New Jersey 9-12th Grade Geometry Standards: "Circling the Bases" National Baseball Hall of Fame and Museum

A. Geometric Properties

1. Use geometric models to represent real-world situations and objects and to solve problems using those models (e.g., use Pythagorean Theorem to decide whether an object can fit through a doorway).
2. Draw perspective views of 3D objects on isometric dot paper, given 2D representations (e.g., nets or projective views).
3. Apply the properties of geometric shapes.
    - Parallel lines - transversal, alternate interior angles, corresponding angles
    - Triangles
        a. Conditions for congruence
        b. Segment joining midpoints of two sides is parallel to and half the length of the third side
        c. Triangle Inequality
    - Verification or refutation of proposed proofs
    - Simple proofs involving congruent triangles
    - Counterexamples to incorrect conjectures
4. Use reasoning and some form of proof to verify or refute conjectures and theorems.
    - Verification or refutation of proposed proofs
    - Simple proofs involving congruent triangles
    - Counterexamples to incorrect conjectures

B. Transforming Shapes

1. Determine, describe, and draw the effect of a transformation, or a sequence of transformations, on a geometric or algebraic object, and, conversely, determine whether and how one object can be transformed to another by a transformation or a sequence of transformations.
2. Recognize three-dimensional figures obtained through transformations of two-dimensional figures (e.g., cone as rotating an isosceles triangle about an altitude), using software as an aid to visualization.
3. Determine whether two or more given shapes can be used to generate a tessellation.
4. Generate and analyze iterative geometric patterns.
    - Fractals (e.g., Sierpinski's Triangle)
    - Patterns in areas and perimeters of self-similar figures
    - Outcome of extending iterative process indefinitely

C. Coordinate Geometry

1. Use coordinate geometry to represent and verify properties of lines.
    - Distance between two points
    - Midpoint and slope of a line segment
    - Finding the intersection of two lines
    - Lines with the same slope are parallel
    - Lines that are perpendicular have slopes whose product is -1
2. Show position and represent motion in the coordinate plane using vectors.
    - Addition and subtraction of vectors

D. Units of Measurement

1. Understand and use the concept of significant digits.
2. Choose appropriate tools and techniques to achieve the specified degree of precision and error needed in a situation.
    - Degree of accuracy of a given measurement tool
    - Finding the interval in which a computed measure (e.g., area or volume) lies, given the degree of precision of linear measurements

E. Measuring Geometric Objects

1. Use techniques of indirect measurement to represent and solve problems.
    - Similar triangles
    - Pythagorean theorem
    - Right triangle trigonometry (sine, cosine, tangent)
2. Use a variety of strategies to determine perimeter and area of plane figures and surface area and volume of 3D figures.
    - Approximation of area using grids of different sizes
    - Finding which shape has minimal (or maximal) area, perimeter, volume, or surface area under given conditions using graphing calculators, dynamic geometric software, and/or spreadsheets
    - Estimation of area, perimeter, volume, and surface area