## Geometry

The focus for students in geometry at this level is reasoning about area, surface area, and volume. Students also learn to work with visual tools for representing shapes, such as graphs in the coordinate plane and nets.

**Area** is a measure of the amount of surface enclosed by a bounding perimeter. The defining unit of area is the *unit square*, which can be a square inch or a square of any other standard unit or arbitrary unit. Students begin their study of area by learning about the notion of the unit square and applying it to find the areas of squares and other shapes that can be decomposed into squares. At this level, students find the areas of triangles, special quadrilaterals, and other polygons.

The word area, by itself, usually means the area of a polygon, circle, or other distinct, planar surface. The area of the surface of a three-dimensional object, or solid, is called *surface area*. If the solid is a polyhedron, for example, then the surface area is the sum of the areas of all its faces. A "flattened out" representation of the solid, called a *net*, can be used to visualize its surface area. At this level, students make nets for and find surface areas of prisms and pyramids.

**Volume** is the space filled, or occupied, by a three-dimensional object. The basic unit of volume is the *unit cube*. Students can study volume by using unit cubes to mentally or physically build up the objects they want to investigate. This works best with rectangular prisms, but the insight gained can be applied to more general cases.

## The Grade 6 Common Core State Standards for Geometry specify that students should-

• Solve real-world and mathematical problems involving area, surface area, and volume.

The following hands-on activities will help students internalize concepts in geometry. They will help students see, for example, that area is a property of surfaces, no matter how the surfaces are situated. This is an example of finding structure in mathematics. Students in geometry at this level will work with many formulas. Hands-on activities help students see why the formulas work.