

Essential Question:

- How can I use scale drawings to compute actual lengths and areas?
- How can I use geometric figures to reproduce a drawing at a different scale?

Targeted Content Standard(s):		Student Friendly Learning Targets
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.		<i>I can...</i> <ul style="list-style-type: none"> • Compute actual lengths and areas from a scale drawing. • Solve problems involving scale drawings using ratios and proportions. • Reproduce a proportional scale drawing using a different scale.
Targeted Mathematical Practice(s):		
<input checked="" type="checkbox"/> 1 Make sense of problems and persevere in solving them. <input checked="" type="checkbox"/> 2 Reason abstractly and quantitatively. <input type="checkbox"/> 3 Construct viable arguments and critique the reasoning of others. <input checked="" type="checkbox"/> 4 Model with mathematics. <input type="checkbox"/> 5 Use appropriate tools strategically. <input checked="" type="checkbox"/> 6 Attend to precision. <input type="checkbox"/> 7 Look for and make use of structure. <input type="checkbox"/> 8 Look for an express regularity in repeated reasoning.		
Supporting Content Standard(s): <i>(optional)</i>		
7.RP.2 Recognize and represent proportional relationships between quantities. <ul style="list-style-type: none"> 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. <i>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 $t = pn$.</i> 		
7.RP.3 Use proportional relationships to solve multi-step ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.		
Purpose of the Lesson:		
Students will apply concepts and procedures for ratios and proportions to represent and solve problems involving scale drawing situations.		
Explanation of Rigor: <i>(Fill in those that are appropriate.)</i>		
Conceptual: Students develop the concept of scale as related to diagrams and models.	Procedural: Students solve problems involving geometric figures including lengths and areas from a scale drawing. Students use procedures for calculating ratios and solving proportional relationships. (7.G.1)	Application: Students reproduce a scale drawing at a different scale. Students apply ratios and proportional reasoning to solve multi-step problems in the context of scale drawing. (7.G.1)
Vocabulary:		
Scale, Dimension, Area, Equivalent, Ratio, Proportion, Scale Factor		
Evidence of Learning (Assessment):		
Pre-Assessment: Unit 2 Scale Drawing Pre-assessment		

Grade 7

Lesson Title: Applying Ratios and Proportionality in Scale Drawing

Unit 2: Ratio & Proportion Applications (Lesson 4 of 4)

Time Frame: 6-7 days

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Formative Assessment(s): Scale Drawing – Recreating a Graphic

Summative Assessment: New flooring for the house

Self-Assessment: Self-Assessment Checklist – Recreating a Graphic

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Lesson Procedures:

Segment 1

Approximate Time Frame: 40 – 50 minutes	Lesson Format: <input type="checkbox"/> Whole Group <input type="checkbox"/> Small Group <input checked="" type="checkbox"/> Independent	Resources: Unit 2 Scale Drawing Pre-Assessment
Focus: Pre-assessment, introduce vocabulary regarding scale.	<input type="checkbox"/> Modeled <input type="checkbox"/> Guided <input type="checkbox"/> Collaborative <input checked="" type="checkbox"/> Assessment	Modalities Represented: <input type="checkbox"/> Concrete/Manipulative <input type="checkbox"/> Picture/Graph <input type="checkbox"/> Table/Chart <input checked="" type="checkbox"/> Symbolic <input type="checkbox"/> Oral/Written Language <input checked="" type="checkbox"/> Real-Life Situation
Math Practice Look For(s): <ul style="list-style-type: none"> • MP1: Looks for students to make sense of proportions that involve scale drawings using diagrams and/or equations. • MP2: Students will apply proportional reasoning to scale drawings to determine if calculations are precise. 	Differentiation for Remediation: Teacher may scaffold the pre-assessment by providing visuals or guiding students to create visuals. Extra examples may be needed to activate prior knowledge. Differentiation for English Language Learners: Pre-teaching of vocabulary using visuals. Differentiation for Enrichment: Teacher may use fractions or decimals in the dimensions. Students may be given the area and asked to find a dimension.	
Potential Pitfall(s): Students may not attend to precision or compute accurately with appropriate units. Students may not be as familiar with the vocabulary as this is their first experience with scale drawing.	Independent Practice (Homework): When students demonstrate understanding of scale, have them bring in a real-life example of scale. (e.g., advertisement, blueprint, diagram, description, etc.)	
Steps: <ol style="list-style-type: none"> 1. Give students the Scale Drawing pre-assessment for Unit 2. Circulate the room to begin gathering an awareness of student understanding. (20-25 minutes) 2. Discuss the pre-assessment and address any misconceptions that have been uncovered. More examples may be used to differentiate and/or reinforce the concepts and vocabulary. Introduce the terms with an example (10-15 minutes) 3. Discussion should include a review of the vocabulary terms. Thought provoking questions might include “Why do we have scale drawings?” (5 minutes/ possible exit slip) 	Teacher Notes/Reflections:	

