New Jersey Tutorials are designed specifically for the New Jersey Core Curriculum Content Standards to prepare students for the PARCC assessments, the New Jersey Biology Competency Test (NJBCT).

Math Tutorials offer targeted instruction, practice and review designed to develop computational fluency, deepen conceptual understanding, and apply mathematical practices. They automatically identify and address learning gaps down to elementary-level content, using adaptive remediation to bring students to grade-level no matter where they start. Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By constantly honing the ability to apply their knowledge in abstract and real world scenarios, students build the depth of knowledge and higher order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible to students through focused content, modeled logic and process, multi-modal representations, and personalized feedback as students reason through increasingly challenging problems. The Review It offers a high impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

Unit 1: Points and Lines

- **POINTS, RAYS, LINE SEGMENTS, LINES, AND FIGURES**
  - G.CO.A.1: Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
- **PARALLEL AND PERPENDICULAR LINES**
  - G.GPE.B.5: Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

Unit 2: Lines and Angles

- **PARALLEL LINES AND ANGLE RELATIONSHIPS**
  - G.CO.C.9: Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segments endpoints.
- **PERPENDICULAR AND ANGLE BISECTOR THEOREMS**

- G.CO.C.9: Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segments endpoints.

Unit 3: Coordinate Geometry 1

- **SLOPE-INTERCEPT FORM OF A LINEAR EQUATION**
  - G.GPE.B.5: Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
- **LENGTH AND THE DISTANCE FORMULA**
  - G.GPE.B.6: (+) Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
  - G.GPE.B.7: Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

Unit 4: Coordinate Geometry 2

- **MIDPOINT FORMULA ON THE COORDINATE PLANE**
  - G.GPE.B.5: Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
- **CONJECTURES IN COORDINATE GEOMETRY**
  - G.GPE.B.4: Use coordinates to prove simple geometric theorems algebraically.

Unit 5: Perimeter and Area

- **PERIMETER ON THE COORDINATE PLANE**
  - G.GPE.B.7: Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.
- **AREA ON THE COORDINATE PLANE**
  - G.GPE.B.7: Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

Unit 6: Transformations

- **TRANSFORMATIONS ON THE COORDINATE PLANE**
  - G.CO.A.2: Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
  - G.CO.A.3: Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

- G.CO.B.6: Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
- G.SRT.A.1.a: A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
- G.SRT.A.1.b: The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

- **DILATIONS, TRANSLATIONS, ROTATIONS, AND REFLECTIONS**
  - G.CO.A.2: Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
  - G.CO.A.4: Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
  - G.CO.A.5: Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.
  - G.SRT.A.1.b: The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

Unit 7: Triangles, Congruence, and Similarity

- **TRIANGLES AND CONGRUENCE TRANSFORMATIONS**
  - G.CO.B.7: Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
  - G.CO.B.8: Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.
  - G.SRT.B.5: Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
- **TRIANGLES AND SIMILARITY TRANSFORMATIONS**
  - G.SRT.A.2: Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
  - G.SRT.A.3: Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
  - G.SRT.B.5: Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Unit 8: Triangles

- **TRIANGLE ANGLE THEOREMS**

- G.CO.C.10: Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.
- G.SRT.B.4: Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.

- **TRIANGLE BISECTORS**
  - G.C.A.3: Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
  - G.CO.C.10: Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.
  - G.SRT.B.4: Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.
  - G.SRT.B.5: Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
- **MEDIANS AND ALTITUDES OF TRIANGLES**
  - G.CO.C.10: Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.
  - G.SRT.B.4: Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.

Unit 9: Quadrilaterals and Constructions

- **PARALLELOGRAMS AND RECTANGLES**
  - G.CO.C.11: Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.
- **SQUARES AND RHOMBI**
  - G.CO.C.11: Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.
- **CONSTRUCTIONS**

- G.CO.D.12: Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.
- G.CO.D.13: Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

Unit 10: Triangles and Trigonometry

- **PYTHAGOREAN THEOREM**
  - G.SRT.C.8: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
- **TRIGONOMETRIC RATIOS**
  - G.SRT.C.6: Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
  - G.SRT.C.7: Explain and use the relationship between the sine and cosine of complementary angles.
  - G.SRT.C.8: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
- **PROBLEM SOLVING WITH RIGHT TRIANGLES**
  - G.SRT.B.5: Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
- **SPECIAL RIGHT TRIANGLES**
  - G.SRT.B.5: Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Unit 11: Circles 1

- **CIRCLE BASICS**
  - G.C.A.2: Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.
- **EQUATION OF A CIRCLE**
  - G.GPE.A.1: (+) Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.
- **CONGRUENT AND SIMILAR CIRCLES**
  - G.C.A.1: Prove that all circles are similar.

Unit 12: Circles 2

- **CENTRAL ANGLES, INSCRIBED ANGLES, AND CHORDS**

- G.C.A.2: Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.
- G.C.A.3: Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

- **SECANTS, ANGLES, AND INTERCEPTED ARCS**
  - G.C.A.2: Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.
- **TANGENTS, ANGLES, AND INTERCEPTED ARCS**
  - G.C.A.2: Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

Unit 13: Circles 3

- **CIRCUMFERENCE AND ARC LENGTH**
  - G.C.B.5: Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.
  - G.CO.A.1: Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
  - G.GMD.A.1: Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieris principle, and informal limit arguments.
- **AREA OF CIRCLES AND SECTORS**
  - G.C.B.5: Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.
  - G.GMD.A.1: Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieris principle, and informal limit arguments.
  - G.MG.A.1: Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

Unit 14: Surface Area

- **SURFACE AREA AND VOLUME OF SPHERES**
  - G.GMD.A.3: Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
- **SURFACE AREA OF COMPOSITE SOLIDS**
  - G.MG.A.1: Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
- **SURFACE AREA OF SIMILAR SOLIDS**
  - G.MG.A.1: Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

Unit 15: Volume

- **RELATING TWO-DIMENSIONAL FIGURES TO THREE-DIMENSIONAL SOLIDS**
  - G.GMD.B.4: Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
- **VOLUME OF PRISMS, CUBES, AND PYRAMIDS**
  - G.GMD.A.1: Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieris principle, and informal limit arguments.
  - G.GMD.A.3: Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
- **VOLUME OF CYLINDERS AND CONES**
  - G.GMD.A.1: Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieris principle, and informal limit arguments.
  - G.GMD.A.3: Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

Unit 16: Applications of Volume

- **MODELING SITUATIONS IN GEOMETRY**
  - G.MG.A.2: Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).
  - G.MG.A.3: Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).
- **VOLUME OF COMPOSITE SOLIDS**
  - G.MG.A.1: Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).