Big Ideas Math: A Common Core Curriculum Geometry © 2015
Correlated to
Common Core State Standards for High School Geometry

Standard		Pages or Locations Where Standard is Addressed
Conceptual Category: Geometry		
Domain: The Number System		
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.	*Primary SE/TE:* 3-10 (1.1), 11-18 (1.2), 37-46 (1.5), 47-54 (1.6), 125-130 (3.1), 529-536 (10.1), 593-600 (11.1) *Supporting SE/TE:* 19-26 (1.3), 99-104 (2.5), 105-114 (2.6)
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).	*Primary SE/TE:* 173-180 (4.1), 181-188 (4.2), 189-196 (4.3), 207-214 (4.5)
G.CO.3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	*Primary SE/TE:* 181-188 (4.2), 189-196 (4.3)
G.CO.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	*Primary SE/TE:* 173-180 (4.1), 181-188 (4.2), 189-196 (4.3)
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.	*Primary SE/TE:* 173-180 (4.1), 181-188 (4.2), 189-196 (4.3), 199-206 (4.4), 215-220 (4.6) *Supporting SE/TE:* 246 (5.3), 262 (5.5), 270 (5.6)
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.	*Primary SE/TE:* 173-180 (4.1), 181-188 (4.2), 189-196 (4.3), 199-206 (4.4)
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.	*Primary SE/TE:* 239-244 (5.2)
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.	*Primary SE/TE:* 245-250 (5.3), 261-268 (5.5), 269-276 (5.6)
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*.	*Primary SE/TE:* 99-104 (2.5), 105-114 (2.6), 131-136 (3.2), 137-144 (3.3), 148-154 (3.4), 180 (4.1), 301-308 (6.1) *Supporting SE/TE:* 65-74 (2.1), 75-82 (2.2), 83-88 (2.3), 91-98 (2.4)
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*.	*Primary SE/TE:* 231-238 (5.1), 251-258 (5.4), 309-318 (6.2), 319-326 (6.3), 329-334 (6.4), 335-342 (6.5), 343-348 (6.6) *Supporting SE/TE:* 65-74 (2.1), 75-82 (2.2), 83-88 (2.3), 91-98 (2.4)
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*.	*Primary SE/TE:* 367-374 (7.2), 375-384 (7.3), 387-396 (7.4) *Supporting SE/TE:* 65-74 (2.1), 75-82 (2.2), 83-88 (2.3), 91-98 (2.4), 359-366 (7.1)
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*.	*Primary SE/TE:* 11-18 (1.2), 19-26 (1.3), 37-46 (1.5), 137-144 (3.3), 147-154 (3.4), 181 (4.4), 309-318 (6.2), 529 (10.1)

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Standard		Pages or Locations Where Standard is Addressed
G.CO.13	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	*Primary SE/TE:* 37 (1.5), 154 (3.4), 254 (5.4), 553-560 (10.4)
Domain: Similarity, Right Triangles, & Trigonometry		
G.SRT.1	Verify experimentally the properties of dilations given by a center and a scale factor:	
	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.	*Primary SE/TE:* 207-214 (4.5)
	b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	*Primary SE/TE:* 207-214 (4.5)
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.	*Primary SE/TE:* 215-220 (4.6), 417-426 (8.1)
G.SRT.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	*Primary SE/TE:* 427-432 (8.2)
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.*	*Primary SE/TE:* 435-444 (8.3), 445-452 (8.4), 463-470 (9.1) *Supporting SE/TE:* 65-74 (2.1), 75-82 (2.2), 83-88 (2.3), 91-98 (2.4)
G.SRT.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	*Primary SE/TE:* 277-282 (5.7), 367-374 (7.2), 375-384 (7.3), 387-396 (7.4), 397-406 (7.5), 427-432 (8.2), 435-444 (8.3), 477-484 (9.3) *Supporting SE/TE:* 301-308 (6.1), 319-326 (6.3)
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.	*Primary SE/TE:* 487-492 (9.4), 493-500 (9.5)
G.SRT.7	Explain and use the relationship between the sine and cosine of complementary angles.	*Primary SE/TE:* 493-500 (9.5)
G.SRT.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★	*Primary SE/TE:* 463-470 (9.1), 487-492 (9.4), 493-500 (9.5), 501-506 (9.6) *Supporting SE/TE:* 471-476 (9.2)
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.	*Primary SE/TE:* 507-516 (9.7)
G.SRT.10	(+) Prove the Laws of Sines and Cosines and use them to solve problems.	*Primary SE/TE:* 507-516 (9.7)
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).	*Primary SE/TE:* 507-516 (9.7)