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Segment 2	
<p>Approximate Time Frame:</p> <p>40-50 minutes</p>	<p>Lesson Format:</p> <p><input checked="" type="checkbox"/> Whole Group <input checked="" type="checkbox"/> Small Group <input checked="" type="checkbox"/> Independent</p>
<p>Focus: Compute lengths and area from scale drawings or given situations.</p>	<p><input type="checkbox"/> Modeled <input type="checkbox"/> Guided <input checked="" type="checkbox"/> Collaborative <input type="checkbox"/> Assessment</p>
<p>Resources:</p> <p>Teacher selected problems from text or other source for computation practice.</p>	<p>Modalities Represented:</p> <p><input type="checkbox"/> Concrete/Manipulative <input checked="" type="checkbox"/> Picture/Graph <input type="checkbox"/> Table/Chart <input checked="" type="checkbox"/> Symbolic <input checked="" type="checkbox"/> Oral/Written Language <input type="checkbox"/> Real-Life Situation</p>
<p>Math Practice Look For(s):</p> <ul style="list-style-type: none"> • MP1: Look for students to make sense of proportions that involve scale drawings using diagrams and/or equations. • MP2: Students will apply proportional reasoning to scale drawings to determine if calculations are precise. • MP3: Students will construct viable arguments by justifying that their examples represent scale. • MP6: Students should be precise in their measurements and calculations, attending to the measurement units in each example. 	<p>Differentiation for Remediation:</p> <p>Differentiation for English Language Learners:</p> <p>Differentiation for Enrichment: For a given drawing, have the walls represented with a thickness of 6 inches. How will this change the area and dimensions of the rooms?</p>
<p>Potential Pitfall(s):</p> <p>Students may not compute accurately by not using the appropriate scale factor. Students may not attend to precise units if different units of measure are given, such as feet and inches.</p>	<p>Independent Practice (Homework):</p> <p>Have students practice finding length and area from a given written situation or a drawing, such as a floor plan. Have students create their own to share.</p>
<p>Steps:</p> <p>1. In small groups, have students share the examples they created or found for homework. Have each group choose one to share with the class and share the features that prove it is an example of scale. (10-15 minutes)</p> <p><i>Having students share their work will assist the teacher in adjusting the pace.</i></p>	<p>Teacher Notes/Reflections:</p>
<p>2. Check for understanding by working through three more problems involving computation of missing lengths or areas. These are typically found in any textbook.</p>	

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Extra examples may be needed to reinforce concepts as students may not be ready to move forward. After checking for understanding, have them work on independent practice. Again, these types of problems are typically found in any textbook. Feel free to select problems you deem appropriate for your population.

