Draw, construct, and describe geometrical figures, and describe the relationships between them (7.G.1-3)

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

Concepts and Skills to Master

- Use a scale or scale factor to find a measurement.
- Find actual lengths and areas from a scale drawing, using a scale factor.
- Create multiple scale drawings from the original model or drawing, using different scales.

Related Standards: Current Course

7.G.1 unit rates; 7.RP.2 proportional reasoning

Related Standards: Future Courses

8.EE.6, 8.G.3, 8.G.4, SII.G.SRT.1

(7.G.1 lays foundation for dilations in 8.G and SII.G.SRT)

Support for Teachers

Critical Background Knowledge

- Find areas of geometric figures. (6.G.1)
- Recognize and represent proportional relationships (7.RP.2)

Academic Vocabulary

Scale, scale factor, scale drawing, enlarge, reduce

Resources

Curriculum Resources: http://www.uen.org/core/core.do?courseNum=5170#71322
Draw, construct, and describe geometrical figures, and describe the relationships between them (7.G.1-3)

**Standard 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.

### Concepts and Skills to Master

- Draw precise geometric figures based on given conditions.
- Discover the conditions necessary for a set of angles (sum of 180°) or sides to make a triangle (Triangle Inequality Theorem) by exploring different combinations of sides and angles.
- Explore conditions that determine unique triangles, multiple triangles, or no triangles (Foundational for future coursework involving Triangle Congruence Theorem).

### Related Standards: Current Course

- 7.EE.4 solving equations/inequalities; 7.G.5 facts about angles

### Related Standards: Future Courses


### Support for Teachers

#### Critical Background Knowledge

- Drawing precise angles using a protractor and ruler (4.MD.6)

#### Academic Vocabulary

- Angle (∠), angle measure ($m\angle$), acute, obtuse, right, degrees (°), polygon, vertex, line segment (side AB of $\triangle ABC$).

#### Resources

- **Curriculum Resources:** [http://www.uen.org/core/core.do?courseNum=5170#71322](http://www.uen.org/core/core.do?courseNum=5170#71322)
Draw, construct, and describe geometrical figures, and describe the relationships between them (7.G.1-3)

**Standard 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.

### Concepts and Skills to Master
- Describe the different ways to slice a 3D figure (i.e. vertical slice, horizontal slice, and angled slice).
- Describe the different 2D cross-sections that will result depending on how you slice the 3D figure.

### Related Standards: Current Course
- SII.GMD.3
- SIII.G.MG.1
- SIII.G.GMD.4

### Support for Teachers

#### Critical Background Knowledge
- Understand attributes of various polygons (1.G.2, 2.G.1, 3.G.1, 5.G.1, 5.G.2)

#### Academic Vocabulary
- Cube, Right rectangular prism, Right rectangular pyramid, Cross-sections, Two-dimensional figure (2D), Three-dimensional figure (3D), Plane sections

#### Resources:
- **Curriculum Resources:** http://www.uen.org/core/core.do?courseNum=5170#71322
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume (7.G.4-6)

| Standard 7.G.4: | Know the formulas for the area and circumference of a circle, and solve problems; give an informal derivation of the relationship between the circumference and area of a circle. |

Concepts and Skills to Master

- Use the formulas for area and circumference of a circle to solve problems.
- Know the relationship between diameter, circumference, and pi.
- Show and explain how the circumference and area of a circle are related.

<table>
<thead>
<tr>
<th>Related Standards: Current Course</th>
<th>Related Standards: Future Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.G.9, SII.G.C (7.G.4 lays foundation for Circles in SII.G.C, SII.G.MG.1)</td>
</tr>
</tbody>
</table>

Support for Teachers

Critical Background Knowledge

- Understand area and perimeter (3.MD.5 and 3.MD.8)
- Attributes of a circle (half circle, quarter circle) (2.G.3)

Academic Vocabulary (This is students first experience with the following academic vocabulary)

Circumference, Radius, Diameter, Center, Area, Pi (π)

Resources:

Curriculum Resources: http://www.uen.org/core/core.do?courseNum=5170#71322
Solve real-life and mathematical problems involving angle measurement, area, surface area, and volume (7.G.4-6)

<table>
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<tr>
<th>Standard 7.G.5: Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write, and use them to solve simple equations for an unknown angle in a figure.</th>
</tr>
</thead>
</table>

Concepts and Skills to Master

- Define and understand properties of supplementary, complementary, vertical and adjacent angles.
- Use properties of supplementary, complementary, vertical and adjacent angles to solve for unknown angles in a figure.
- Write and solve equations based on a diagram of intersecting lines with some known angle measures.

### Related Standards: Current Course

- 7.EE.1, 7.EE.2, 7.EE.3, 7.EE.4a

### Related Standards: Future Courses


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### Support for Teachers

**Critical Background Knowledge**

- Solve multi-step equations (7.EE.4a)
- Properties of angle addition (4.MD.7)
- Attributes of angles (4.MD.5)

**Academic Vocabulary**

- Supplementary, complementary, vertical angles, adjacent angles, Intersecting lines

**Resources:**

*Curriculum Resources: http://www.uen.org/core/core.do?courseNum=5170#71322*
Solve real-life and mathematical problems involving angle measurement, area, surface area, and volume (7.G.4-6)

**Standard 7.G.6**: Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

**Concepts and Skills to Master**
- Decompose two-dimensional composite shapes into triangles, quadrilaterals, and polygons to find the area.
- Decompose three-dimensional composite shapes into cubes, and right prisms to find volume.
- Decompose three-dimensional composite shapes whose faces are triangles, quadrilaterals, and polygons, to find the surface area.
- Find volumes of cubes, right prisms, and composite polyhedra including those found in real-world contexts.

**Related Standards: Current Course**
- 7.G.1 Solve problems involving scale drawings; 7.G.5 angle properties

**Related Standards: Future Courses**
- 8.G.9, SII.G.GMD.1, SII.G.GMD.3, SIII.G.MG.1

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**Support for Teachers**

**Critical Background Knowledge**
- Find area of rectangles (4.MD.3), special quadrilaterals, triangles, and polygons (6.G.1)
- Find the volume of rectangular prisms (5.MD.5)
- Find surface area using nets (6.G.4)
- Find volume of rectangular prism (6.G.2)

**Academic Vocabulary**
- Area, surface area, volume, slant height, base, altitude, height

**Resources**
- **Curriculum Resources**: [http://www.uen.org/core/core.do?courseNum=5170#71322](http://www.uen.org/core/core.do?courseNum=5170#71322)