

EngageNY
7th Grade Module 1

Topic A: Proportional Relationships

7.RP.2a

Recognize and represent proportional relationships between quantities.

- a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

Lesson 1: An Experience in Relationships as Measuring Rate			SBAC Connection
Lesson Hints	Additional Supports/ Materials	I can...	<p>7.G.1 and 7.RP.2</p> <hr/> <p>A company designed two rectangular maps of the same region. These maps are described below.</p> <p>Map 1: The dimensions are 8 inches by 10 inches. The scale is $\frac{3}{4}$ mile to 1 inch.</p> <p>Map 2: The dimensions are 4 inches by 5 inches.</p> <p>Which ratio represents the scale on Map 2?</p> <p>(A) $\frac{1}{2}$ mile to $\frac{3}{4}$ inch</p> <p>(B) $\frac{3}{4}$ mile to $\frac{1}{2}$ inch</p> <p>(C) $\frac{1}{4}$ mile to 1 inch</p> <p>(D) $\frac{3}{8}$ mile to 1 inch</p>
<ul style="list-style-type: none"> Enlarge example 1 table Use closing activities to guide summary (great idea for every lesson) Students should take Cornell Notes using the lesson summary as a guide Pre-view and have video ready for the exit task. 	<ul style="list-style-type: none"> You will need a stack of papers to pass out for the “How fast is our class?” example. 	<ul style="list-style-type: none"> Compute unit rates. Use ratios and finding unit rate in context. 	
Lesson 2: Proportional Relationships			
Lesson Helps	Additional Supports/ Materials	I can....	
<ul style="list-style-type: none"> Use closing activities to guide summary (great idea for every lesson) 		<ul style="list-style-type: none"> Determine if two quantities are proportional. Use corresponding measures to find unknown lengths 	
Lesson 3 – 4 Identifying Proportional and Non-Proportional Relationships in Tables			
Lesson Helps	Additional Supports/ Materials	I can...	
<ul style="list-style-type: none"> Ask questions to insure that students understand what the ratios mean in the examples. Ask students questions to 		<ul style="list-style-type: none"> Determine if two quantities are proportional in a given table by checking for the constant rate of change. 	

<p>insure that they know how to use given information.</p> <ul style="list-style-type: none"> • Connect vocabulary from 6th grade (ex: constant rate of change, slope, unit rate, etc.) • Lesson 4: have students work in small student-centered groups. 		<ul style="list-style-type: none"> • Determine if two quantities are not proportional. 	
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Lesson 5- 6 Identifying Proportional and Non-Proportional Relationships in Graphs

Lesson Helps	Additional Supports/ Materials	I can...	
<ul style="list-style-type: none"> • Opening exercise used as a launch into the lesson followed by the discussion questions. • Make student edition graphs larger or have students use graph paper 	<p>Lesson 6: poster paper, graph paper, prepare ratios in envelopes and sticky notes</p>	<ul style="list-style-type: none"> • Determine if two quantities are proportional on a given graph. • Determine if two quantities are not proportional. 	

Topic B: Unit Rate and Constant of Proportionality

7.RP.2b, 7.RP.2c, 7.RP.2d




Recognize and represent proportional relationships between quantities.

- Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p , the relationship between the total cost and the number of items can be expressed as $t = pn$.*
- Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate

7.EE.4a

Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

- Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*

 Lesson 7 Unit Rate as the Constant of Proportionality		
Lesson Helps	Additional Supports/ Materials	I can...
<ul style="list-style-type: none"> Students should do a quick vocabulary activity (ex: mind mapping, Frayer model, etc.) 		<ul style="list-style-type: none"> Identify the constant rate of change and how it relates to unit rate in a word problem. Interpret the constant of proportionality (constant rate of change) in a word problem.
 Lesson 8-9 Representing Proportional Relationships with Equations		
Lesson Helps	Additional Supports/ Materials	I can...
<ul style="list-style-type: none"> Discuss different forms of an equation for example, $y=kx$ or $y=mx$. Have students label all parts of the equation to help insure understanding. Discuss independent vs dependent axis. 		<ul style="list-style-type: none"> Use the constant of proportionality to represent proportional relationships by equations in real world contexts.
 Lesson 10 Interpreting Graphs of Proportional Relationships		
Lesson Helps	Additional Supports/ Materials	I can...
<ul style="list-style-type: none"> Have students discuss what a particular coordinate (x,y) means in contexts with a given situation. 		<ul style="list-style-type: none"> Interpret what the points on the graph of a proportional relationship mean in terms of the situations or context of the problem, including the point $(0,0)$. Identify the interpret unit rate as a coordinate on a graph.

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Mid-Module Assessment and rubric can be used at your discretion.

Topic C: Ratios and Rates Involving Fractions

7.RP.2b, 7.RP.2c, 7.RP.2d

Recognize and represent proportional relationships between quantities.

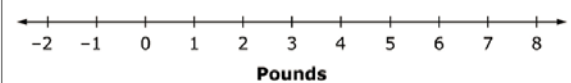
- b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- c. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p , the relationship between the total cost and the number of items can be expressed as $t = pn$.*
- d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate

7.EE.4a

Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.



