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### How to Use This Addenda

Make sure you're ready to teach by noting the **Necessary Materials and Pre-Lesson Prep** you will need to gather or complete prior to the lesson

Find high-leverage instructional moves in the **Lesson Look Fors**. This is what leaders should see when observing your instruction

Note how your lesson objective ties to your state **Standards**

Plan purposeful questioning and responses using **Opportunities to CFU**

Plan to stress **Important Vocabulary** in the lesson. New vocab for the unit is indicated in bold

Note exemplar pacing in the **Lesson Agenda**

Use the **Mathematical Goal of the Lesson** to keep you focused on the appropriate student outcome

Plan instruction around what students need to Know & Do to be successful on the **Exit Ticket** using the identified **Student Criteria for Success**

Find recommended lesson modifications, content knowledge boosters, and/or high-leverage instructional moves that may not be in your Teacher Edition located in **Other Notes to Inform Your Planning**

Date: \_\_\_\_\_

**Lesson 9: Find related multiplication facts by adding and subtracting equal groups in array models**

Standard(s)	Notes for Intellectual Preparation & Lesson Planning	
<b>3.4K</b> solve one-step and two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recall of facts	<b>Necessary Materials and Pre-Lesson Prep</b>	
	<ul style="list-style-type: none"> <li>▪ (S) Multiply by 2 (1–5) Pattern Sheet</li> <li>▪ (S) Personal white board</li> </ul>	<ul style="list-style-type: none"> <li>▪ (S) Three's array no fill template</li> <li>▪ (S) Blank paper</li> </ul>
	<b>Lesson Agenda</b>	<b>Time</b>
	I. Do Now (source: fluency #1)	5 min
	II. Fluency*	8 min
	III. Concept Development	25 min
	IV. Student Practice	15 min
	V. Student Debrief	7 min
	VI. Exit Ticket*	5 min
	<b>Mathematical Goal of this Lesson</b> Students learn they can use decomposition to break one larger number into two smaller numbers as a strategy for multiplication. The goal of this lesson is simply for student to understand how to interpret and create an array that demonstrates such decomposition. Students will build on this understanding in subsequent lessons. This lesson also supports the goal of student thinking in terms of counting units, an overarching goal for academy math.	
	<b>Opportunities to CFU</b> 7 threes = 5 threes + 2 threes 7 × 3 = 5 × 3 + 2 × 3 21 = 15 + 6	
	<b>Other Notes to Inform Your Planning</b> For <b>Do Now</b> : Use the Multiply by 2 (1–5) Pattern Sheet for your Do Now. 3 minutes for completion, 2 minutes whole group classwork check. For <b>Fluency</b> : Complete the Group Counting activity (notice the inclusion of 4s in preparation for upcoming lessons) and Forms of Multiplication activity. For <b>Concept Development</b> : Consider prepping personal whiteboard in advance. Spend no more than 12 minutes for CD Problem 1 and 13 minutes for CD Prob 2. For <b>Student Practice</b> : consider creating an extra set of Qs like 1-3 in case students struggle with entry-level understanding. If they don't, move on to Qs 4 and above. For <b>Student Debrief</b> : consider using the Eureka assigned Exit Ticket for whole group debrief exercise; Suggested strategy – guided discourse. For <b>Exit Ticket</b> : Use <b>Homework</b> problems 2 & 3 for this lesson's Exit Ticket.	
	<i>Though not formally discussed yet, this is a foundation to understanding of distributive property. Students visually see multiplying the sum of two or more addends by a number will give the same result as multiplying each addend individually by the number and then adding the products together.</i>	

## UNIT SYNOPSIS

This unit features 3 topics. In unit 3, students expand upon their understanding of ratios and proportionality to solve a wide variety of proportions, including similar figures, scale drawings, measurement conversions, and percentages. The focus of proportional relationships will be for students to understand multiplicative relationships and use this understanding to set up and solve proportions using part-to-part or part-to-whole ratios. Students will also learn to find the scale factor when solving for a missing value in a proportional relationship then determine which strategy (finding the multiplicative relationship or scale factor) works best to solve for a missing value in a proportion.. They then solve problems with similar figures and extend their understanding of proportional relationships to scale drawings, measurement conversions, and percentages, including percentages greater than 100% and percent of change. Finally, they take what they learned about part-to part and part-to-whole relationships and solve for a missing value using algebraic expressions/equations.

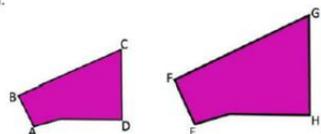
## Topic A Overview – Similar Figures, Scale Drawings, and Measurement Conversions

Topic A focuses on similar figures, scale drawings, and measurement conversions. Lesson 1 students discover that, scale factor or multiplicative relationships can be used to find missing quantities when the two ratios are equivalent. In Lesson 2, students are introduced to the concept of similar figures. This lesson sets students up for success by ensuring they have familiarity with geometric notation, figures, and vocabulary prior to being asked to apply their proportional reasoning skills. This lesson also focuses on identifying corresponding sides and angles in similar figures with practice using scale factors. In Lesson 3, students then take what they learned about corresponding sides and angles and discover that proportions can be used to find missing quantities when the two figures are similar. They also will also have more opportunity to practice using scale factor or multiplicative relationships to solve for a missing quantity in a proportion. They first solve for missing values in similar figures, then set up a proportion to represent a real-world situation and solve use scale factors or multiplicative relationships. This lesson prepares them for Lessons 4 on scale drawings and 5 on measurement conversions.

### Similar Figures

Let's Practice! – Visual Inspection

1.



Hint:  $\overline{BC}$  corresponds to  $\overline{FG}$ .

a. Which side do you think corresponds to  $\overline{CD}$ ?

GH

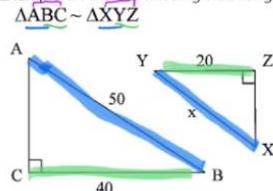
b. Which side do you think corresponds to  $\overline{FE}$ ?

BA

c. Which angle do you think corresponds to  $\angle D$ ?

$\angle H$

Example 1: Find the missing side length of  $\triangle XYZ$ .



1. Use triangle name to setup proportions

$$\frac{AB}{XY} = \frac{BC}{YZ} = \frac{AC}{XZ}$$

2. Determine which two ratios to use based on what's given, and what's asked for. Setup your proportion with known and unknown

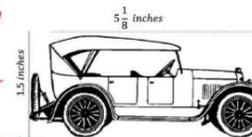
$$\frac{50}{x} = \frac{40}{20}$$

3. Use a math strategy to find the unknown. Try finding an easy to spot multiplier first!

$$\frac{50}{x} = \frac{40}{20} \xrightarrow{\times 2 \text{ or } \div 2} \frac{50}{x} = \frac{40}{20} \rightarrow x = 25$$

### Scale Drawings

2 A model car was created using a scale of  $\frac{1}{2}$  inch : 2 feet. Find the actual length and height of the car.



length

$$5\frac{1}{8} \times 4 = 20.5 \text{ feet}$$

height

$$1.5 \times 4 = 6 \text{ feet}$$

### Measurement Conversions

3 There are approximately 3.8 liters in 1 gallon. How many liters of water are in the jug?

$$3.8 \text{ liters} = \frac{x \text{ liters}}{5 \text{ gallons}}$$

$$\begin{array}{r} 3.8 \\ \times 5 \\ \hline 19.0 \end{array}$$

19 liters

## Topic B Overview – Percent Proportions, Percents using Multiplication, and Percents Greater than 100%

In Topic B students begin working with percentages. In Lesson 6 students begin using proportions to solve percentage problems. They will also use their understanding of proportionality to identify multiplicative relationships that can be used to solve for unknown quantities in percentage problems. They also build the understanding that percent means per 100, and percent is a ratio that compares a number to 100. Lesson 7 is a continuation of Lesson 6 to allow more opportunity for practice. Lesson 8 extends what students learned about percentages to include percentages that are greater than 100%. In Lesson 9 students use multiplication to calculate the percent of a number. In this lesson, students learn they can use multiplication to find the percent of a number.

