

**Alpena Montmorency Alcona Educational Service District
6 Pacing Guide**

**Unit 1: Rates, Ratios, and Proportions
24-26 Days**

Math Background:

- Research - TE p1L-1O
- Background - TE p1P-1GG
- Learning Community - TE p1HH-1JJ

Last year, students...	This year, students will...	Next year, students will...
Developed fluency with whole number multiplication and division	Relate rate and ratio situations and connect them to whole number multiplication and division.	Extend discussion of unit rates to ratios and identify them constant of proportionality.
Used knowledge of factors and multiples to solve Factor Puzzles	Connect Factor puzzles to tables of equivalent ratios and use Factor Puzzles to solve proportions.	Use proportional relationships to solve multistep ratio problems.
	Solve unit rate problems including those involving unit pricing and constant speed.	
Graphed points in the coordinate plane (Q1) to solve real world and mathematical problems	Graph data from rate tables in all four quadrants.	Extend graphing to ratio situations.
	Solve real world problems involving rates, ratios, and proportions.	

Big Idea 1: Multiplication and Rates (About 7 days. Suggested date of completion: September 12, 2013)

Vocabulary: column, row, Factor Puzzle, factors, products, multiple, rate table, unit rate, ratio, rate, constant rate, every, each, per, scrambled rate table

Common Core State Standards for Mathematics [CCSS-M]

CC.6.RP.2: Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship.

CC.6.RP.3: Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

CC.6.RP.3a: Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

CC.6.RP.3b: Solve unit rate problems including those involving unit pricing and constant speed

Common Core Standards of Mathematical Practice [SMPs]

CC.K-12.MP.1: Make sense of problems and persevere in solving them.

CC.K-12.MP.2: Reason abstractly and quantitatively.

CC.K-12.MP.3: Construct viable arguments and critique the reasoning of others.

CC.K-12.MP.4: Model with math.

CC.K-12.MP.5: Use appropriate tools strategically.

CC.K-12.MP.6: Attend to precision.

CC.K-12.MP.7: Look for and make use of structure.

CC.K-12.MP.8: Look for and express regularity in repeated reasoning.

Lesson	Focus	CCSS-M and SMPs	Additional Resources Supplemental/Reteaching Materials Essential (E) Non-essential (NE)	Hints
1.1	<p>I can</p> <ul style="list-style-type: none"> Relate Factor Puzzles to four numbers in the multiplication table. Learn strategies for solving Factor Puzzles. <p>Formative Assessment: Ask students to explain what a Factor Puzzle is and how it relates to the multiplication table. Students should be able to verbalize that a Factor Puzzle is made using the four numbers in the cell where two rows and two columns of the multiplication table cross. Three of the four numbers are given, and solving the puzzle involves finding the fourth number.</p>	<p>RP.3 RP.3a</p> <p>SMP 1 SMP 3 SMP 5 SMP 6 SMP 7 SMP 8</p>	<p>SAB p1-6 (E) HW p1-2 (E) AC 1-1 ● (NE) AC 1-1 ▲ (NE) AC 1-1 ■ (NE)</p>	<p>Read TE p1Y-1Z</p> <p>Throughout the lesson, gradually release students from relying on the multiplication table to solve the Factor Puzzle.</p> <p>This lesson may take two days.</p>
Lesson 1.1 Notes				
1.2	<p>I can</p> <ul style="list-style-type: none"> Learn a Quick Practice Routine. Solve and make Factor Puzzles <p>Formative Assessment: Ask students to describe how they begin to solve a Factor Puzzle. Students should verbalize that they need to find either a row with two products or a column with two products. Then they need to identify the row or column of the multiplication table that contains the two</p>	<p>RP.3 RP.3a</p> <p>SMP 3 SMP 6</p>	<p>SAB p7-8 (E) HW p3-4 (E) AC 1-2 ● (NE) AC 1-2 ▲ (NE) AC 1-2 ■ (NE)</p>	<p>Begin thinking about how you will establish Math Talk in all daily routines (lessons, Quick Practices, etc).</p>

