Claim 1: Concepts and Procedures
Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.

Content Domain: **Geometry**

Target E [a]: Draw, construct, and describe geometrical figures and describe the relationships between them. (DOK Levels 1, 2)

Tasks associated with this target will ask students to create scale drawings or apply an understanding of scale factor to solve a problem, often paired with 7.RP Target A.

Other tasks for this target will require students to draw geometric shapes with given conditions. Some tasks, such as those that require students to provide reasoning to explain why certain conditions cannot lead to a particular shape, will lead to evidence for Claim 3.

Standards: 7.G.A, 7.G.1, 7.G.2, 7.G.3	**7.G.A Draw, construct, and describe geometrical figures and describe the relationships between them.** **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. **7.G.2** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. **7.G.3** Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right-rectangular prisms and right-rectangular pyramids.
Related Below-Grade and Above-Grade Standards for Purposes of Planning for Vertical Scaling: 6.G.A, 6.G.1, 6.G.3, 6.G.4 8.G.A, 8.G.1, 8.G.2, 8.G.3, 8.G.4, 8.G.5, 8.G.B, 8.G.6, 8.G.7, 8.G.8	**Related Grade 6 standards** **6.G.A Solve real-world and mathematical problems involving area, surface area, and volume.** **6.G.1** Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. **6.G.3** Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems. **6.G.4** Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems. **Related Grade 8 Standards** **8.G.A Understand congruence and similarity using physical models, transparencies, or geometry software.** **8.G.1** Verify experimentally the properties of rotations, reflections, and translations: a. Lines are taken to lines, and line segments to line segments

	of the same length. b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines. **8.G.2** Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **8.G.3** Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. **8.G.4** Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. **8.G.5** Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.* **8.G.B Understand and apply the Pythagorean Theorem.** **8.G.6** Explain a proof of the Pythagorean Theorem and its converse. **8.G.7** Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. **8.G.8** Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
DOK Levels:	1, 2
Achievement Level Descriptors:	
RANGE Achievement Level Descriptor (Range ALD) Target E: Draw, construct, and describe geometrical figures, and describe the relationships between them.	**Level 1** Students should be able to draw or construct geometric shapes with given conditions by freehand, with ruler and protractor, and by using technology.
	Level 2 Students should be able to describe geometric shapes with given conditions, and determine whether or not a set of any three given angle or side-length measures can result in a unique triangle, more than one triangle, or no triangle at all. They should be able to describe the relationship between a geometric figure and its scale drawing by finding the scale factor between them.
	Level 3 Students should be able to compute actual lengths and areas from a scale drawing, and reproduce a scale drawing using a different scale. They should be able to describe the two-dimensional figures that result from slicing prisms and pyramids by planes that are parallel to a given face.
	Level 4 Students should be able to describe the two-dimensional figures that result from slicing cones, spheres, cylinders, or other three-dimensional figures with rectangular or triangular faces by planes that are not parallel to a given face.
Evidence Required:	1. The student creates scale drawings. 2. The student solves problems involving scale drawings using proportional reasoning.

	3. The student draws, constructs, or describes geometric shapes given certain conditions. 4. The student describes a two-dimensional figure resulting from slicing a three-dimensional figure by a plane.
Allowable Response Types:	Multiple Choice, multiple correct response; Matching Tables; Equation/Numeric; Graphing
Allowable Stimulus Materials:	
Construct-Relevant Vocabulary:	scale drawing, scale, scale factor, ratio, proportion, polygon, triangle (right, acute, obtuse, equilateral, isosceles, scalene), quadrilateral, trapezoid, parallelogram, cube, right-rectangular prism, right-rectangular pyramid, square pyramid, cone, cylinder, plane, perpendicular, parallel, base of a three-dimensional figure, horizontal slice, vertical slice
Allowable Tools:	Calculator (varies by task model)
Target-Specific Attributes:	
Non-Targeted Constructs:	Understanding the relationship between the areas of two polygons in a scale drawing as the square of the scale factor.
Accessibility Concerns:	Students with challenges in fine motor skills may have difficulty with items involving drawing. Visual graphics may be difficult or not accessible for students who are blind or visually impaired. Reviewing tactile graphics and 3-D images may be time-consuming but not prohibitive. The simplest graphics with labels should be used to minimize this issue. Students with dyscalculia may have difficulty with the calculations. Students with visual perceptual disabilities may struggle with answer choices that contain complex number sentences. Students who are visually impaired or blind may need enlarged or brailled text. Students with reading disabilities may struggle with the reading load of word problems. All vocabulary should be at or below grade level to minimize this issue. Students with reading disabilities may need to read the text out loud, or have access to trackers or maskers to follow along. Students with visual processing impairments may benefit from using a tracker or masker when reading. Drag and Drop response types may not be accessible for students who are visually impaired. Consider replacing these response types with multiple choice items for Braille versions. The accommodations listed here are suggestions and could be altered depending on what accommodations will be allowable.
Development Notes:	Other tasks for this target will require students to draw geometric shapes with given conditions. Some tasks, such as those that require students to provide reasoning to explain why certain conditions cannot lead to a particular shape, will lead to evidence for Claim 3.