### Percent Proportions

Missing Whole	$\frac{\text{percent}}{100} = \frac{\text{part}}{?}$	1.) 12 is 20% of what number?	2.) 108 is 75% of what number?
		$\frac{20}{100} = \frac{12}{x}$ $102 \text{ is } 20\% \text{ of } 60$	$\frac{75}{100} = \frac{108}{x}$ $\frac{3}{4} = \frac{108}{x}$ $108 \text{ is } 75\% \text{ of } 144$

### Percents Greater than 100%

① Bobby is raising money for the local animal shelter. He has set a goal of raising \$6,000.

a) What percent of his goal will he have raised when he has raised \$6,000?

The whole amount was raised, so 100%.

b) If Bobby raises \$9,000, what percent of his goal will he have raised?

$$\frac{9000}{6000} = \frac{x}{100}$$

$$150\%$$

$$9000 = 6000 + 3000$$

100% + 50%  
of 6000 of 6000

$$\begin{array}{r} 150. \\ 6 \overline{) 900.} \\ \underline{-6} \phantom{00} \\ 30 \phantom{0} \\ \underline{-30} \phantom{0} \\ 0 \end{array}$$

c) What happened to the percent when Bobby exceeded his goal?

When he exceeded his goal, the percent exceeded 100.

### Finding Percent of a Number using Multiplication

3. On the next problem on the math assignment is: Find 40% of 20  
Show two different ways to solve this problem.

$$40\% = .4$$

$$20 \times .4 = 8.0$$

$$\frac{40}{100} = \frac{x}{20}$$

$$40\% \text{ of } 20 \text{ is } 8.$$

## Topic C Overview – Percent of Change and Writing Algebraic Expressions/Equations to Represent Relationships

In Topic C, students build understanding of percent of change and writing expressions then equations to represent relationships. In Lesson 10, students first discover the need for calculating percent of change using real-world scenarios. Then they begin to calculate the percentage of change from one quantity to another using what they have been learning about proportions. In Lesson 11, students begin to write algebraic expressions to represent different percent problems. In Lesson 12, students will connect what they learned about writing algebraic expressions to write algebraic equations.

### Percent of Change

a. Albert gained 5 pounds last year. Do you think Albert gained too much weight?

What if Albert is a chipmunk?



What if Albert is an elephant?



② Bobby increased his math grade from a 60% to an 84%. Kylee increased her math grade from an 80% to a 92%. Which student had a greater improvement in their grade.

$$\begin{array}{l} \text{Bobby} \rightarrow 40\% \text{ increase} \\ 60 \rightarrow 84 \\ \frac{4}{10} \cdot \frac{24}{60} = \frac{x}{100} \end{array}$$

$$\begin{array}{l} \text{Kylee} \rightarrow 15\% \text{ increase} \\ 80 \rightarrow 92 \\ \frac{3}{20} \cdot \frac{12}{80} = \frac{x}{100} \end{array}$$

Bobby had the greater improvement in their grade.

### Writing Algebraic Expressions

Write an expression to represent each (Step 1 is already done for you).

- (a) 75% of  $x$       (b) 9% of  $h$       (c) 120% of  $y$       (d) 205% of  $k$

$.75x$        $.09h$        $1.2y$        $2.05k$

- (e) Maria puts 20% of her paycheck into her savings account. If " $p$ " represents the amount of her paycheck, write an expression to represent the amount of money Maria will deposit into her savings account.

$.2p$

### Writing Algebraic Equations

① Students took a pre-test and post-test in their Spanish class. Some students' scores are shown in the table:

Student	Pre-Test Score	Post-Test Score	% increase	Equation to represent % of change
Julie	$28 + 21 =$	49	75%	$x + 0.75x = y \rightarrow 1.75x = y$
Harry	$52 + 13 =$	65	25%	$x + 0.25x = y \rightarrow 1.25x = y$
Louis	$50 + 30 =$	80	60%	$x + 0.6x = y \rightarrow 1.6x = y$
Tessa	$40 + 24 =$	64	60%	$x + 0.6x = y \rightarrow 1.6x = y$
Ezra	$32 + 28 =$	60	87.5%	$x + 0.875x = y \rightarrow 1.875x = y$

$\uparrow$  change

## CONTENT STANDARDS

Below are the standards addressed in this unit.

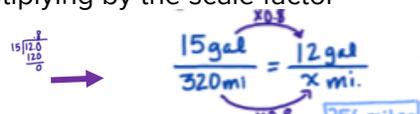
Readiness Standards	Supporting Standards
7.4(D) solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems	7.13(A) calculate the sales tax for a given purchase and calculate income tax for earned wages

<p><b>Focus on Disciplinary Literacy</b></p> 	Mathematical Process Standard (F) – analyze mathematical relationships to connect and communicate mathematical ideas
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# ROADMAP

AT A GLANCE: Unit 3 Proportional Reasoning Applications				
Topic	Day	Date	Lesson	Lesson Title
<b>Topic A</b> Similar Figures, Scale Drawings, and Measurement Conversions	1		1	The Multiplicative Relationship of Proportions
	2		2	Introduction to Similar Figures
	3		3	Similar Figures and Proportions
	4		4	Scale Drawings
	5		5	Measurement Conversions
	6			<b>Success Day   Topic Quiz 3</b>
<b>Topic B</b> Percent Proportions, Percents using Multiplication, and Percents Greater than 100%	7		6	Using Proportions to Solve Percent Problems
	8		7	Solving Percent Problems – Day 2
	9		8	Percentages Greater than 100%
	10		9	Finding Percent of a Number Using Multiplication
<b>Topic C</b> Percent of Change and Writing Expressions/Equations to Represent Relationships	11		10	Percent of Change
	12		11	Writing Expressions to Represent Relationships
	13		12	Percent of Change and Algebraic Reasoning
	14			Review
	15			Exam