	products.			
	Lesson 1.2 Notes			
1.3	<p>I can</p> <ul style="list-style-type: none"> Understand rate situations as involving a constant increase. Distinguish multiplication situations from non-multiplication situations. Make a table to show a rate situation for many multiples of the situations. Understand rate tables as columns of the multiplication table. <p>Formative Assessment: Ask children to discuss their scenes with groups of 3 and how they know they have drawn groups of 3.</p>	<p>RP.2 RP.3 RP.3a RP.3b</p> <p>SMP 1 SMP 2 SMP 3 SMP 5 SMP 6 SMP 7 SMP 8</p>	<p>SAB p9-12 (E) HW p5-6 (E) AC 1-3 ● (NE) AC 1-3 ▲ (NE) AC 1-3 ■ (NE)</p>	<p>Read TE P. 1AA-1BB</p> <p>This lesson may take two days.</p> <p>This lesson sets the stage for proportional thinking. Take your time on this lesson, and start to push students' thinking from additive relationships to multiplicative relationships.</p>
	Lesson 1.3 Notes			
1.4	<p>I can</p> <ul style="list-style-type: none"> Understand unit rate and totals made from rates. Understand unit rate language. Understand how a rate table is related to equal groups multiplication. <p>Formative Assessment: Ask students to explain how a rate table is like an equal-groups multiplication.</p>	<p>RP.2 RP.3 RP.3a RP.3b</p> <p>SMP 2 SMP 3 SMP 6 SMP 7 SMP 8</p>	<p>SAB p13-14 (E) HW p7-8 (E) AC 1-4 ● (NE) AC 1-4 ▲ (NE) AC 1-4 ■ (NE)</p>	
	Lesson 1.4 Notes			

1.5	<p>I can</p> <ul style="list-style-type: none"> Decide if a constant rate is reasonable for a given situation. Identify rate tables and make up rate situations. Find the unit rate and use it to make a rate table. Make drawings to show a unit rate situation. <p>Formative Assessment: Ask students to explain how to find the unit rate for this situation: Abby bought 3 jars of peanuts for \$6.</p>	<p>RP.2 RP.3 RP.3a RP.3b</p> <p>SMP 3 SMP 4 SMP 6</p>	<p>SAB p15-16 (E) HW p9-10 (E) AC 1-5● (NE) AC 1-5 ▲ (NE) AC 1-5 ■ (NE) MCC 1</p>
	Lesson 1.5 Notes		
Quiz 1	AG Quick Quiz 1		
Reteach	To reteach, use the resources listed above (Essentials and Non-Essentials) as well as the Response to Intervention Resource Books.		

Big Idea 2: Special Rate Situations (About 3 days. Suggested date of completion: September 17, 2013)

Vocabulary: unit price, coordinate plane, x-coordinate, y-coordinate, x-axis, y-axis, unit rate triangle, ordered pair, coordinates

Common Core State Standards for Mathematics [CCSS-M]

CC.6.RP.2: Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship.

CC.6.RP.3: Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

CC.6.RP.3a: Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

CC.6.RP.3b: Solve unit rate problems including those involving unit pricing and constant speed

CC.6.EE.6: Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

CC.6.EE.9: Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.

Common Core Standards of Mathematical Practice [SMPs]

CC.K-12.MP.1: Make sense of problems and persevere in solving them.

CC.K-12.MP.2: Reason abstractly and quantitatively.

CC.K-12.MP.3: Construct viable arguments and critique the reasoning of others.

CC.K-12.MP.4: Model with math.

CC.K-12.MP.5: Use appropriate tools strategically.

CC.K-12.MP.6: Attend to precision.

CC.K-12.MP.7: Look for and make use of structure.

CC.K-12.MP.8: Look for and express regularity in repeated reasoning.