Task Model 1

Response Type: Graphing

DOK Level 2

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.

Evidence Required:
1. The student creates scale drawings.

Tools: Calculator

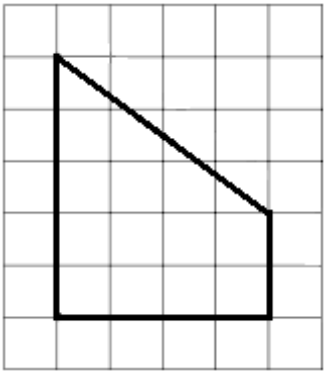
Prompt Features: The student is prompted to create a scale drawing of a polygon on a grid using drawing tools.

Stimulus Guidelines: Item difficulty can be adjusted via these example methods:

- Figures may consist of polygons such as quadrilaterals, trapezoids or parallelograms.
- Lengths and angles may be positive integers or rational numbers.
- Scale factor may be a positive rational number.
- Inclusion of extraneous information.

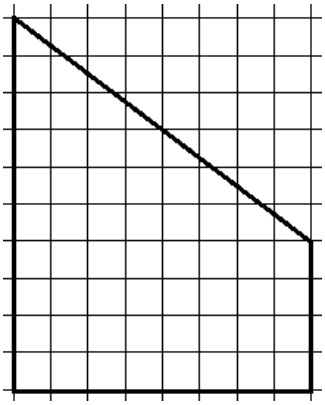
TM1a
Stimulus: The student is presented with a simple polygon on a grid and a scale factor.

Example Stem: A scale factor of 2 is applied to this figure.
Use the Connect Line tool to draw the resulting figure.

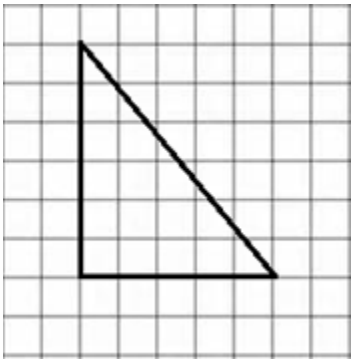


Interaction: The student is given the Connect Line, Add Point, and Delete tools to draw the polygon on a grid.

Rubric: (1 point) Student draws the correct figure with correct dimensions. Allow for correct scoring regardless of orientation of the figure (see one example of a correct response below).



Response Types: Graphing

Task Model 1 **Response Type: Equation/Numeric** **DOK Level 2** **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. **Evidence Required:** 1. The student creates scale drawings. 2. The student solves problems involving scale drawings using proportional reasoning. **Tools:** Calculator	**Prompt Features:** The student is prompted to give the area of an actual figure based on a scale drawing and scale factor. **Stimulus Guidelines:** Item difficulty can be adjusted via these example methods: • Types of polygons (square, rectangle, parallelogram, or right triangle). • Linear dimensions can be a combination of rational numbers. • Area can be a combination of rational numbers. **TM1b** **Stimulus:** The student is presented with a polygon (square, rectangle, parallelogram, or right triangle) on a grid and the scale factor at which it was created. **Example Stem:** The scale drawing of the right triangle shown was drawn using a scale factor of $\frac{1}{20}$.  Each square on the grid is 3 units in length. What is the area of the actual figure, in square units, on which this scale drawing is based? **Rubric:** (1 point) Student enters the correct area (e.g., 2700). **Response Type:** Equation/Numeric

Task Model 2

Response Type: Equation/Numeric

DOK Level 1

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.

Evidence Required:
2. The student solves problems involving scale drawings using proportional reasoning.

Tools: Calculator

Prompt Features: The student is prompted to give the length of one or more sides of a polygon or the scale factor being applied based on a scale drawing.

Stimulus Guidelines:

- Scale factor and side lengths may be positive rational numbers.
- Item difficulty can be adjusted via these example methods:
  - Types of polygons (square, rectangle, parallelogram, or right triangle).
  - Linear dimensions can be a combination of rational numbers.
  - Lengths of corresponding sides of similar polygons are not all labeled.
  - Inclusion of extraneous information.

TM2a
Stimulus: The student is presented with two polygons and a scale factor. A side length is given and the corresponding side is labeled with a variable.

Example Stem: Figure A is a scale image of Figure B, as shown.