- b. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where $p, q,$ and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*

 Lessons 11-12 Ratios of Fractions and Their Unit Rates	SBAC Connections
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Lesson Helps	Additional Supports/ Materials	I can...	7.EE.4
<ul style="list-style-type: none"> • Clarify procedures and conceptual understanding with computation and operations with fractions. • Discuss differences and similarities between ratios and fractions. • Use visual contextual models and manipulatives when possible. • Support lessons with fraction entry tasks. 		<ul style="list-style-type: none"> • Use ratio tables reasoning to compute unit rates associated with ratios of fractions in the context of measures quantities such as recipes, lengths, areas, and speed. 	<div style="border: 1px solid black; padding: 10px;"> <p>David wants to buy 2 pineapples and some bananas.</p> <ul style="list-style-type: none"> • The price of 1 pineapple is \$2.99. • The price of bananas is \$0.67 per pound. <p>David wants to spend less than \$10.00. Write an inequality that represents the number of pounds of bananas, b, David can buy.</p> <div style="border: 1px solid black; width: 100px; height: 20px; margin: 10px auto;"></div> <p>On the number line below, draw a graph that represents the number of pounds of bananas David can buy.</p> <div style="text-align: center;">  <p style="margin: 0;">-2 -1 0 1 2 3 4 5 6 7 8</p> <p style="margin: 0;">Pounds</p> </div> </div>

 Lessons 13 Finding Equivalent Ratios Given the Total Quantity	SBAC Connections
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Lesson Helps	Additional Supports/ Materials	I can...	
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	Materials		
<ul style="list-style-type: none"> When possible use visual representations of dividing fractions and fraction strips. 		<ul style="list-style-type: none"> Use tables to find an equivalent ratio given a part-to-part ratio and then find the total of those quantities. 	
 Lessons 14 Multi-step Ratio Problems			
Lesson Helps	Additional Supports/ Materials	I can...	
<ul style="list-style-type: none"> Use tape diagrams as a model. Lesson summary lends itself to Cornell Note taking opportunity. 		<ul style="list-style-type: none"> Solve multi-step ratio problems including fractional markdowns, markups, commissions, fees, etc. 	
 Lessons 15 Equations of Graphs of Proportional Relationships Involving Fractions			
Lesson Helps	Additional Supports/ Materials	I can...	
<ul style="list-style-type: none"> Use the Classwork section page 132 to spark a class discussion. 		<ul style="list-style-type: none"> I can use equations and graphs to represent proportional relationships arising from ratios and rates involving fractions. I can interpret what points on the graph of the relationship mean in terms of the situation or context of the problem. 	

**Lesson 17 The Unit Rate as Scale Factor (CMP lessons)**

Lesson Hints	Additional Supports & Materials	ICAN Statements	SBAC Connections
Sept. 18, 2015			
<ul style="list-style-type: none"> Use different units of 			

Topic D is optional depending on time (Module 4, Topic C has a review of these Standards & Lessons).

Topic D: Ratios of Scale Drawings

7.RP.2b,7.G.1 Focus Standard:

7.RP.2 Recognize and represent proportional relationships between quantities.

b .Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.




7.G.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale

**Lesson 16 Relate Scale Drawing to ratios and Rates (Mug Wumps)**


Lesson Hints	Additional Supports & Materials	ICAN Statements	SBAC Connections
<ul style="list-style-type: none"> CMP Lesson of Wumps would be a great foundation. (look ahead to G7 Module 4, Topic B, Lesson 12 to incorporate percents) Could personalize and use student's photographs and enlarge or reduce using a copier. 	<ul style="list-style-type: none"> Student's photographs can be used to scale up or down. (<i>younger funny pictures are wonderful!</i>) Rulers, protractors 	<ul style="list-style-type: none"> Compute unit rates of quantities associated with ratios of fractions (length, area, & other quantities). 	

Sept. 18, 2015

<p>measurement to compare the scale factors.</p> <ul style="list-style-type: none"> • Extension: Students can enlarge an image they want to draw or paint by drawing a grid using a ruler over their reference picture and drawing a grid of equal ratio on their work surface. Direct students to focus on one square at a time until the image is complete. Have students compute the scale factor for the drawing. 	<ul style="list-style-type: none"> • Rulers, protractors • Appropriate grid paper (cm, inch) <p><i>Rod Tamura</i> will adapt his lesson to a Smart Notebook.</p>		
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 Lesson 18 Computing Actual Lengths from a Scale Drawing			
Lesson Hints	Additional Supports & Materials	ICAN Statements	SBAC Connections
<ul style="list-style-type: none"> • Reminder for students to look at the given scale. 		<ul style="list-style-type: none"> • Solve problems involving scale drawings, when given scale 	
 Lesson 19 Computing Actual Areas from a Scale Drawing			
Lesson Hints	Additional Supports & Materials	ICAN Statements	SBAC Connections
<ul style="list-style-type: none"> • Students should use manipulatives to create meaning about the ratio of scale factor with the relationship of three dimensions. • 		<ul style="list-style-type: none"> • Compute lengths and area from a scale drawing. 	
 Lesson 20: An Exercise in Creating a Scale Drawing			

Lesson Hints	Additional Supports & Materials	ICAN Statements	SBAC Connection
<ul style="list-style-type: none"> • Extension Lesson: Optional lesson- teachers may use as a project • Have some students measure the perimeter of the classroom for the class beforehand. ----Could have students measure their own rooms instead. 	<ul style="list-style-type: none"> • Extension: Have students choose flooring and record the costs. Including the furniture, students can calculate the cost of the designed room. • Meter sticks • Grid paper (unit square if available) www.PrintablePaper.net 	<ul style="list-style-type: none"> • Reproduce the drawing of a different scale using a given scale drawing 	

 **Lesson 21-22: An Exercise in Changing Scales (optional lesson – teacher use at their discretion)**

Lesson Hints	Additional Supports & Materials	ICAN Statements	SBAC Connection
<ul style="list-style-type: none"> • Talks about scale drawing of a different scale by applying real life situations (similarities and differences of the original and new drawing). 	<ul style="list-style-type: none"> • Use drawings from Lesson 20 as original drawings • Grid paper • Rulers • Calculators 	<ul style="list-style-type: none"> • Reproduce the drawing of a different scale using a given scale drawing 	