Lesson 1: The Multiplicative Relationship of Proportions		Date: _____												
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors												
<p>◆ <b>7.4D</b> solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems</p>	<p><b>Necessary Materials and Pre-Lesson Prep</b></p> <ul style="list-style-type: none"> <li>▪ Unit 3 Student Workbook</li> <li>▪ Document Camera</li> <li>▪ Projector</li> </ul> <p><b>Lesson Agenda</b></p> <table border="1"> <thead> <tr> <th></th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now</td> <td>7 min</td> </tr> <tr> <td>II. INM</td> <td>35 min</td> </tr> <tr> <td>III. Student Practice</td> <td>14 min</td> </tr> <tr> <td>IV. Student Debrief</td> <td>6 min</td> </tr> <tr> <td>V. Exit Ticket</td> <td>8 min</td> </tr> </tbody> </table> <p><b>Mathematical Goal of this Lesson</b> The goal of this lesson is for students to identify a multiplicative relationship among two ratios, including scale factor and use a multiplicative relationship to find missing values in a proportion.</p> <p><b>Opportunities to CFU</b></p> <ul style="list-style-type: none"> <li>✓ INM: #1-3</li> <li>✓ Student Practice: #1, 2b</li> </ul> <p><b>Other Notes to Inform Your Planning</b> <b>INM:</b> Students that struggle with multiplication facts should be provided with a 12X12 multiplication chart as they will struggle in this lesson. Consider allowing all students to use a calculator to check their calculations ONLY. Students should still show their process of thinking. It would be a best practice to model the process for students under a document camera during this portion of the lesson. <b>Student Practice:</b> Allow students to determine if it is easier to use the scale factor or determine the multiplicative relationship to find the missing value of a proportion(#1a, b, c, d, e, f(mistake in student workbook). Encourage students Read Draw Write to make sense of the word problems in the student practice.</p>		Time	I. Do Now	7 min	II. INM	35 min	III. Student Practice	14 min	IV. Student Debrief	6 min	V. Exit Ticket	8 min	<p><b>Look for teachers to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use the lesson vocabulary: Multiplicative Relationship, Scale Factor. Proportion</li> <li><input type="checkbox"/> <b>Stamp</b> that two ratios must have the same scale factor or the multiplicative relationship between the numerator and denominator of the first ratio must be the same as the second ratio.</li> </ul> <p><b>Look for students to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Determine if two ratios have a multiplicative relationship and explain why.</li> <li><input type="checkbox"/> Identify the scale factor then determine the missing value in a proportional</li> <li><input type="checkbox"/> Determine which process makes the most sense when finding a missing value; finding the scale factor or determining the multiplicative relationship between the numerator and denominator</li> </ul>
		Time												
I. Do Now	7 min													
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<p><b>Important Vocabulary</b></p> <ul style="list-style-type: none"> <li>▪ Multiplicative Relationship</li> <li>▪ Scale Factor</li> <li>▪ Proportion</li> </ul>	<p><b>Focus on Disciplinary Literacy</b></p> <div style="display: flex; align-items: center;">  <p>INM Part I: #1-3 INM Part II: #4-6</p> </div>	<p><b>Student Know/Do Chart</b></p> <p> The multiplicative relationship between the numerator and denominator of the first ratio must be the same as the second ratio in order for to be proportional.</p> <p> In scale factor, the numerator and denominator must be multiplied by the same number to create a proportion.</p> <p> Determine if two ratios are equivalent.</p> <p> Determine the multiplicative relationship or scale factor of two ratios to find a missing value</p>												

Lesson 2: Introduction to Similar Figures		Date: _____												
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors												
<p>◆ <b>7.5C</b> solve mathematical and real-world problems involving similar shape and scale drawings</p>	<p><b>Necessary Materials and Pre-Lesson Prep</b></p> <ul style="list-style-type: none"> <li>Unit 3 Student Workbook</li> <li>Document Camera</li> <li>Projector</li> <li>2-3 Different color highlighters</li> </ul> <p><b>Lesson Agenda</b></p> <table border="1"> <thead> <tr> <th></th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now</td> <td>4 min</td> </tr> <tr> <td>II. INM</td> <td>40 min</td> </tr> <tr> <td>III. Student Practice</td> <td>10 min</td> </tr> <tr> <td>IV. Student Debrief</td> <td>7 min</td> </tr> <tr> <td>V. Exit Ticket</td> <td>8 min</td> </tr> </tbody> </table> <p><b>Mathematical Goal of this Lesson</b> The primary goal of this lesson is for students to identify corresponding elements and the scale factor of similar figures. In the lesson, students are introduced to the concept of similar figures. This lesson sets students up for success by ensuring they have familiarity with geometric notation, figures, and vocabulary prior to being asked to apply their proportional reasoning skills.</p> <p><b>Opportunities to CFU</b></p> <ul style="list-style-type: none"> <li>✓ INM: #1,2,7-9, Part 3</li> <li>✓ Student Practice: #2,3,4,5</li> </ul> <p><b>Other Notes to Inform Your Planning</b> For <b>INM</b>: Provide students who struggle with multiplication facts a 12X12 multiplication chart. Those that struggle to divide or multiply decimals should be provided with graph paper to support them in organizing their numbers. Consider creating an anchor chart that models identifying corresponding angles and the process for finding scale factors; particularly when decimals or fractions are involved. Allow students to highlighters or markers to support with identify corresponding angles.</p> <p><b>Student Practice:</b> For #6; ensure that students are going through each choice and recognizing to determine which pattern is accurate and represents that of a scale factor. See example in TE.</p>		Time	I. Do Now	4 min	II. INM	40 min	III. Student Practice	10 min	IV. Student Debrief	7 min	V. Exit Ticket	8 min	<p><b>Look for teachers to...</b></p> <ul style="list-style-type: none"> <li>Stamp the process for identifying corresponding angles and the scale factor in the INM.</li> <li>Create an anchor chart that models identifying corresponding angles and the scale factor.</li> <li>Use the guided questions from the INM to scaffold for students that may struggle.</li> </ul> <p><b>Look for students to...</b></p> <ul style="list-style-type: none"> <li>Identify corresponding angles and explain what makes these angles corresponding angles.</li> <li>Show evidence of learning including setting up a proportion, finding the scale factor and multiplying by the scale factor</li> </ul> 
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I. Do Now	4 min													
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<p><b>Important Vocabulary</b></p> <ul style="list-style-type: none"> <li>Congruent</li> <li>Corresponding Elements</li> <li>Proportional</li> <li>Multiplicative Relationship</li> <li>Scale Factor</li> </ul>	<p><b>Focus on Disciplinary Literacy</b></p>  <p>INM: #7,8,9a-b Student Practice: #5</p>	<p><b>Student Know/Do Chart</b></p> <ul style="list-style-type: none"> <li><b>Know</b> Similar figures have the same shape but different sizes</li> <li><b>Know</b> Similar figures have congruent angle measures however a scale factor changes the lengths of the sides but not the measure of the angles.</li> <li><b>Do</b> Identify corresponding angles in similar figures</li> <li><b>Do</b> Calculate the scale factor of similar figures</li> <li><b>Do</b> Use the scale factor to find the value of a missing side</li> </ul>												

