

New Jersey 8th Grade Geometry Standards: “Circling the Bases” National Baseball Hall of Fame and Museum

A. Geometric Properties

1. Understand and apply concepts involving lines, angles, and planes.
 - Complementary and supplementary angles
 - Vertical angles
 - Bisectors and perpendicular bisectors
 - Parallel, perpendicular, and intersecting planes
 - Intersection of plane with cube, cylinder, cone, and sphere
2. Understand and apply the Pythagorean theorem.
3. Understand and apply properties of polygons.
 - Quadrilaterals, including squares, rectangles, parallelograms, trapezoids, rhombi
 - Regular polygons
 - Sum of measures of interior angles of a polygon
 - Which polygons can be used alone to generate a tessellation and why
4. Understand and apply the concept of similarity.
 - Using proportions to find missing measures
 - Scale drawings
 - Models of 3D objects
5. Use logic and reasoning to make and support conjectures about geometric objects.

B. Transforming Shapes

1. Understand and apply transformations.
 - Finding the image, given the pre-image, and vice-versa
 - Sequence of transformations needed to map one figure onto another
 - Reflections, rotations, and translations result in images congruent to the pre-image
 - Dilations (stretching/shrinking) result in images similar to the pre-image
2. Use iterative procedures to generate geometric patterns.
 - Fractals (e.g., the Koch Snowflake)
 - Self-similarity
 - Construction of initial stages
 - Patterns in successive stages (e.g., number of triangles in each stage of Sierpinski's Triangle)

C. Coordinate Geometry

1. Use coordinates in four quadrants to represent geometric concepts.
2. Use a coordinate grid to model and quantify transformations (e.g., translate right 4 units).

D. Units of Measurement

1. Solve problems requiring calculations that involve different units of measurement within a measurement system (e.g., 4'3" plus 7'10" equals 12'1").
2. Use approximate equivalents between standard and metric systems to estimate measurements (e.g., 5 kilometers is about 3 miles).
3. Recognize that the degree of precision needed in calculations depends on how the results will be used and the instruments used to generate the measurements.
4. Select and use appropriate units and tools to measure quantities to the degree of precision needed in a particular problem-solving situation.
5. Recognize that all measurements of continuous quantities are approximations.
6. Solve problems that involve compound measurement units, such as speed (miles per hour), air pressure (pounds per square inch), and population density (persons per square mile).

E. Measuring Geometric Objects

1. Develop and apply strategies for finding perimeter and area.
 - Geometric figures made by combining triangles, rectangles and circles or parts of circles
 - Estimation of area using grids of various sizes
 - Impact of a dilation on the perimeter and area of a 2-dimensional figure
2. Recognize that the volume of a pyramid or cone is one-third of the volume of the prism or cylinder with the same base and height (e.g., use rice to compare volumes of figures with same base and height).
3. Develop and apply strategies and formulas for finding the surface area and volume of a three-dimensional figure.
 - Volume - prism, cone, pyramid
 - Surface area - prism (triangular or rectangular base), pyramid (triangular or rectangular base)
 - Impact of a dilation on the surface area and volume of a three-dimensional figure
4. Use formulas to find the volume and surface area of a sphere.