New Jersey Student Learning Standards	Geometry Lesson
G-CO.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.	1.1, 4.1, 8.1, 8.5
G-CO.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).	1.3, 1.4, 1.5, 1.6, 2.2, 2.4, 5.3
G-CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	1.4, 1.6
G-CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	1.3, 1.5, 1.6, 1.7, 4.4, 11.3
G-CO.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.	1.3, 1.4, 1.5, 1.6, 1.7, 2.4, 5.1, 5.3
G-CO.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.	1.3, 1.4, 1.5, 1.6, 1.7, 5.3
G-CO.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.	1.3, 1.4, 5.3
G-CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	5.3, 5.4
G-CO.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 segment's endpoints.	3.3, 3.4, 4.1, 4.2, 4.3, 6.2
G-CO.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.	4.5, 5.3, 5.4, 6.1, 6.4
G-CO.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.	9.1, 9.2, 9.3
G-CO.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.	1.1, 4.3, 6.2
G-CO.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	5.1, 8.3, 9.6
G-SRT.1 Verify experimentally the properties of dilations given by a center and a scalefactor. G-SRT.1a 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.	2.2
G-SRT.1b The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	2.2
G-SRT.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.	2.2, 2.3, 2.4

G-SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	7.1
G-SRT.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.*	7.4
G-SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	2.1, 2.2, 5.2, 5.3, 5.4, 7.1, 7.2
Define trigonometric ratios and solve problems involving right triangles	
G-SRT.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.	7.6
G-SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.	7.6
G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.*	7.3, 7.5, 7.6, 7.8
G-SRT.9 (+) Derive the formula $A = 1/2\ ab\ \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.	7.8
G-SRT.10 (+) Prove the Laws of Sines and Cosines and use them to solve problems.	7.8
G-SRT.11 (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).	7.8
G-C.1 Prove that all circles are similar.	2.3, 11.3
G-C.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.*	8.1, 8.2, 8.3, 8.4
G-C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	6.3, 6.5, 8.1, 8.3
G-C.4 (+) Construct a tangent line from a point outside a given circle to the circle.	8.1
G-C.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.	8.5
G-GPE.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.	11.1, 11.3
G-GPE.2 Derive the equation of a parabola given a focus and directrix.	11.2
G-GPE.3 (+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.	11.5, 11.6
G-GPE.4 Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, $\sqrt{3}$) lies on the circle centered at the origin and containing the point (0, 2).*	6.1, 9.5
G-GPE.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).	4.4, 9.1
G-GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	1.2
G-GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.*	9.6
G-GMD.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, Cavalieri's principle, and informal limit arguments.*	8.1, 10.4
G-GMD.2 (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.	10.4
G-GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.*	10.3
G-GMD.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.	10.1, 11.1, 11.2
G-MG.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).*	9.6, 9.7, 10.2, 10.3
G-MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).*	9.6, 10.2, 10.5

G-MG.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).*	2.3, 9.6, 9.8, 10.2, 10.3
S-CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").	12.1, 12.3, 12.4
S-CP.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	12.3
S-CP.3 Understand the conditional probability of A given B as $P(A$ and $B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.	12.5
S-CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. *For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.*	12.5
S-CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.*	12.3, 12.5
S-CP.6 Find the conditional probability of A given B as the fraction of $B's$ outcomes that also belong to A, and interpret the answer in terms of the model.	12.5
S-CP.7 Apply the Addition Rule, $P(A$ or $B) = P(A) + P(B) − P(A$ and $B)$, and interpret the answer in terms of the model.	12.4
S-CP.8 (+) Apply the general Multiplication Rule in a uniform probability model, $P(A$ and $B) = P(A)P(B|A) = P(B)P(A|B)$, and interpret the answer in terms of the model.	12.3, 12.5
S-CP.9 (+) Use permutations and combinations to compute probabilities of compound events and solve problems.	12.2
Use probability to evaluate outcomes of decisions **S-MD.6** (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).	12.1, 12.3
S-MD.7 (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).	12.1, 12.3, 12.4, 12.5
N-RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. *For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.*	R.7
N-RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.	R.7
N-RN.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	R.7
N-Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	R.3
N-Q.2 Define appropriate quantities for the purpose of descriptive modeling.	R.3
A-SSE.2 Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 − y^4$ as $(x^2)^2 − (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 − y^2)(x^2 + y^2)$.*	R.1, R.2, R.5, R.6
A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* **A-SSE.3a** Factor a quadratic expression to reveal the zeros of the function it defines.	R.8
A-SSE.3b Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	R.9
A-APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	R.5

A-CED.1 Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*	R.1, R.2
A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*	R.2
A-CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*	R.1
A-REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	R.1
A-REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	R.1, R.2
A-REI.4 Solve quadratic equations in one variable. **A-REI.4a** Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.	R.8, R.9
A-REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	R.4
A-REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	R.4
A-REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	R.3, R.9
A-REI.11 Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.*	R.4
F-IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.*	R.3
F-IF.8a Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	R.9
F-LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. **F-LE.1a** Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.	R.3
F-LE.1b Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	R.3