Lesson 3: Similar Figures and Proportions		Date: _____												
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors												
<p>◆ <b>7.5C</b> solve mathematical and real-world problems involving similar shape and scale drawings</p>	<p><b>Necessary Materials and Pre-Lesson Prep</b></p> <ul style="list-style-type: none"> <li>▪ Student Workbook 3</li> <li>▪ Document Camera</li> <li>▪ Projector</li> <li>▪ 2-3 different color highlighters</li> </ul> <p><b>Lesson Agenda</b></p> <table border="1"> <thead> <tr> <th></th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now</td> <td>8 min</td> </tr> <tr> <td>II. INM/Concept Development</td> <td>30 min</td> </tr> <tr> <td>III. Student Practice</td> <td>15 min</td> </tr> <tr> <td>IV. Student Debrief</td> <td>7 min</td> </tr> <tr> <td>V. Exit Ticket</td> <td>8 min</td> </tr> </tbody> </table> <p><b>Mathematical Goal of this Lesson</b> The primary goal of this lesson is to calculate missing side lengths and angle measures in a set of similar figures using corresponding sides. In this lesson students build on what they learned yesterday regarding similar figures. This time they are incorporating proportional relationships and reasoning to identify missing side lengths.</p> <p><b>Opportunities to CFU</b></p> <ul style="list-style-type: none"> <li>✓ INM: Examples 2, 3, 4</li> <li>✓ Student Practice: #1-3</li> </ul> <p><b>Other Notes to Inform Your Planning</b></p> <p><b>Do Now:</b> The Do Now is a Must Do as it reviews the previous lesson on corresponding angles/sides.</p> <p>For <b>INM:</b> Example 1 should be modeled under the document camera using highlighters to identify corresponding sides.</p> <p>Students should use highlighters throughout the lesson to support them with identifying corresponding sides. Use this time to review Lesson 1 on multiplicative relationships and scale factor. Ensure that students are showing their process of thinking whether they are using a multiplicative relationship or identifying the scale factor to find the missing value. When modeling scaffold by using a different color to show the multiplier or scale factor. See TE for examples.</p>		Time	I. Do Now	8 min	II. INM/Concept Development	30 min	III. Student Practice	15 min	IV. Student Debrief	7 min	V. Exit Ticket	8 min	<p><b>Look for teachers to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Stamp that if polygons are similar, proportions can be used to find a missing value.</li> <li><input type="checkbox"/> Use a document camera to model Example 1 in the INM.</li> <li><input type="checkbox"/> Allow students to use highlighters to identify corresponding sides</li> </ul> <p><b>Look for students to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use a highlighter to identify corresponding sides in similar figures</li> <li><input type="checkbox"/> Accurately use a scale factor or multiplicative relationship in a proportion to find a missing side length.</li> <li><input type="checkbox"/> Explain the meaning of corresponding sides.</li> </ul>
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<p><b>Important Vocabulary</b></p> <ul style="list-style-type: none"> <li>▪ Congruent</li> <li>▪ Corresponding Elements</li> <li>▪ Proportional</li> <li>▪ Multiplicative Relationship</li> <li>▪ Scale Factor</li> </ul>	<div style="text-align: center; border: 1px solid black; padding: 5px;"> <p><b>Focus on Disciplinary Literacy</b></p>  <p><b>INM: Example 4</b> <b>SP: #3, 5</b></p> </div>	<p><b>Student Know/Do Chart</b></p> <ul style="list-style-type: none"> <li> Similar figures have proportional side measure and congruent angles.</li> <li> The same scale factor is used to scale up/down each side of a similar figure</li> <li> The order of the letters in similar shapes will help to determine which sides/angles are corresponding</li> <li> Use a proportion to determine a missing side length</li> <li> Use a proportion to describe the relationship between corresponding sides of two figures</li> </ul>												

Lesson 4: Scale Drawings		Date: _____												
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors												
<p>◆ <b>7.5C</b> solve mathematical and real-world problems involving similar shapes and scale drawings</p>	<p><b>Necessary Materials and Pre-Lesson Prep</b></p> <ul style="list-style-type: none"> <li>▪ Unit 3 Student Workbook</li> <li>▪ Document Camera</li> <li>▪ Projector</li> <li>▪ Teacher-created PowerPoint</li> </ul> <p><b>Lesson Agenda</b></p> <table border="1"> <thead> <tr> <th></th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now</td> <td>8 min</td> </tr> <tr> <td>II. INM/Concept Development</td> <td>40 min</td> </tr> <tr> <td>III. Student Practice</td> <td>10 min</td> </tr> <tr> <td>IV. Student Debrief</td> <td>4 min</td> </tr> <tr> <td>V. Exit Ticket</td> <td>8 min</td> </tr> </tbody> </table> <p><b>Mathematical Goal of this Lesson</b> The primary goal of the lesson is for students to use the scale given for a model, map, or scale drawing to find actual missing measures. Students will understand that when an object is scaled up/down the ratio of all measures remains the same and is proportional to the original object.</p> <p><b>Opportunities to CFU</b></p> <ul style="list-style-type: none"> <li>✓ INM: #3-5</li> <li>✓ Student Practice: #1-3</li> </ul>		Time	I. Do Now	8 min	II. INM/Concept Development	40 min	III. Student Practice	10 min	IV. Student Debrief	4 min	V. Exit Ticket	8 min	<p><b>Look for teachers to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Connect the lesson to what students learned about similar figures.</li> <li><input type="checkbox"/></li> </ul> <p><b>Look for students to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use proportional reasoning to find a missing measure in a scale drawing or scale model or to find a missing value in the scale.</li> </ul>
		Time												
I. Do Now	8 min													
II. INM/Concept Development	40 min													
III. Student Practice	10 min													
IV. Student Debrief	4 min													
V. Exit Ticket	8 min													
<p><b>Important Vocabulary</b></p> <ul style="list-style-type: none"> <li>▪ Scale Factor</li> <li>▪ Scale Drawing</li> <li>▪ Scale Model</li> </ul>	<p><b>Other Notes to Inform Your Planning</b></p> <p>For <b>INM/Student Debrief</b>: It will be important to introduce students to real-world examples of scale drawings or models as they have seen at school or in their life. The examples in the T.E. should be added to a PowerPoint presentation to introduce students to scale drawings and models. Students will use scratch paper to answer the questions in the T.E. The examples <b>were not</b> included in the SE. Students will need to use proportions to solve throughout this lesson. See notes in the T.E.</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>Focus on Disciplinary Literacy</b></p>  <p>INM: #1-3 SP: #2</p> </div>	<p><b>Student Know/Do Chart</b></p> <ul style="list-style-type: none"> <li> Scale drawings or models will be proportional to the original item and the same scale should be used to resize all parts of the object.</li> <li> Find missing values in a scale drawing or scale model.</li> <li> Find missing values in the scale used to resize an image or object.</li> </ul>												