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Standard		Pages or Locations Where Standard is Addressed
Domain: Circles		
G.C.1	Prove that all circles are similar.	*Primary SE/TE:* 537-544 (10.2)
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.*	*Primary SE/TE:* 529-536 (10.1), 537-544 (10.2), 545-548 (10.3), 553-560 (10.4), 561-568 (10.5), 569-574 (10.6)
G.C.3	Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	*Primary SE/TE:* 309-318 (6.2), 553-560 (10.4)
G.C.4	(+) Construct a tangent line from a point outside a given circle to the circle.	*Primary SE/TE:* 529-536 (10.1)
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.	*Primary SE/TE:* 593-600 (11.1), 601-608 (11.2)
Domain: Expressing Geometric Properties with Equations		
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.	*Primary SE/TE:* 575-580 (10.7)
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, √3) lies on the circle centered at the origin and containing the point (0, 2).*	*Primary SE/TE:* 283-288 (5.8), 575-580 (10.7) *Supporting SE/TE:* 329-334 (6.4)
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).	*Primary SE/TE:* 155-162 (3.5), 435-444 (8.3)
G.GPE.6	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	*Primary SE/TE:* 155-162 (3.5), 445-452 (8.4)
G.GPE.7	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★	*Primary SE/TE:* 29-36 (1.4) *Supporting SE/TE:* 19-26 (1.3)
Domain: Geomteric Measurement and Dimension		
G.MD.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*.	*Primary SE/TE:* 593-600 (11.1), 601-608 (11.2), 625-634 (11.5), 635-640 (11.6), 641-646 (11.7)
G.MD.2	(+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.	*Primary SE/TE:* 625-634 (11.5), 647-654 (11.8)
G.MD.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★	*Primary SE/TE:* 625-634 (11.5), 635-640 (11.6), 641-646 (11.7), 647-654 (11.8) *Supporting SE/TE:* 609-616 (11.3)
G.MD.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.	*Primary SE/TE:* 617-622 (11.4)

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Standard		Pages or Locations Where Standard is Addressed
Domain: Modeling with Geometry		
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).★	*Primary SE/TE:* 29-36 (1.4), 231-238 (5.1), 245-250 (5.3), 251-258 (5.4), 261-268 (5.5), 301-308 (6.1), 309-318 (6.2), 329-334 (6.4), 375-384 (7.3), 387-396 (7.4), 397-406 (7.5), 435-444 (8.3), 471-476 (9.2), 501-506 (9.6), 569-574 (10.6), 625-634 (11.5), 635-640 (11.6), 647-654 (11.8)
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).★	*Primary SE/TE:* 601-608 (11.2), 625-634 (11.5)
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).★	*Primary SE/TE:* 181-188 (4.2), 261-268 (5.5), 309-318 (6.2), 387-396 (7.4), 417-426 (8.1), 501-506 (9.6), 507-516 (9.7), 545-548 (10.3), 625-634 (11.5)