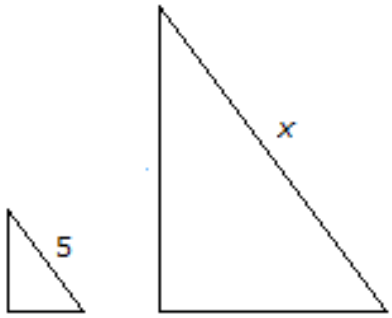
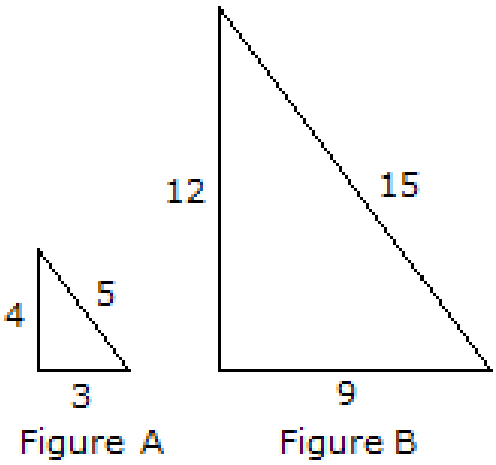


Figure A Figure B

The scale that maps Figure A onto Figure B is $1:3\frac{1}{2}$. Enter the value of *x*.

Rubric: (1 point) Student gives the correct value of the variable, which is a single numeric answer. Units, if given, should be assumed from the stem (e.g., 17.5).

Response Type: Equation/Numeric

Task Model 2 **Response Type: Equation/Numeric** **DOK Level 1** **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. **Evidence Required:** 2. The student solves problems involving scale drawings using proportional reasoning. **Tools:** Calculator	**TM2b** **Stimulus:** The student is presented with two polygons with lengths of some or all corresponding sides given or indicated by a grid. **Example Stem:** Figure B is a scale image of Figure A, as shown.  Figure A Figure B Enter the scale factor applied to Figure A to produce Figure B. **Rubric:** (1 point) Student gives the correct scale factor, which is a single numeric answer. The keypad should only contain numbers (e.g., 3). **Response Type:** Equation/Numeric

Task Model 2

Response Type: Equation/Numeric

DOK Level 2

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.

Evidence Required:
2. The student solves problems involving scale drawings using proportional reasoning.

Tools: Calculator

Prompt Features: The student is prompted to give the length of one side of an actual figure based on a scale drawing.

Stimulus Guidelines:

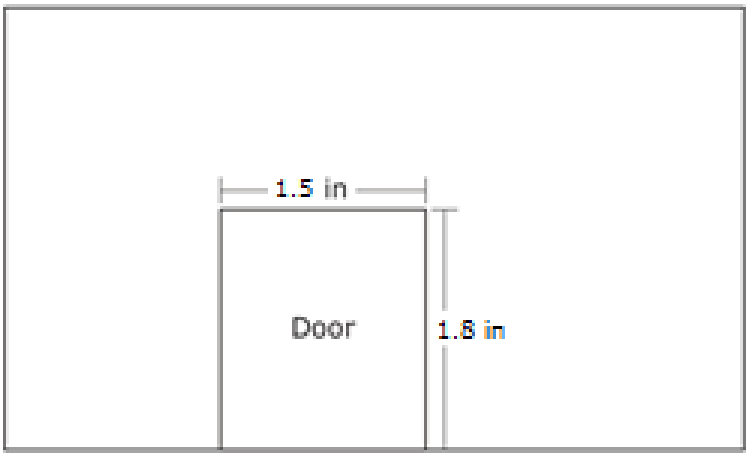
- Context should be familiar to 12–14 year olds.
- Scale factor may be given in a key.
- Item difficulty can be adjusted via these example methods:
  - Numbers can be rational.
  - Combinations of area and length are provided.
  - Extra information is provided.
  - Unit conversion is used.
  - Scale factor may be a positive rational number.

TM2c
Stimulus: The student is presented with information about the area and/or dimensions of a scale drawing, including the scale factor.

Example Stem: The front side of a playhouse is shown in this scale drawing. The height of the door in the drawing is 1.8 inches.

The scale that maps the drawing to the actual playhouse is 1 inch to 2.5 feet.

Scale Drawing of the Playhouse



Using the scale given, enter the actual height of the playhouse door, in feet.

Rubric: (1 point) Correct answer is a single numeric answer (e.g., 4.5).

Response Type: Equation/Numeric

Task Model 2
 	
Response Type: Equation/Numeric
 	
DOK Level 2
 	
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.
 	
Evidence Required:
2. The student solves problems involving scale drawings using proportional reasoning.
 	
Tools: Calculator
	Prompt Features: The student is prompted to give the area of a polygon based on a scale drawing.
	
	Stimulus Guidelines:
	• Context should be familiar to 12–14 year olds.
	• Item difficulty can be adjusted via these example methods:
	  ○ Dimensions can be a combination of positive rational numbers.
	  ○ Scale factor may be a positive rational number.
	
