# Geometry: Standards-Based Skills Worksheet

*Revised March 20, 2018*

The skills inventory worksheets are designed to assist with data analysis and goal writing for standards-based IEPs. They are based on the [Virginia SOL Curriculum Frameworks](http://www.doe.virginia.gov/testing/sol/standards_docs/index.shtml). Go to [Standards-Based IEP](http://www.doe.virginia.gov/special_ed/iep_instruct_svcs/stds-based_iep/) for the *Standards-based Individualized Education Program (IEP) A Guide for School Divisions* for additional information on the process for creating standards-based IEPs.

## Directions

### **Step 1**

Go to [Standards-Based IEP](http://www.doe.virginia.gov/special_ed/iep_instruct_svcs/stds-based_iep/) for to print the appropriate PDF file **Skills Worksheet** that will match the projected (or current if mid-year) grade level for the student.

### **Step 2**

Gather and analyze data to identify how the student has performed in each of the strands included in the curriculum. **Review data on student performance** and indicate all data sources analyzed to assess performance in this strand:

* Present Level of Performance (PLOP)
* Prior SOL data
* Standardized test data
* Classroom assessments
* Teacher observations

### **Step 3**

Based on prior performance, predict what level of instruction ***will be*** necessary for the student to successfully master upcoming curriculum in each of the strands using the following worksheets. Check the areas that specially designed instruction and/or supports may be critical to meeting the standard.

### **Step 4**

After completing the Worksheet, based on data and your knowledge of the student as discussed in the present level of academic and functional performance (PLOP), determine if a goal(s) is/are needed to address the specific skill(s). Guiding Question:  **Is/Are standard-based goal(s) needed?**

* **YES** Address areas of need in PLOP
* **NO Check one or more justifications:**
	+ Accommodations Available (specify):
	+ Area of Strength in PLOP
	+ New Content
	+ Other (Specify):

### **Step 5**

Additional space is provided under each strand for comments or notes on data analysis

## Essential Knowledge and Skills

### Strand: Reasoning, Lines and Transformations (SOL G.1a-c, G.2a-b, G.3a-d, G.4a-h)

*The student will:*

* Identify the converse, inverse, and contrapositive of a conditional statement. (a)
* Translate verbal arguments into symbolic form using the symbols of formal logic. (b)
* Determine the validity of a logical argument using valid forms of deductive reasoning. (c)
* Determine that an argument is false using a counterexample. (c)
* Prove two or more lines are parallel given angle measurements expressed numerically or algebraically. (a)
* Prove two lines are parallel using deductive proofs given relationships between and among angles. (a)
* Solve problems by using the relationships between pairs of angles formed by the intersection of two parallel lines and a transversal including corresponding angles, alternate interior angles, alternate exterior angles, same-side (consecutive) interior angles, and same-side (consecutive) exterior angles. (b)
* Solve problems, including practical problems, involving intersecting and parallel lines. (b)
* Determine the coordinates of the midpoint or endpoint of a segment, using the midpoint formula. (a)
* Use a formula to determine the slope of a line. (a)
* Apply the distance formula to determine the length of a line segment when given the coordinates of the endpoints. (a)
* Compare the slopes to determine whether two lines are parallel, perpendicular, or neither. (b)
* Determine whether a figure has point symmetry, line symmetry, both, or neither. (c)
* Given an image and preimage, identify the transformation or combination of transformations that has/have occurred. Transformations include:
* a translation;
* a reflection over any horizontal or vertical line or the lines *y* = *x* or *y* = −*x*;
* a clockwise or counter clockwise rotation of 90°, 180°, 270°, or 360° on a coordinate grid where the center of rotation is limited to the origin; and
* a dilation from a fixed point on a coordinate grid. (d)
* Construct and justify the constructions of
* a line segment congruent to a given line segment; (a)
* the perpendicular bisector of a line segment; (b)
* a perpendicular to a given line from a point not on the line; (c)
* a perpendicular to a given line at a given point on the line; (d)
* the bisector of a given angle; (e)
* an angle congruent to a given angle; (f)
* a line parallel to a given line through a point not on the given line; (g) and

an equilateral triangle, a square, and a regular hexagon inscribed in a circle. (h)