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Standard		Pages or Locations Where Standard is Addressed
Mathematical Practices		
Big Ideas Math is a research-based program, systematically developed using the Common Core State Standards for Mathematical Practice as the underlying structure. The Standards for Mathematical Practice are seamlessly connected to the Common Core State Content Standards resulting in a program that maximizes both teacher effectiveness and student understanding. Every section has additional Mathematical Practice support in the Dynamic Classroom and in the online Lesson Plans at *BigIdeasMath.com* .		
1	Make sense of problems and persevere in solving them. Mathematically proficient students: • Explain to themselves the meaning of a problem and looking for entry points to its solution. • Analyze givens, constraints, relationships, and goals • Make conjectures about the form and meaning of the solution attempt. • Plan a solution pathway rather than simply jumping into a solution. • Consider analogous problems and try special cases and simpler forms of the original problen in order to gain insight into its solution. • Monitor and evaluate their progress and change course if necessary. • Transform algebraic expressions or change the viewing window on their graphing calculator to get information. • Explain correspondences between equations, verbal descriptions, tables, and graphs. • Draw diagrams of important features and relationships, graph data, and search for regularity or trends. • Use concrete objects or pictures to help conceptualize and solve a problem. • Check their answers to problems using a different method. • Ask themselves, “Does this make sense?” • Understand the approaches of others to solving complex problems and identify correspondences between approaches.	Each section begins with an Essential Question. Clear step-by-step examples encourage students to plan a solution pathway rather than jumping into a solution attempt. Guided questions and instructional scaffolding support students’ perseverance. ***Sample references:*** Chapter 1, pages 29-36 Chapter 4, pages 173-180 Chapter 5, pages 231-238 Chapter 6, pages 329-334 Chapter 8, pages 417-432 Chapter 9, pages 478-484, 487-500 Chapter 10, pages 528, 561-568 Chapter 11, pages 625-634
2	Reason abstractly and quantitively. Mathematically proficient students: • Make sense of quantities and their relationships in problem situations. • Bring two complementary abilities to bear on problems involving quantitative relationships: - Decontextualize (abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents) and - Contextualize (pause as needed during the manipulation process in order to probe into the referents for the symbols involved) • Use quantitative reasoning that entails creating a coherent representation of the problem at hand, considering the units involved, and attending to the meaning of quantities, not just how to compute them . • Know and flexibly use different properties of operations and objects.	Students learn to represent problems by consistently using a verbal model, paying close attention to units and employing mathematical properties. This helps students represent problems symbolically and manipulate the representative symbols. They are taught to contextualize by thinking about the referents and symbols involved. ***Sample references:*** Chapter 2, pages 91-104 Chapter 7, pages 375-384 Chapter 9, pages 463-470 Chapter 10, pages 529-536, 569-574 Chapter 11, pages 592, 601-616

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3	Construct viable arguments and critique the reasoning of others. Mathematically proficient students: • Understand and use stated assumptions, definitions, and previously established results in constructing arguments. • Make conjectures and build a logical progression of statements to explore the truth of their conjectures. • Analyze situations by breaking them into cases. • Recognize and use counterexamples. • Justify their conclusions, communicate them to others, and respond to the arguments of others. • Reason inductively about data, making plausible arguments that take into account the context from which the data arose. • Compare the effectiveness of two plausible arguments. • Distinguish correct logic or reasoning from that which is flawed and, if there is a flaw, explain what it is - Elementary students construct arguments using concrete referents such as objects, drawings, diagrams, and actions. - Later students learn to determine domains to which an argument applies. • Listen or read the arguments of others, decide whether they make sense, and ask useful question to clarify or improve arguments.	Throughout the series students are expected to develop models, formulate deductions, and make conjectures. Essential Questions, Error Analysis exercises, and Reasoning exercises provide opportunities for students to make assumptions, examine results, and explain their reasoning. Which One Doesn't Belong and Making an Argument encourage debate and sensemaking. ***Sample references:*** Chapter 2, pages 65-82 Chapter 3, pages 125-130, 137-144, 147-154 Chapter 5, pages 230-238, 251-258, 269-279 Chapter 6, pages 329-334 Chapter 7, pages 359-366, 387-396 Chapter 8, pages 427-432, 435-444 Chapter 9, pages 477-484 Chapter 11, pages 641-646
4	Model with mathematics. Mathematically proficient students: • Apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. - In early grades, this might be as simple as writing an addition equation to describe a situation. - In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. - By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. • Make assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. • Identify important quantities in a practical situation • Map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. • Analyze those relationships mathematically to draw conclusions. • Interpret their mathematical results in the context of the situation. • Reflect on whether the results make sense, possibly improving the model if it has not served its purpose.	In each section, students work with the mathematics of everyday life. Throughout this series, students use graphs, tables, charts, number lines, diagrams, and formulas to organize, make sense of, and identify realistic solutions to real-life situations. ***Sample references:*** Chapter 1, pages 3-10, 29-36 Chapter 5, pages 231-238 Chapter 6, pages 329-334 Chapter 7, page 358 Chapter 8, pages 427-432 Chapter 9, pages 471-484, 487-500