	TM2d
	Stimulus: The student is presented with a scale drawing of a polygon (square, rectangle, or right triangle) with dimensions labeled and the dimension for one side of the actual polygon given.
	
	Example Stem: This scale drawing of a rectangular rug has dimensions 8 inches by 5 inches. The length of the longer side of the actual rug is 32 feet.
	
	 
	
	Enter the area, in square feet, of the actual rug.
	
	Rubric: (1 point) Correct answer is a single numeric answer. Units should be assumed from the stem (e.g., 640).
	
	Response Type: Equation/Numeric

Task Model 3

Response Type: Matching Tables

DOK Level 2

7.G.2
Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

Evidence Required:
3. The student draws, constructs, or describes geometric shapes given certain conditions.

Tools: None

Prompt Features: Identify the type of triangles that can be constructed based on given information about the sides and angles of the triangle.

Stimulus Guidelines:

- Number of statements should be within three to five.
- Information given may either:
  - Describe a unique triangle
  - Be insufficient to determine a unique triangle (more than one triangle)
  - Be inconsistent with the triangle inequality or the triangle angle sum theorem (no triangle)
- Item difficulty can be adjusted via these example methods:
  - Triangles may be right, acute, obtuse, equilateral, isosceles, or scalene.
  - Angle measures and unit lengths are composed of differing positive rational numbers.
  - Inclusion of extraneous information.

TM3a
Stimulus: The student is presented with side lengths and/or angle measures of a triangle and statements about the type of triangle.

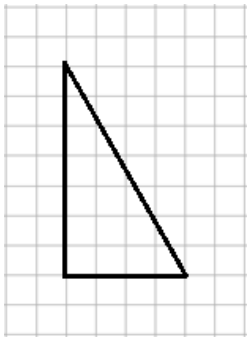
Example Stem: A triangle has a 45° angle, a 60° angle, and a side 3 centimeters in length.

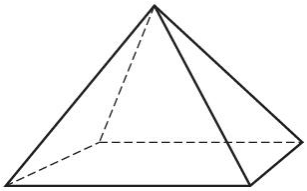
Select True or False for each statement about this type of triangle.

Statement	True	False
The triangle might be an isosceles triangle.		
The triangle must be an acute triangle.		
The triangle must contain an angle measuring 75°.		

Rubric: (1 point) Student selects True or False for each statement (e.g., F, T, T).

Item Type: Matching Tables

Task Model 3 **Response Type: Graphing** **DOK Level 1** **7.G.2** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. **Evidence Required:** 3. The student draws, constructs, or describes geometric shapes given certain conditions. **Tools:** None	**Prompt Features:** The student is prompted to generate geometric shapes based on given conditions. **Stimulus Guidelines:** Item difficulty can be adjusted via these example methods: • Figures may consist of triangles (right, acute, obtuse, equilateral, isosceles, scalene), quadrilaterals, trapezoids or parallelograms, or combinations of the above. • Combinations of given side lengths and angles. • Inclusion of extraneous information. **TM3b** **Stimulus:** The student is presented with a series of conditions regarding a triangle or quadrilateral. The conditions should determine a unique polygon, and measurements should be positive integers reasonable for display in the workspace provided. **Example Stem:** Use the Connect Line tool to draw a triangle with a 90° angle, a side with a length of 7 units, and a side with a length of 4 units. Each square on the grid is 1 unit in length. **Interaction:** The student is given the Connect Line, Add Point, and Delete tools to generate line segments on a grid. **Rubric:** (1 point) The student correctly constructs the figure described.  **Response Type:** Graphing

Task Model 4 **Response Type: Multiple Choice, multiple correct response** **DOK Level 2** **7.G.3** Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right-rectangular prisms and right-rectangular pyramids. **Evidence Required:** 4. The student describes a two-dimensional figure resulting from slicing a three-dimensional figure by a plane. **Tools:** None	**Prompt Feature:** The student is prompted to identify a two-dimensional figure that results from slicing a given three-dimensional figure by a plane. **Stimulus Guidelines:** Item difficulty can be adjusted via these example methods: • Three-dimensional figures can be right-rectangular prisms or right-rectangular pyramids. • Slices may be horizontal planes, vertical planes, or planes that are not parallel to a face. • Increasing number of possible answer choices. **TM4** **Stimulus:** The student is presented with a three-dimensional figure and a description of how the figure is sliced by a plane. **Example Stem:** This figure is a square pyramid.  Select **all** figures that can be formed by a vertical slice perpendicular to the base of the square pyramid. A. Isosceles Trapezoid B. Line segment C. Square D. Triangle **Answer Choices:** Answer choices will be names of polygons and can also include line segment as a choice. **Rubric:** (1 point) Student selects the correct figures (e.g., A, B, and D). **Response Type:** Multiple Choice, multiple correct response