### Strand: Triangles (SOL G.5a-d, G.6, G.7, G.8a-c)

*The student will:*

* Given information about the lengths of sides and/or measures of angles in triangles, solve problems, including practical problems. (a, b, c, d)
* Order the sides of a triangle by their lengths when given information about the measures of the angles. (a)
* Order the angles of a triangle by their measures when given information about the lengths of the sides. (b)
* Given the lengths of three segments, determine whether a triangle could be formed. (c)
* Given the lengths of two sides of a triangle, determine the range in which the length of the third side must lie. (d)
* Prove two triangles congruent given relationships among angles and sides of triangles expressed numerically or algebraically.
* Prove two triangles congruent given representations in the coordinate plane and using coordinate methods (distance formula and slope formula).
* Use direct proofs to prove two triangles congruent.
* Prove two triangles similar given relationships among angles and sides of triangles expressed numerically or algebraically.
* Prove two triangles similar given representations in the coordinate plane and using coordinate methods (distance formula and slope formula).
* Use direct proofs to prove triangles similar.
* Solve problems, including practical problems, using right triangle trigonometry and properties of special right triangles. (a, b, c)
* Determine whether a triangle formed with three given lengths is a right triangle. (a)
* Solve for missing lengths in geometric figures, using properties of
45°-45°-90° triangles where rationalizing denominators may be necessary. (b)
* Solve for missing lengths in geometric figures, using properties of
30°-60°-90° triangles where rationalizing denominators may be necessary. (b).
* Solve problems, including practical problems, involving right triangles with missing side lengths or angle measurements, using sine, cosine, and tangent ratios. (c)

### Strand: Polygons And Circles (SOL G.9, G.10a-c, G.11a-d, G.12)

* Solve problems, including practical problems, by applying properties of circles. (a, b, c, d)
* Determine angle measures and arc measures associated with
* two intersecting chords;
* two intersecting secants;
* an intersecting secant and tangent;
* two intersecting tangents; and
* central and inscribed angles. (a)
* Determine segment lengths associated with:
* two intersecting chords;
* two intersecting secants;
* an intersecting secant and tangent; and
* two intersecting tangents. (b)
* Calculate the length of an arc of a circle. (c)
* Calculate the area of a sector. (d)
* Given a graph or the equation of a circle in standard form, identify the coordinates of the center of the circle.
* Given the coordinates of the endpoints of a diameter of a circle, determine the coordinates of the center of the circle.
* Given a graph or the equation of a circle in standard form, identify the length of the radius or diameter of the circle.
* Given the coordinates of the endpoints of the diameter of a circle, determine the length of the radius or diameter of the circle.
* Given the coordinates of the center and the coordinates of a point on the circle, determine the length of the radius or diameter of the circle.
* Given the coordinates of the center and length of the radius of a circle, identify the coordinates of a point(s) on the circle.
* Determine the equation of a circle given:
* a graph of a circle with a center with coordinates that are integers;
* coordinates of the center and a point on the circle;
* coordinates of the center and the length of the radius or diameter; or
* coordinates of the endpoints of a diameter

### Strand: Three Dimensional Figures (SOL G.13, G.14a-d)

*The student will:*

**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**

* Determine the surface area of cylinders, prisms, pyramids, cones, hemispheres, and spheres, using the appropriate formulas.
* Determine the volume of cylinders, prisms, pyramids, cones, hemispheres, and spheres, using the appropriate formulas.
* Solve problems including practical problems, involving surface area and volume of cylinders, prisms, pyramids, cones, hemispheres, and spheres, as well as composite three-dimensional figures.
* Solve problems, including practical problems, involving the lateral area of circular cylinders, prisms, and regular pyramids.
* Given information about a three-dimensional figure such as length of a side, area of a face, or volume, determine missing information.
* Compare ratios between side lengths, perimeters, areas, and volumes, given two similar figures. (a)
* Describe how changes in one or more dimensions affect other derived measures (perimeter, area, surface area, and volume) of a figure. (b)
* Describe how changes in one or more measures (perimeter, area, surface area, and volume) affect other measures of a figure. (c)
* Solve real-world problems involving measured attributes of similar figures. (d).