currency in Argentina is the Peso. The exchange rate is approximately $3 = 1 Peso. At this rate, how many Pesos would you get if you exchanged $121.10?

17) Mary reduced the size of a painting to a width of 3.3 in. What is the new height if it was originally 32.5 in tall and 42.9 in wide?

18) Molly bought two heads of cabbage for $1.80. How many heads of cabbage can Willie buy if he has $28.80?

 Name_____

Proportion Word Problems

Date_____ Period____

Answer each question and round your answer to the nearest whole number.

1) If you can buy one can of pineapple chunks for $2 then how many can you buy with $10?

5

2) One jar of crushed ginger costs $2. How many jars can you buy for $4?

2

3) One cantaloupe costs $2. How many cantaloupes can you buy for $6?

3

4) One package of blueberries costs $3. How many packages of blueberries can you buy for $9?

3

5) Shawna reduced the size of a rectangle to a height of 2 in. What is the new width if it was originally 24 in wide and 12 in tall?

4 in

6) Ming was planning a trip to Western Samoa. Before going, she did some research and learned that the exchange rate is 6 Tala for $2. How many Tala would she get if she exchanged $6?

18 Tala

7) Jasmine bought 32 kiwi fruit for $16. How many kiwi can Lisa buy if she has $4?

8

8) If you can buy four bulbs of elephant garlic for $8 then how many can you buy with $32?

16

9) One bunch of seedlees black grapes costs $2. How many bunches can you buy for $20?

10

10) The money used in Jordan is called the Dinar. The exchange rate is $3 to 2 Dinars. Find how many dollars you would receive if you exchanged 22 Dinars.

$33

11) Gabriella bought three cantaloupes for $7. How many cantaloupes can Shayna buy if she has $21?

9

12) Jenny was planning a trip to the United Arab Emirates. Before going, she did some research and learned that the exchange rate is 4 Dirhams for every $1. How many Dirhams would she get if she exchanged $5?

20 Dirhams

13) Castel bought four bunches of fennel for $9. How many bunches of fennel can Mofor buy if he has $18?

8

14) If you can buy one fruit basket for $30 then how many can you buy with $60?

2

Answer each question. Round your answer to the nearest tenth. Round dollar amounts to the nearest cent.

15) Asanji took a trip to Mexico. Upon leaving he decided to convert all of his Pesos back into dollars. How many dollars did he receive if he exchanged 42.7 Pesos at a rate of $5.30 = 11.1 Pesos?

$20.39

16) The currency in Argentina is the Peso. The exchange rate is approximately $3 = 1 Peso. At this rate, how many Pesos would you get if you exchanged $121.10?

40.4 Pesos

17) Mary reduced the size of a painting to a width of 3.3 in. What is the new height if it was originally 32.5 in tall and 42.9 in wide?

2.5 in

18) Molly bought two heads of cabbage for $1.80. How many heads of cabbage can Willie buy if he has $28.80?

32

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worksheet

RATIOS AND PROPORTIONS
PRE-ALGEBRA

NAME: _____
PERIOD: _____

1. Suppose a class has 14 redheads, 8 brunettes, and 6 blondes.

a. What is the ratio of redheads to brunettes?

b. What is the ratio of redheads to blondes?

c. What is the ratio of blondes to brunettes?

d. What is ratio of blondes to total students?

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2. Express the following as ratios in fraction form and <u>reduce</u> (simplify).

a. 3 to 12

b. 25 to 5

c. 6 to 30

d. 100 to 10

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3. Write the <u>unit rate</u> for each situation.
(HINT: With unit rates and unit prices, the denominator in the ratio must be 1).

a. earn $92 in 8 hours.

b. $100 for 5 books

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ANSWERS

1a. _____
1b. _____
1c. _____
1d. _____
2a. _____
2b. _____
2c. _____
2d. _____
3a. _____
3b. _____

4. Find each <u>unit price</u>. Then determine which is the better buy. Show work.

a. Which is the better buy –

10 pencils for $1.10 or 30 pencils for $3.15?

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b. Which is the better buy –

$50 for 10 comic books or $202.50 for 45 comic books?

ANSWERS

4a. _____

4b. _____

5a. _____

5b. _____

5c. _____

6a. _____

6b. _____

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5. Solve each <u>proportion</u>.

a. $\frac{3}{x} = \frac{2}{8}$ b $\frac{2}{5} = \frac{x}{45}$ c. $\frac{3}{4} = \frac{21}{b}$

6. <u>Use a proportion</u> to find each missing number.

a. 175 days = _____ weeks b. 1440 minutes = _____ hours

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7. For the following problems, <u>set up a proportion</u> and solve.

a. At the Copy Shoppe, 18 copies cost $1.08. At this rate, how much will 40 copies cost?

b. Three posters cost $9.60. At this rate, how many posters could you buy for $48?

ANSWERS

7a. _____

7b. _____

7c. _____

7d. _____

7e. _____

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c. A microchip inspector found three defective chips in a batch containing 750 chips. At that rate, how many defective chips would there be in 10,000 chips.

d. You can do 12 math problems in 45 minutes. At this rate, how long will it take you to do 20 math problems.

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e. A baseball team scores 4 runs in the first three innings of a 9-inning baseball game. If it continues at that rate, how many runs will it score in the game.?

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