Lesson 5: Measurement Conversions		Date: _____											
Standard(s)	Notes for Intellectual Preparation & Lesson Planning												
<p>◆ <b>7.4E</b> convert between measurement systems, including the use of proportions and the use of unit rates</p>	<p><b>Necessary Materials and Pre-Lesson Prep</b></p> <ul style="list-style-type: none"> <li>▪ Unit 3 Student Workbook</li> <li>▪ Document Camera</li> <li>▪ Projector</li> </ul>												
	<p><b>Lesson Agenda</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now</td> <td style="text-align: center;">8 min</td> </tr> <tr> <td>II. INM/Concept Development</td> <td style="text-align: center;">25 min</td> </tr> <tr> <td>III. Student Practice</td> <td style="text-align: center;">20 min</td> </tr> <tr> <td>IV. Student Debrief</td> <td style="text-align: center;">7 min</td> </tr> <tr> <td>V. Exit Ticket</td> <td style="text-align: center;">8 min</td> </tr> </tbody> </table>			Time	I. Do Now	8 min	II. INM/Concept Development	25 min	III. Student Practice	20 min	IV. Student Debrief	7 min	V. Exit Ticket
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II. INM/Concept Development	25 min												
III. Student Practice	20 min												
IV. Student Debrief	7 min												
V. Exit Ticket	8 min												
	<p><b>Mathematical Goal of this Lesson</b></p> <p>The primary goal of this lesson is for students to use proportional reasoning to convert measurements. Students will use their understanding of proportional relationships to find a missing value in a measurement conversion. They will practice identifying the multiplicative relationship among equivalent ratios in proportions.</p>												
	<p><b>Opportunities to CFU</b></p> <ul style="list-style-type: none"> <li>✓ INM: #1b,c, 2, 3</li> <li>✓ Student Practice: #1-4</li> </ul>												
Important Vocabulary	<p><b>Other Notes to Inform Your Planning</b></p> <p><b>INM:</b> Students work a lot with scale factors that are decimals in this unit and may make computational errors. Consider allowing them to use a calculator <i>only</i> to check their answers. For students who struggle with multiplication allow them to use a 12x12 chart or grid paper.</p> <p><b>Student Practice:</b> For questions 1-4 ensure that students label their proportions with the unit of measures. Make sure students are labeling their answers in units. Allow students to determine which method works best finding the scale factor or identifying the multiplicative relationship.</p>												
<ul style="list-style-type: none"> <li>▪ Proportion</li> <li>▪ Ratio</li> <li>▪ Scale Factor</li> </ul>													
	<div style="background-color: #fff9c4; padding: 5px; border: 1px solid black; display: inline-block;"> <p><b>Focus on Disciplinary Literacy</b></p> </div>												
	<div style="display: flex; align-items: center; justify-content: center;"> <p>INM: #1-3 Student Practice: #1-4</p> </div>												
	Lesson Look Fors												
	<p><b>Look for teachers to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use a think-aloud to model setting up proportions and finding the scale factor <i>not</i> cross multiplication or butterfly method.</li> <li><input type="checkbox"/> Require students to label their answers with units</li> </ul>												
	<p><b>Look for students to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Set up proportions accurately, labeling units</li> <li><input type="checkbox"/> Accurately divide to find the scale factor then multiply to find the missing information.</li> </ul>												
	Student Know/Do Chart												
	<p> Models or diagrams can be used to calculate unit conversions</p>												
	<p> Equivalent ratios or proportional reasoning can be used to perform unit conversions.</p>												
	<p> Accurately set up a proportion to convert between measurement systems.</p>												
	<p> Identify the multiplicative relationship or scale factor to find a missing value</p>												

Lesson 6: Using Proportions to Solve Percent Problems		Date: _____												
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors												
<p>◆ <b>7.4D</b> solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems</p>	<p><b>Necessary Materials and Pre-Lesson Prep</b></p> <ul style="list-style-type: none"> <li>Unit 3 Student Workbook</li> <li>Projector</li> <li>Document Camera</li> </ul> <p><b>Lesson Agenda</b></p> <table border="1"> <thead> <tr> <th></th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now</td> <td>5 min</td> </tr> <tr> <td>II. INM/Concept Development</td> <td>40 min</td> </tr> <tr> <td>III. Student Practice</td> <td>12 min</td> </tr> <tr> <td>IV. Student Debrief</td> <td>5 min</td> </tr> <tr> <td>V. Exit Ticket</td> <td>8 min</td> </tr> </tbody> </table> <p><b>Mathematical Goal of this Lesson</b> The primary goal of this lesson is for students to solve the three types of percent problems using proportions. In this lesson, students use their understanding of proportionality to identify multiplicative relationships that can be used to solve for unknown quantities in percentage problems.</p> <p><b>Opportunities to CFU</b></p> <ul style="list-style-type: none"> <li>✓ INM: #1, 3, 5, 8</li> <li>✓ Student Practice: #2,3, 7</li> </ul> <p><b>Other Notes to Inform Your Planning</b> <b>INM/Student Practice:</b> Students who struggle with basic multiplication and division may struggle with these types of problems. They could benefit from a multiplication chart and foldable with step-by-step instructions. Students often struggle with being able to read a problem or situation and determining what's missing(part/whole/percent). Use Read Draw Write(RDW) to support students in making sense of word problems. Here is an example of how you could model this for students.</p>		Time	I. Do Now	5 min	II. INM/Concept Development	40 min	III. Student Practice	12 min	IV. Student Debrief	5 min	V. Exit Ticket	8 min	<p><b>Lesson Look Fors</b></p> <p><b>Look for teachers to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use a think-a-loud to model setting up a proportion to find a missing, part, whole or percentage. .</li> <li><input type="checkbox"/> Encourage students to label proportions: <math>\frac{\text{Part } 3}{\text{Whole } 8} = \frac{x}{100}</math></li> <li><input type="checkbox"/> Pull a small group during the student practice to work with students who are struggling with identifying missing parts, wholes, or percentages.</li> </ul> <p><b>Look for students to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Determine the missing part/whole/percent from a word problem then set up a proportion.</li> <li><input type="checkbox"/> Show their thinking in an organized way by setting up and labeling a proportion, then solve by using the scale factor, or determining the multiplicative relationship</li> </ul>
		Time												
I. Do Now	5 min													
II. INM/Concept Development	40 min													
III. Student Practice	12 min													
IV. Student Debrief	5 min													
V. Exit Ticket	8 min													
<p><b>Important Vocabulary</b></p> <ul style="list-style-type: none"> <li>Percents</li> <li>Ratio</li> <li>Multiplicative Relationship</li> <li>Scale Factor</li> <li>Proportion</li> </ul>	<p><b>Focus on Disciplinary Literacy</b></p> <p>INM: #1-9 Student Practice: #1-7</p>	<p><b>Student Know/Do Chart</b></p> <p><b>Know</b> It is necessary to either use a scale factor or determine the multiplicative relationship to find a missing value.</p> <p><b>Know</b> Percent Proportion <math>\Rightarrow \frac{\text{part}}{\text{whole}} = \frac{x}{100}</math></p> <p><b>Do</b> Accurately, set up a percent proportion to find a missing, part, whole, or percent from a word problem</p> <p><b>Do</b> Use the scale factor or determine the multiplicative relationship to solve for a missing value..</p>												

**Standard(s)**

◆ **7.4D** solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems

**Notes for Intellectual Preparation & Lesson Planning**

**Necessary Materials and Pre-Lesson Prep**

- Unit 3 Student Workbook
- Document Camera
- Projector

**Lesson Agenda**

	Time
I. Do Now	8 min
II. INM/Concept Development	20 min
III. Student Practice	25 min
IV. Student Debrief	7 min
V. Exit Ticket	8 min

**Mathematical Goal of this Lesson**

The primary goal of this lesson is to solve three types of percent problems using proportions. This lesson is a continuation of Lesson 6, allowing students more time to practice and internalize the concepts of percentages and proportions.

**Opportunities to CFU**

- ✓ INM: #1-3
- ✓ Student Practice: #3-7

**Other Notes to Inform Your Planning**

**INM/Student Practice:** Students who struggle with basic multiplication and division may struggle with these types of problems. They could benefit from a multiplication chart and foldable with step-by-step instructions. Students often struggle with being able to read a problem or situation and determining what’s missing(part/whole/percent). Use Read Draw Write(RDW) to support students in making sense of word problems. Here is an example of how you could model this for students.

**Important Vocabulary**

- Percents
- Ratio
- Scale Factor
- Proportion
- Multiplicative Relationship

**Lesson Look Fors**

**Look for teachers to...**

- Use a think-a-loud to model setting up a proportion to find a missing, part, whole or percentage. .
- Encourage students to label proportions:  $\frac{\text{part}}{\text{whole}} = \frac{x}{100}$
- Pull a small group during the student practice to work with students who are struggling with identifying missing parts, wholes, or percentages.