Lesson	Focus	CCSS-M and SMPs	Additional Resources Supplemental/Reteaching Materials Essential (E) Non-essential (NE)	Hints
1.6	<p>I can</p> <ul style="list-style-type: none"> Determine missing values in rate tables. Solve unit pricing problems Graph a rate table in the coordinate plane. <p>Formative Assessment: Ask students to tell how to find the unit rate by using a table or graph. Students should be able to explain that in a rate table, the unit rate is the number next to the 1 in the first column. In a graph, the unit rate is the height of the unit rate triangle.</p>	RP.2 RP.3 RP.3a RP.3b EE.6 EE.9 SMP 1 SMP 3 SMP 4 SMP 5 SMP 6 SMP 7	SAB p17-18 (E) HW p11-12 (E) AC 1-6 ● (NE) AC 1-6 ▲ (NE) AC 1-6 ■ (NE)	Read TE p1CC This lesson may take two days. This lesson sets the tone for students' work next year with proportional relationships represented in graphs.
Lesson 1.6 Notes				
1.7	<p>I can</p> <ul style="list-style-type: none"> Solve constant speed problems. Fill in missing values in a rate table. Graph a rate table in the coordinate plane. Given a graph, make a rate table. <p>Formative Assessment: Ask students to describe the graph for a rate table that shows a unit rate of 5 mph. Students should explain that the graph will be a straight line and that the unit rate triangle for the graph will be a right triangle 1 unit across and 5 units</p>	RP.1 RP.3 RP.3a RP.3b EE.9 SMP 1 SMP 3 SMP 4 SMP 5 SMP 6	SAB p19-22 (E) HW p13-14 (E) AC 1-7 ● (NE) AC 1-7 ▲ (NE) AC 1-7 ■ (NE) MCC 2 (NE)	

	up.			
	Lesson 1.7 Notes			
Quiz 2	AG Quick Quiz 2			
Reteach	To reteach, use the resources listed above (Essentials and Non-Essentials) as well as the Response to Intervention Resource Books.			

Big Idea 3: Solve Problems with Ratio and Proportion (About 5 days. Suggested date of completion: September 24, 2013)

Vocabulary: ratio, rate, Linked Rate Table, ratio table, basic ratio, equivalent ratio

Common Core State Standards for Mathematics [CCSS-M]

CC.6.RP.1: Write and evaluate numerical expressions involving whole-number exponents.

CC.6.RP.2: Write, read, and evaluate expressions in which letters stand for numbers.

CC.6.RP.3: Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

CC.6.RP.3a: Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

CC.6.NS.4: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express $36 + 8$ as $4(9 + 2)$.*

Common Core Standards of Mathematical Practice [SMPs]

CC.K-12.MP.1: Make sense of problems and persevere in solving them.

CC.K-12.MP.2: Reason abstractly and quantitatively.

CC.K-12.MP.3: Construct viable arguments and critique the reasoning of others.

CC.K-12.MP.4: Model with math.

CC.K-12.MP.5: Use appropriate tools strategically.

CC.K-12.MP.6: Attend to precision.

CC.K-12.MP.7: Look for and make use of structure.

CC.K-12.MP.8: Look for and express regularity in repeated reasoning.