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5	Use appropriate tools strategically. Mathematically proficient students: • Consider available tools when solving a mathematical problem. (pencil and paper, concrete models, ruler, protractor, calculator, spreadsheet, computer algebra system, statistical package, or dynamic geometry software) • Are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. • Detect possible errors by strategically using estimation and other mathematical knowledge. • Know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. • Identify relevant external mathematical resources and use them to pose or solve problems. • Use technological tools to explore and deepen their understanding of concepts.	Opportunities for students to select and use appropriate tools such as paper and pencil, rulers, protractors, graphing calculators, spreadsheets, dynamic geometry software, websites, and other external resources are provided for students throughout the series. ***Sample references:*** Chapter 1, pages 11-18, 37-46 Chapter 3, page 124 Chapter 4, pages 172, 173, 181, 189, 199, 207, 215 Chapter 5, pages 231, 239, 245, 251, 261, 269, 283 Chapter 6, pages 300, 301, 309, 319, 329, 335, 343 Chapter 7, pages 359, 367, 375, 387, 397 Chapter 8, pages 417, 427, 435, 445 Chapter 9, pages 471, 477, 487, 493, 501, 507 Chapter 10, page 529
6	Attend to Precision. Mathematically proficient students: • Try to communicate precisely to others. - In the elementary grades, students give carefully formulated explanations to each other. - In high school, students have learned to examine claims and make explicit use of definitions. • Try to use clear definitions in discussion with others and in their own reasoning. • State the meaning of the symbols they choose, including using the equal sign consistently and appropriately. • Specify units of measure and label axes to clarify the correspondence with quantities in a problem. • Calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context.	Through the balanced approach to instruction, students have daily opportunities to communicate mathematically. Students work through explorations, examples, and exercises to understand and use the language of mathematics, paying careful attention to the importance of units, labeling, and quantities. ***Sample references:*** Chapter 1, pages 2, 47-54 Chapter 2, pages 83-88 Chapter 3, pages 131-136 Chapter 4, pages 215-220 Chapter 6, pages 335-342 Chapter 9, pages 462, 471-476, 487-492, 501-506 Chapter 11, pages 593-600

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7	Look for and make use of structure. Mathematically proficient students: • Look closely to discern a pattern or structure. - Young students might notice that three and seven more is the same amount as seven and three more or they may sort a collection of shapes according to how many sides the shapes have. - Later, students will see 7 x 8 equals the well remembered 7 x 5 + 7 x 3, in preparation for the distributive property. - In the expression $x^2 + 9x + 14$, older students can see the 14 as 2 x 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. • Step back for an overview and can shift perspective. • See complicated things, such as some algebraic expressions, as single objects or composed of several objects.	Real and relevant word problems encourage students to "see" that these problems are composed of several components. Students find that some mathematical representations share common mathematical structures and learn to look for these relationships discerning inherent patterns and structures. ***Sample references:*** Chapter 2, pages 91-98 Chapter 4, pages 181-188, 207-214 Chapter 6, pages 309-326 Chapter 8, pages 416-426, 445-452 Chapter 9, pages 493-500 Chapter 10, pages 545-550 Chapter 11, pages 635-640
8	Look for and express regularity in repeated reasoning. Mathematically proficient students: • Notice if calculations are repeated. • Look both for general methods and for shortcuts. - Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeated decimal. - Paying attention to the calculation of slope as they repeatedly check whether the points are on the line through (1,2) with a slope 3, middle school students might abstract the equation (y-2)/(x-1)=3. - Noticing the regularity in the way terms cancel when expanding (x-1)(x+1), $(x-1)(x^2+x+1)$, and $(x-1)(x^3+x^2+x+1)$ might lead high school students to the general formula for the sum of a geometric series. • Maintain oversight of the process of solving a problem, while attending to the details. • Continually evaluate the reasonableness of intermediate results.	The series helps students see that mathematics is well structured and predictable. Students work through a problem, not through the numbers. They consider factors such as an appropriate answer to the question, reasonable intermediate steps, and a realistic solution using the four-step problem solving plan. ***Sample references:*** Chapter 1, pages 7, 15, 33 Chapter 2, page 95 Chapter 4, pages 177, 189-196 Chapter 5, pages 235, 261-268 Chapter 6, pages 332, 346 Chapter 7, pages 375-384, 392, 397-406 Chapter 8, pages 420, 430 Chapter 9, pages 479, 490, 497 Chapter 10, page 565 Chapter 11, pages 593-600, 629