**Look for students to...**

- Determine the missing part/whole/percent from a word problem then set up a proportion.
- Show their thinking in an organized way by setting up and labeling a proportion, then solve by using the scale factor, or determining the multiplicative relationship

**Focus on Disciplinary Literacy**

INM: #1-3  
Student Practice: #1-8

**Student Know/Do Chart**

**Know** It is necessary to either use a scale factor or determine the multiplicative relationship to find a missing value.

**Know** Percent Proportion =>  $\frac{\text{part}}{\text{whole}} = \frac{x}{100}$

**Do** Accurately, set up a percent proportion to find a missing, part, whole, or percent from a word problem

**Do** Use the scale factor or determine the multiplicative relationship to solve for a missing value.

Lesson 8: Percentages Greater than 100%		Date: _____												
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors												
<p>◆ <b>7.4D</b> solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems</p>	<p><b>Necessary Materials and Pre-Lesson Prep</b></p> <ul style="list-style-type: none"> <li>▪ Unit 3 Student Workbook</li> <li>▪ Projector</li> <li>▪ Document Camera</li> </ul> <p><b>Lesson Agenda</b></p> <table border="1"> <thead> <tr> <th></th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now</td> <td>6 min</td> </tr> <tr> <td>II. INM/Concept Development</td> <td>28 min</td> </tr> <tr> <td>III. Student Practice</td> <td>20 min</td> </tr> <tr> <td>IV. Student Debrief</td> <td>7 min</td> </tr> <tr> <td>V. Exit Ticket</td> <td>8 min</td> </tr> </tbody> </table> <p><b>Mathematical Goal of this Lesson</b> The primary goal of the lesson is for students to answer questions involving percents that are greater than 100%. This lesson extends what students have learned about percentages to now include percents greater than 100%. Students should continue to strengthen their understanding of proportional reasoning.</p> <p><b>Opportunities to CFU</b></p> <ul style="list-style-type: none"> <li>✓ INM: #1a-c, 2a-b, 3-5</li> <li>✓ Student Practice: #3-7</li> </ul> <p><b>Other Notes to Inform Your Planning</b> <b>INM:</b> Consider modeling under the document camera #1b to support student understanding of setting up proportions with percents that are greater than 100%. Stamp for students that if 6000 represents 100% then any value above that would represent a percentage greater than 100%. See the annotations in the T.E. Students may struggle with setting up #2a/b; allow them to grapple in their groups, listen to their conversations to identify and clarify misconceptions. You may decide to ask guiding questions such as: “What is my total or my whole in this situation?” “What do you think the part is?” “Is it greater or less than the whole?” This would be a great time to share with students that a percent can be greater than 100%. An anchor chart that models representations of percents greater than 100% would be helpful. It would also be a great idea to include word problem examples.</p>		Time	I. Do Now	6 min	II. INM/Concept Development	28 min	III. Student Practice	20 min	IV. Student Debrief	7 min	V. Exit Ticket	8 min	<p><b>Look for teachers to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use guided questioning to assist students in making sense of problems where the percentage is greater than 100%. See Other Notes to Inform Your Planning</li> <li><input type="checkbox"/> Make the connection between Lesson 1 Finding a Fraction of a number and this lesson, Multiplication to Find a Percent of a Number</li> </ul> <p><b>Look for students to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Accurately set up a proportion, determine the scale factor or multiplicative relationship and solve for the missing value where percent is greater than 100%</li> <li><input type="checkbox"/> Make sense of a word problem and apply their understanding of setting up a proportion to find a missing value.</li> <li><input type="checkbox"/> Explain what happens when a percentage is greater than 100%(Give examples/explain the examples in the INM/Student Practice)</li> </ul>
		Time												
I. Do Now	6 min													
II. INM/Concept Development	28 min													
III. Student Practice	20 min													
IV. Student Debrief	7 min													
V. Exit Ticket	8 min													
<p><b>Important Vocabulary</b></p> <ul style="list-style-type: none"> <li>▪ Percents</li> <li>▪ Ratio</li> <li>▪ Scale Factor</li> <li>▪ Proportion</li> </ul>	<p><b>Focus on Disciplinary Literacy</b></p>  <p>INM: #1-5 Student Practice: #1-7</p>	<p><b>Student Know/Do Chart</b></p> <p> Percents greater than 100% are representations of exceeding the whole or total amount</p> <p> Accurately, set up a proportion, determine the scale factor or multiplicative relationship and solve for the missing value where percent is greater than 100%.</p> <p> Use scale factor or multiplicative relationships to find a missing value.</p>												

Lesson 9: Finding Percent of a Number using Multiplication		Date: _____												
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors												
<p>◆ <b>7.4D</b> solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems</p>	<p><b>Necessary Materials and Pre-Lesson Prep</b></p> <ul style="list-style-type: none"> <li>▪ Unit 3 Student Workbook</li> <li>▪ Document Camera</li> <li>▪ Projector</li> </ul> <p><b>Lesson Agenda</b></p> <table border="1"> <thead> <tr> <th></th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now</td> <td>8 min</td> </tr> <tr> <td>II. INM/Concept Development</td> <td>30 min</td> </tr> <tr> <td>III. Student Practice</td> <td>15 min</td> </tr> <tr> <td>IV. Student Debrief</td> <td>7 min</td> </tr> <tr> <td>V. Exit Ticket</td> <td>8 min</td> </tr> </tbody> </table> <p><b>Mathematical Goal of this Lesson</b> The primary goal of the lesson is for students to use multiplication to calculate the percentage of a number. In this lesson, students learn they can also use multiplication as a means of finding percent of a number.</p> <p><b>Opportunities to CFU</b></p> <ul style="list-style-type: none"> <li>✓ INM: #2 b-d</li> <li>✓ Student Practice: #1a, b, #2, 3</li> </ul> <p><b>Other Notes to Inform Your Planning</b> <b>INM/Student Practice:</b> Provide students who struggle with multiplication facts a multiplication chart. Stamp for students that to turn a percent to a decimal; you must divide by 100 which is the same as moving the decimal twice to the left. Watch for misconceptions when determining the decimal for percent types such as: 130%. Students may are likely to incorrectly place the decimal in percents greater than 100%. This lesson provides an opportunity for students to practice multiplication skills. It may be necessary to pull small groups of students who struggled in the INM during the Student Practice. Provide an answer key for those students who will work independently after the first 8 minutes of the student practice.</p>		Time	I. Do Now	8 min	II. INM/Concept Development	30 min	III. Student Practice	15 min	IV. Student Debrief	7 min	V. Exit Ticket	8 min	<p><b>Look for teachers to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Stamp that to turn a percent to a decimal; you must divide by 100 which is the same as moving the decimal twice to the left.</li> <li><input type="checkbox"/> Use a document camera to model and stamp key points on #3 in the INM.</li> </ul> <p><b>Look for students to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Understand that to turn a percent into a decimal, divide by 100 which is the same as moving the decimal twice to the left.</li> <li><input type="checkbox"/> Explain the steps to find the percent of a number using multiplication</li> <li><input type="checkbox"/> Make sense of a word problem and apply their understanding of multiplication to find percent of a number to solve</li> </ul>
		Time												
I. Do Now	8 min													
II. INM/Concept Development	30 min													
III. Student Practice	15 min													
IV. Student Debrief	7 min													
V. Exit Ticket	8 min													
<p><b>Important Vocabulary</b></p> <ul style="list-style-type: none"> <li>▪ Percents</li> </ul>	<p><b>Focus on Disciplinary Literacy</b></p> <div style="border: 1px solid black; padding: 5px; display: inline-block;">  <p>INM: #1-4 Student Practice: #1-3</p> </div>	<p><b>Student Know/Do Chart</b></p> <p> Multiplication can be used to find the percent of a number by changing the percent to a decimal and multiplying it by the whole.</p> <p> Convert percents to decimals Make sense of a problem and know when it is necessary to find the percent of change.</p> <p> Use multiplication to find the percent of a number in a given problem situation.</p>												