Segment 3

Approximate Time Frame:

180-220 minutes

Lesson Format:

- Whole Group
 Small Group
 Independent

- Modeled
 Guided
 Collaborative
 Assessment

Resources:

Scale Drawing Activity- Recreating a Graphic 7.G.1
 Grid Paper
 Self-Assessment Checklist

Modalities Represented:

- Concrete/Manipulative
 Picture/Graph
 Table/Chart
 Symbolic
 Oral/Written Language
 Real-Life Situation

Focus: Reproduce a scale drawing at a different scale.

Math Practice Look For(s):

MP5: Students will select appropriate measurement and construction tools when reproducing scale drawings.

Differentiation for Remediation: Give students a picture to recreate what has mostly straight lines, such as block letters. Curved lines are more challenging to recreate. Some students may need to see models that have been recreated with different scale factors to understand their values.

Differentiation for English Language Learners: English Language Learners may need to see models that have been recreated with different scale factors to understand their values. They may need teachers to model the recreation process to understand the language of the steps in the procedure.

Differentiation for Enrichment: Some students may be able to make their own grids instead of using grid paper that is provided for them. Some students may also be able to change the look of their drawing by dilating the scale factor.

Potential Pitfall(s):

Remind students that a larger grid can be more challenging to recreate. Some students may have

Independent Practice (Homework):

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difficulty placing graphics on the grid or, if drawing their own, doing so precisely.	
Steps: 1. Students will need a logo, symbol, picture, etc., to recreate. <i>This is a good opportunity to utilize technology if available. If technology is not available, students will need to bring in their own picture or logo. Students may copy the graphic into Microsoft Word and put in the gridlines electronically.</i>	Teacher Notes/Reflections:
2. Follow the Scale Drawing Activity – Recreating a Graphic 7.G.1. (Decide if you are having the students draw their own grids or if you will be providing them.)	
3. Students use the Self-Assessment Checklist to critique their own work.	

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Segment 4	
<p>Approximate Time Frame:</p> <p>60-80 minutes</p>	<p>Lesson Format:</p> <p><input type="checkbox"/> Whole Group</p> <p><input type="checkbox"/> Small Group</p> <p><input checked="" type="checkbox"/> Independent</p>
<p>Focus:</p> <p>Final assessment of Unit 2 Scale Drawing and RP3 Task</p>	<p><input type="checkbox"/> Modeled</p> <p><input type="checkbox"/> Guided</p> <p><input type="checkbox"/> Collaborative</p> <p><input checked="" type="checkbox"/> Assessment</p>
<p>Resources:</p> <p>Flooring for the New House</p> <p>Floor Plan</p> <p>Cm Ruler</p>	<p>Modalities Represented:</p> <p><input checked="" type="checkbox"/> Concrete/Manipulative</p> <p><input checked="" type="checkbox"/> Picture/Graph</p> <p><input checked="" type="checkbox"/> Table/Chart</p> <p><input checked="" type="checkbox"/> Symbolic</p> <p><input type="checkbox"/> Oral/Written Language</p> <p><input checked="" type="checkbox"/> Real-Life Situation</p>
<p>Math Practice Look For(s):</p> <p>MP1: Students will make sense of the blueprint of a house to determine the actual dimensions of the rooms. They will also make sense of the rational numbers to compute the total cost of the project with discounts and tax, as well as the commission for the salesman.</p>	<p>Differentiation for Remediation:</p> <p>Some students would benefit from having the dimensions provided so that they can demonstrate their ability to calculate without being hampered by difficulty with precise measurement.</p> <p>Differentiation for English Language Learners:</p> <p>Differentiation for Enrichment:</p>
<p>Potential Pitfall(s):</p> <p>Students who measure inaccurately will have difficulty having accurate calculations for their costs.</p>	<p>Independent Practice (Homework):</p>
<p>Steps:</p> <ol style="list-style-type: none"> 1. Give students the floor plan for the new house. Have them calculate the actual dimensions of each room using scale conversions, and then the area of each room in the blueprint. 2. Have students answer the questions regarding the cost of the project. 	<p>Teacher Notes/Reflections:</p>