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| Understand congruence and similarity using physical models, transparencies, or geometry software. |
| **8.G.1** Verify experimentally the properties of rotations, reflections, and translations:1. Lines are taken to lines, and line segments to line segments of the same length.
2. Angles are taken to angles of the same measure.

c. Parallel lines are taken to parallel lines. | **8.G.1** I can verify experimentally that rotations, reflections, and translations preserve length, angle measure, and parallelism (i.e. lines to lines, line segments to line segments, angles to angles, and 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.2.a** I understand that congruency of two-dimensional figures is preserved through any sequence of rotations, reflections, and translations.**8.G.2.b** I can describe a sequence of transformations between two congruent figures. |
| **8.G.3** Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. | **8.G.3** I can describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates **For example:** The point (*x*, *y*) can be translated to the point (*x* + 2, *y* – 3)**For example:** A dilation with scale factor of 2 centered at the origin is performed on a circle centered at the origin with a radius of 1. The dilated circle contains the point (0, 2). |
| **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.4.a** I understand that similarity of a two-dimensional figure is preserved through any sequence of rotations, reflections, translations, and dilations.**8.G.4.b** I can describe a sequence of transformations between two similar figures. |
| **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.5.a** I can informally establish the exterior angle of triangles and angle sum theorems.**8.G.5.b** I can informally establish angle relationships created when parallel lines are cut by a transversal.**8.G.5.c** I can informally establish the angle-angle criterion for similarity of triangles. |
| Understand and apply the Pythagorean Theorem. |
| **8.G.6** Explain a proof of the Pythagorean Theorem and its converse. | **8.G.6** I can 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.7** I can use the Pythagorean Theorem to determine unknown side lengths in right triangles in contextual situations **For example**: Determine if a baseball bat 33 inches long will fit completely in a box that is 28 inches by 16 inches by 7 inches. |
| **8.G.8** Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. | **8.G.8** I can use the Pythagorean Theorem to find the distance between two points in a coordinate system. |

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| Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres |
| **8.G.9** Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. | **8.G.9** I know and can use the formulas for the volumes of cones, cylinders, and spheres and use them to solve contextual and mathematical problems.  |