**Standard(s)**

**Notes for Intellectual Preparation & Lesson Planning**

**Lesson Look Fors**

◆ **7.4D** solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems

**Necessary Materials and Pre-Lesson Prep**

- Unit 3 Student Workbook
- Document Camera
- Projector
- Percent of Change PowerPoint

**Lesson Agenda**

	Time
I. Do Now	6 min
II. INM/Concept Development	40 min
III. Student Practice	12 min
IV. Student Debrief	4 min
V. Exit Ticket	8 min

**Mathematical Goal of this Lesson**  
The primary goal of this lesson is for students to calculate the percent of change from one quantity to another. Students will build a conceptual understanding of percent of change and discover the need for calculating percent of change via real-world scenarios.

**Opportunities to CFU**

- ✓ **INM:** Part Two, Part Three
- ✓ **Student Practice:** #2,3

**Other Notes to Inform Your Planning**  
**INM/Student Practice:** Stamp for students that the amount of change represents the difference of the new and original amounts. The amount of change will not be a negative number. Students have been working with percents and percent proportions all throughout the unit. If students struggled with finding a missing value in a percent proportion in the previous lessons, they will have difficulty in this lesson.  
Consider pulling a small group to address misconceptions around solving to find the amount of change and setting up a proportion accurately. To further support student understanding, consider creating an anchor chart that models examples of percent increase and decrease for them to reference in independent practice.

**Look for teachers to...**

- Allow students to do the heavy lifting in the beginning of the INM so that they build a conceptual understanding of percent of change using real-world examples.
- Stamp for students that they should compare the original amount and the new amount to determine increase or decrease.
- Watch for misconceptions around finding the amount of change

**Look for students to...**

- Explain that to find percent of change, first find the difference between the original value and new value.
- Show their process of thinking: finding the amount of change, setting up the proportion then using scale factor or multiplicative relationship to find a missing value

**Important Vocabulary**

- Percents
- Ratio
- Scale Factor
- Proportion
- Multiplicative Relationship

**Focus on Disciplinary Literacy**

INM: Part Two, Part Three(ALL)  
Student Practice: #1-3

**Student Know/Do Chart**

- Percent of change is found by subtracting to find the **amount of change** in order to calculate the percent of change
- The amount of change is the **part**, and the original amount represents a **whole** in the percent of change proportion.
- Make sense of a word problem and determine if it represents a percent increase or decrease.
- Accurately set up a percent of change proportion to find a missing value.

Lesson 11: Writing Expressions to Represent Percent Relationships		Date: _____												
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors												
<p>◆ <b>7.4D</b> solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems.</p>	<p><b>Necessary Materials and Pre-Lesson Prep</b></p> <ul style="list-style-type: none"> <li>▪ Unit 3 Student Workbook</li> <li>▪ Projector</li> <li>▪ Document Camera</li> </ul> <p><b>Lesson Agenda</b></p> <table border="1"> <thead> <tr> <th></th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now</td> <td>8 min</td> </tr> <tr> <td>II. INM/Concept Development</td> <td>30 min</td> </tr> <tr> <td>III. Student Practice</td> <td>18 min</td> </tr> <tr> <td>IV. Student Debrief</td> <td>5 min</td> </tr> <tr> <td>V. Exit Ticket</td> <td>8 min</td> </tr> </tbody> </table> <p><b>Mathematical Goal of this Lesson</b> The primary goal of this lesson is for students to write algebraic expressions to represent percent relationships. In this lesson, students will learn to write an expression to represent different percent problems.</p> <p><b>Opportunities to CFU</b></p> <ul style="list-style-type: none"> <li>✓ INM: #1a,b,f,h-2</li> <li>✓ Student Practice: #1-2</li> </ul>		Time	I. Do Now	8 min	II. INM/Concept Development	30 min	III. Student Practice	18 min	IV. Student Debrief	5 min	V. Exit Ticket	8 min	<p>Look for teachers to...</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Model/Review writing a percent as a decimal whole group</li> <li><input type="checkbox"/> Identify/Correct misconceptions around turning percents such as 8% and 120% into decimals.</li> </ul> <p>Look for students to...</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Explain whether a statement represents a percent or increase.</li> <li><input type="checkbox"/> Accurately write an expression to represent a given statement</li> </ul>
		Time												
I. Do Now	8 min													
II. INM/Concept Development	30 min													
III. Student Practice	18 min													
IV. Student Debrief	5 min													
V. Exit Ticket	8 min													
<p><b>Important Vocabulary</b></p> <ul style="list-style-type: none"> <li>▪ Percents</li> <li>▪ Scale Factor</li> <li>▪ Proportion</li> <li>▪ Multiplicative Relationship</li> <li>▪ Expression</li> <li>▪ Original Price</li> </ul>	<p><b>Other Notes to Inform Your Planning</b></p> <p>For INM/Student Practice: Watch for misconceptions when determining the decimal for percent types such as: 205%, 9%, 120%, 8.5%. For the student practice, ensure that students understand the definition of terms such as, markdown, tip, sales tax, 25% off, and salary raise. In planning, consider creating sentence stems to support students or provide them with scenarios to choose from if they seem to struggle with writing a real-life situation to represent an expression in #3a-b.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center; background-color: #FFD700; margin: 0;"><b>Focus on Disciplinary Literacy</b></p> <div style="display: flex; align-items: center; justify-content: center;">  <p>INM: #1-2 Student Practice: #1-3</p> </div> </div>	<p><b>Student Know/Do Chart</b></p> <ul style="list-style-type: none"> <li> To find the percent of a number, first turn the percent to a decimal.</li> <li> Two expressions can be written to represent percent increase or decrease.</li> <li> Accurately turn a percent into a decimal</li> <li> Write a percent expression to represent a statement.</li> </ul>												