Lesson	Focus	CCSS-M and SMPs	Additional Resources Supplemental/Reteaching Materials Essential (E) Non-essential (NE)	Hints
1.8	<p>I can</p> <ul style="list-style-type: none"> Understand that a ratio table is made from two related rate tables. Make drawing to show ratios. <p>Formative Assessment: Have students explain how a Linked Rate Table and a ratio table are the same and how they are different.</p>	RP.1 RP.2 RP.3 RP.3a SMP 3 SMP 4 SMP 6 SMP 7	SAB p23-24 (E) HW p15-16 (E) AC 1-8 ● (NE) AC 1-8 ▲ (NE) AC 1-8 ■ (NE)	Read TE p1DD This lesson may take two days.
Lesson 1.8 Notes				
1.9	<p>I can</p> <ul style="list-style-type: none"> Use ratio language and the 2:3 written formats. Understand basic ratios and equivalent ratios. Recognize ratio and non-ratio tables. <p>Formative Assessment: Ask students to make a ratio table and describe the constant increased in each column. Have students suggest a story for the ratio table and tell the linking unit.</p>	RP.1 RP.3 RP.3a SMP 2 SMP 3 SMP 4 SMP 5 SMP 6	SAB p25-26 (E) HW p17-18 (E) AC 1-9 ● (NE) AC 1-9 ▲ (NE) AC 1-9 ■ (NE)	The hand gestures on TE p71 will help bridge students' thinking between additive and multiplicative relationships. This lesson may take two days.
Lesson 1.9 Notes				

1.10	<p>I can</p> <ul style="list-style-type: none"> Understand that a proportion is made up of two equal ratios. Solve a proportion problem by solving a Factor Puzzle. <p>Formative Assessment: Students explain what a proportion is and what it means to solve a proportion. Students should show understanding that a proportion is a statement that says two ratios are equivalent. Solving a proportion means finding the fourth number when three numbers are shown.</p>	<p>RP.1 RP.3 RP.3a</p> <p>SMP 1 SMP 2 SMP 3 SMP 4 SMP 5 SMP 6 SMP 7</p>	<p>SAB p27-28 (E) HW p19-20 (E) AC 1-10 ● (NE) AC 1-10 ▲ (NE) AC 1-10 ■ (NE)</p>	<p>Proportions are emphasized heavily in 7th grade, so consider this lesson as the surface introduction to proportions. During this lesson and the next, lead students to finding missing values in proportions using the rate table/Factor Puzzle method (instead of other methods like cross multiplication).</p>
	<p>Lesson 1.10 Notes</p>			
1.11	<p>I can</p> <ul style="list-style-type: none"> Tell the assumptions that must be stated to make a situation a proportion problem Understand that a Factor Puzzle can have the rows or columns switched and still represent a proportion. <p>Formative Assessment: Students tell what they can change in a Factor Puzzle and still have the puzzle represent the same proportional relationship. Students should verbalize that they can switch the columns or the rows in the Factor Puzzle.</p>	<p>RP.1 RP.3 RP.3a</p> <p>SMP 1 SMP 2 SMP 3 SMP 6 SMP 7</p>	<p>SAB p29-30 (E) HW p21-22 (E) AC 1-11 ● (NE) AC 1-11 ▲ (NE) AC 1-11 ■ (NE) MCC 3 (NE)</p>	<p>Read TE p1EE-1FF</p>
	<p>Lesson 1.11 Notes</p>			
Quiz 3	<p>AG Quick Quiz 3</p>			

Reteach	To reteach, use the resources listed above (Essentials and Non-Essentials) as well as the Response to Intervention Resource Books.
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Big Idea 4: Identify, Solve, and Write Proportion Situations (About 4 days. Suggested date of completion: September 30)

Vocabulary: greatest common factor, scale

Common Core State Standards for Mathematics [CCSS-M]

CC.6.RP.1: Write and evaluate numerical expressions involving whole-number exponents.

CC.6.RP.2: Write, read, and evaluate expressions in which letters stand for numbers.

CC.6.RP.3: Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

CC.6.RP.3a: Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

Common Core Standards of Mathematical Practice [SMPs]

CC.K-12.MP.1: Make sense of problems and persevere in solving them.

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CC.K-12.MP.5: Use appropriate tools strategically.

CC.K-12.MP.6: Attend to precision.

CC.K-12.MP.7: Look for and make use of structure.

CC.K-12.MP.8: Look for and express regularity in repeated reasoning.