Lesson 12: Percent of Change and Algebraic Reasoning		Date: _____												
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors												
<p>◆ <b>7.4D</b> solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems.</p>	<p><b>Necessary Materials and Pre-Lesson Prep</b></p> <ul style="list-style-type: none"> <li>▪ Unit 3 Student Workbook</li> <li>▪ Projector</li> <li>▪ Document Camera</li> </ul> <p><b>Lesson Agenda</b></p> <table border="1"> <thead> <tr> <th></th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now</td> <td>10 min</td> </tr> <tr> <td>II. INM/Concept Development</td> <td>32 min</td> </tr> <tr> <td>III. Student Practice</td> <td>12 min</td> </tr> <tr> <td>IV. Student Debrief</td> <td>7 min</td> </tr> <tr> <td>V. Exit Ticket</td> <td>8 min</td> </tr> </tbody> </table> <p><b>Mathematical Goal of this Lesson</b> The primary goal of this lesson is for students to write and solve algebraic equations to represent percent of change problems. In this lesson students will tie what they learned about percent increase/decrease, percent of change, and writing expressions to represent percent problems in the form of an equation</p> <p><b>Opportunities to CFU</b></p> <ul style="list-style-type: none"> <li>✓ INM: #2, 3</li> <li>✓ Student Practice: #1,3</li> </ul> <p><b>Other Notes to Inform Your Planning</b> For <b>INM/Student Practice</b>: In the INM Part I, students may need to be reminded to simplify their ratio to easier numbers then find the scale factor. In INM <b>Part IIa</b>, remind students that an increase represents 100% + the percent of change = a total percentage for percent of increase (i.e., 100% + <b>an increase of 37.5%</b> =&gt; 137.5% =&gt; 1.375). It may be helpful to also provide them with an anchor chart to reference during INM and Student Practice. See the example linked here.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center; background-color: #FFD700; margin: 0;"><b>Focus on Disciplinary Literacy</b></p> <div style="display: flex; align-items: center; justify-content: center;">  <p>INM: #1-3 Student Practice: #1-3</p> </div> </div>		Time	I. Do Now	10 min	II. INM/Concept Development	32 min	III. Student Practice	12 min	IV. Student Debrief	7 min	V. Exit Ticket	8 min	<p><b>Look for teachers to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Allow students to do the heavy lifting.</li> <li><input type="checkbox"/> Label the pre-test score column with an “x” and the post-test score column with “y” in the second table in the INM to support students with creating an equation to represent % of change.</li> </ul> <p><b>Look for students to...</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Accurately set up and solve a proportion to determine the percent of increase/decrease.</li> <li><input type="checkbox"/> Accurately set up an equation to represent a given problem situation and solve.</li> </ul>
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I. Do Now	10 min													
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<p><b>Important Vocabulary</b></p> <ul style="list-style-type: none"> <li>▪ Percents</li> <li>▪ Scale Factor</li> <li>▪ Proportion</li> <li>▪ Multiplicative Relationship</li> <li>▪ Expression</li> <li>▪ Original Price</li> </ul>	<p><b>Student Know/Do Chart</b></p> <div style="margin-bottom: 10px;">  Percent of change is a calculation of what percent the is of the original quantity.         </div> <div style="margin-bottom: 10px;">  The amount of change in one quantity to another is relative and calculating the percent of change can help put the size of the change into context.         </div> <div style="margin-bottom: 10px;">  Set up a percent of change proportion or equation to represent a word problem.         </div> <div>  Solve a percent of change proportion or equation to represents a word problem.         </div>													

## Recommended Success Day Materials and Resources

### 7.4D 7.5C, and 7.13A

Unit 3 Proportional Reasoning and Percents Practice I  
Unit 3 Proportional Reasoning and Percents Practice II  
Percent Proportion Practice and Algebraic Expressions  
Similar Figures Practice  
Similar Figures Practice - PowerPoint

#### Notes to Inform Your Planning

These resources are relatively brief and can be used for either small-group or whole-group reteach.

*If student data indicates a pause point is not necessary, you can opt to move forward and reserve a Success Day to use at a later date.*

Using exit ticket data can help you prioritize what to review. For example, if you remember that students did poorly on Lesson 3, pull problems from lesson 3, especially if they are problems students did not do before (for example, SP or INM problems you skipped during class). You can also take questions from the resources linked above.

All unit exams should be given online to prepare students for STAAR online.

# UNPACKED STANDARDS

Standard Breakdown		
Standard	Specificity	STAAR Alignment
<p><b>7.4(D)</b> solve problems involving <u>ratios</u>, <u>rates</u>, and <u>percents</u>, including <u>multi-step problems</u> involving <u>percent increase</u> and <u>percent decrease</u>, and <u>financial literacy</u></p>	<p><b>Concepts:</b>            Ratios            Rates  <u>Percents</u>            Multi-Step Problems            Percent Increase            Percent Decrease            Financial Literacy</p> <p><b>Skills:</b>            Solve</p> <p><b>Clarifications Including but Not Limited To:</b></p> <ul style="list-style-type: none"> <li>- Includes three types of percent problems:               <ul style="list-style-type: none"> <li>• Missing percent</li> <li>• Missing part</li> <li>• Missing whole</li> </ul> </li> <li>- Percent problems should be solved using proportions or by drawing models.</li> </ul> <p>• <b>Limitations:</b>            -When solving proportions, scale factors should not exceed the thousandth percent</p>	<p><b>2021:</b>  <b>Q18:</b> The owner of a bookstore buys used books from customers for \$1.50 each. The owner then resells the used books for 400% of the amount he paid for them.             What is the price of a used book in this bookstore?</p> <p><b>2019:</b>  <b>Q15:</b> The price of a sweater was reduced from \$20 to \$12. By what percentage was the price of the sweater reduced?</p> <p><b>2017:</b>  <b>Q14:</b> The price of a video game was reduced from \$60 to \$45. By what percentage was the price of the video game reduced?</p> <p><b>2016:</b>  <b>Q48:</b> The price of a television was reduced from \$250 to \$200. By what percentage was the price of the television reduced?</p> <p><b>2015:</b>  <b>Q8:</b> Amanda increased the amount of protein she eats every day from 48g to 54g. By what percentage did Amanda increase the amount of protein she eats?</p>

## VERTICAL STANDARDS ALIGNMENT

6 <sup>th</sup> Grade	Later in 7 <sup>th</sup> Grade Pre-Algebra	8 <sup>th</sup> Grade Math
<p><b>6.4</b> Proportionality. The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:</p> <p><b>(B)</b> apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratios and rates.</p> <p><b>(E)</b> represent ratios and percents with concrete models, fractions, and decimals.</p> <p><b>(F)</b> represent benchmark fractions and percents such as 1%, 10%, 25%, 33 1/3%, and multiples of these values using 10 by 10 grids, strip diagrams, number lines, and numbers.</p> <p><b>(G)</b> generate equivalent forms of fractions, decimals, and percents using real-world problems, including problems that involve money.</p> <p><b>6.5</b> Proportionality. The student applies mathematical process standards to solve problems involving proportional relationships. The student is expected to:</p> <p><b>(C)</b> use equivalent fractions, decimals, and percents to show equal parts of the same whole.</p>	<p><b>7.5</b> Proportionality. The student applies mathematical process standards to use geometry to describe or solve problems involving proportional relationships. The student is expected to:</p> <p><b>(A)</b> generalize the critical attributes of similarity, including ratios within and between similar shapes.</p> <p><b>(B)</b> describe <math>\pi</math> as the ratio of the circumference of a circle to its diameter.</p> <p><b>(C)</b> solve mathematical and real-world problems involving similar shape and scale drawings.</p> <p><b>7.6</b> Proportionality. The student applies mathematical process standards to use probability and statistics to describe or solve problems involving proportional relationships. The student is expected to:</p> <p><b>(C)</b> make predictions and determine solutions using experimental data for simple and compound events.</p> <p><b>(D)</b> make predictions and determine solutions using theoretical probability for simple and compound events.</p> <p><b>(G)</b> solve problems using data represented in bar graphs, dot plots, and circle graphs, including part-to-whole and part-to-part comparisons and equivalents.</p>	<p><b>8.3</b> Proportionality. The student applies mathematical process standards to use proportional relationships to describe dilations. The student is expected to:</p> <p><b>(A)</b> generalize that the ratio of corresponding sides of similar shapes are proportional, including a shape and its dilation.</p> <p><b>(B)</b> compare and contrast the attributes of a shape and its dilation(s) on a coordinate plane.</p>