Lesson	Focus	CCSS-M and SMPs	Additional Resources Supplemental/Reteaching Materials Essential (E) Non-essential (NE)	Hints
1.12	<p>I can</p> <ul style="list-style-type: none"> • Solve numeric proportion problems. • Create proportion problems for numeric problems. • Understand that proportions can involve large numbers. • Differentiate proportion from non- 	<p>RP.1 RP.3 RP.3a</p> <p>SMP 2 SMP 3 SMP 4</p>	<p>SAB p31-32 (E) HW p23-24 (E) AC 1-12 ● (NE) AC 1-12 ▲ (NE) AC 1-12 ■ (NE)</p>	<p>Read TE p1GG</p>

	<p>proportion problems.</p> <p>Formative Assessment: Have each student give an example of a proportion with one number unknown. Have the student read the proportion and draw a Factor Puzzle that matches the proportion.</p>	<p>SMP 6 SMP 7</p>		
Lesson 1.12 Notes				
1.13	<p>I can</p> <ul style="list-style-type: none"> Solve proportion problems containing greater numbers. Understand and solve proportions that use a basic ratio. Use the GCF to factor to find a basic ratio. Differentiate proportion from non-proportion problems. <p>Formative Assessment: Ask students to explain to ways to find the basic ratio for 24:36.</p>	<p>RP.1 RP.2 RP.3 RP.3a NS.4</p> <p>SMP 3 SMP 6</p>	<p>SAB p33-34 (E) HW p25-26 (E) AC 1-13 ● (NE) AC 1-13 ▲ (NE) AC 1-13 ■ (NE)</p>	<p>In the CCSS, Greatest Common Factor is found and used differently than in the GLCEs. Please read the standard NS.4 to see an example of this. The goal of this lesson is not to calculate the GCF, but to use the GCF (or any common factor) to factor and find equivalent ratios. Again, this is bridging to multiplicative thinking.</p>
Lesson 1.13 Notes				
1.14	<p>I can</p> <ul style="list-style-type: none"> Solve problems that use a basic ratio. Use the GCF to factor to solve proportion problems with greater numbers. Solve, explain, and edit proportion problems. 	<p>RP.1 RP.3 RP.3a</p> <p>SMP 3 SMP 6</p>	<p>HW p27-28 (E) AC 1-14 ● (NE) AC 1-14 ▲ (NE) AC 1-14 ■ (NE) MCC 4 (NE)</p>	<p>Read TE p1GG</p> <p>In the CCSS, equivalent fractions are emphasized in previous grades, but lowest term/reducing is not emphasized as heavily as it</p>

	<p>Formative Assessment: Ask students to explain how and why either multiplication or division can be used to write the basic ratio for 4:6.</p>			was in the GLCEs. Keep this in mind when making connections between ratios and fractions.
	Lesson 1.14 Notes			
Quiz 4	AG Quick Quiz 4			
Reteach	To reteach, use the resources listed above (Essentials and Non-Essentials) as well as the Response to Intervention Resource Books.			
1.15	<p>Math Practices Lesson</p>	<p>RP.1 RP.2 RP.3 RP.3a SMP 1-8</p>	<p>SAB p35-36 (E) HW p29-30 (E) AC 1-15 ● (NE) AC 1-15 ▲ (NE) AC 1-15 ■ (NE)</p>	
	Lesson 1.15 Notes			

Unit 1: Enrichment/Intervention Loop (About 3-5 days. Suggested date of completion: October 7, 2013)

Unit Test Objectives

- 1A Solve Factor Puzzles
- 1B Identify and compare rate tables.
- 1C Find the unit rate.
- 1D Graph rate situations.
- 1E Identify and compare ratio tables.
- 1F Solve numeric proportional problems.
- 1G Find a basic ratio.
- 1H Solve real world problems.

Day 1: Final Formative Assessment - SAB p37-40

Day 2-4: Reteaching Activities- TE p118-120

Day 5: Assessment - Unit 1 Test AG

