Summer School CC Geometry B Curricular Map
Similarity Right Triangles, and Trigonometry

Week	Conceptual Category	CCSS-M Standards/Practices	Domains and Clusters	Resources
1	**Geometry -** *Expressing Geometric Properties with Equations; Circles*	G.GPE. 4 - 7 **MP 1, 2, 3, 4, 7**	**Expressing Geometric Properties with Equations; Circles** G-PE-B-Use coordinates to prove simple geometric theorem algebraically	**Mathematics Assessment Project (MARS Tasks):** Slopes and Circles : G.GPE.1 **Illustrative Mathematics** A Midpoint Miracle: G.GPE.4b, 5b
2	**Geometry -** *Expressing Geometric Properties with Equations; Circles*	G.C. 1 -5 GPE.1 -2 **MP 1, 2, 3, 4, 7**	**Expressing Geometric Properties with Equations; Circles** G-C-A- Understand and apply theorems about circles G-C-B- Find arc lengths and areas of sectors of circles G-PE-A- Translate between the geometric description and the equation for a conic section	**Illustrative Mathematics** Locating Warehouse : G.C.3a, G.CO.13 **LAUSD Concept Task:** • **Awesome Amanda**
3	**Geometry -** *Similarity, Right Triangles and Trigonometry;* *Geometric Measurement and Dimension*	G-SRT. 6 - 8.1 G-GMD. 1-6 **MP 1, 2, 3, 4, 7**	**Similarity, Right Triangles and Trigonometry** G-SRT-C - Define trigonometric ratios and solve problems involving right triangles. **Geometric Measurement and Dimension** G-GMD-A-Explain volume formulas and use them to solve problems G-GMD-B-Visualize relationships between two-dimensional and three- dimensional objects	**Illustrative Mathematics** Defining Trigonometric Ratios: G.SRT.6 **LAUSD Concept Task:** **Chocolate Factory**
4	**Statistic and Probability-** *Conditional Probability and the Rules of Probability*	S.CP.1-5 **MP 1, 2, 3, 4, 7**	**Conditional Probability and the Rules of Probability** S-CP-A-Understand independence and conditional probability and use them to interpret data	**Illustrative Mathematics** • The Titanic 1: S.CP.1,4, and 6 • The Titanic II: S.CP.2-6
5	**Statistic and Probability-** *Conditional Probability and the Rules of Probability* *Use Probability to Make Decisions*	S.CP.6-9 S-MD.6-7 **MP 1, 2, 3, 4, 7**	**Conditional Probability and the Rules of Probability** S-CP-B-Use the rules of probability to compute probabilities of compound events in a uniform probability model **Use Probability to Make Decisions** S-MD-B-Use probability to evaluate outcomes of decisions	**Illustrative Mathematics** Fred's Factory But Mango is My Favorite…

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Week	Domains	Clusters and Standards
1	*Expressing Geometric Properties with Equations; Circles*	**Use coordinates to prove simple geometric theorem algebraically** 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).* 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). G.GPE.6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio. G.GPE.7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula. ★
2	*Expressing Geometric Properties with Equations; Circles*	**Understand and apply theorems about circles** G.C.1. Prove that all circles are similar. 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.* G.C.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. **Find arc lengths and areas of sectors of circles** 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. Convert between degrees and radians. CA **Translate between the geometric description and the equation for a conic section** 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. G.GPE.2. Derive the equation of a parabola given a focus and directrix.
3	*Similarity, Right Triangles and Trigonometry;*	**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. G.SRT.7 Explain and use the relationship between the sine and cosine of complementary angles. G.SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. G.SRT.8.1 Derive and use the trigonometric ratios for special right triangles (30°,60°,90°and 45°,45°,90°). CA **Explain volume formulas and use them to solve problems** 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.*

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	Geometric Measurement and Dimension	G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. **Visualize relationships between two-dimensional and three- dimensional objects** 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. G.GMD.5 Know that the effect of a scale factor k greater than zero on length, area, and volume is to multiply each by k, k^2, and k^3, respectively; determine length, area and volume measures using scale factors. CA G.GMD.6 Verify experimentally that in a triangle, angles opposite longer sides are larger, sides opposite larger angles are longer, and the sum of any two side lengths is greater than the remaining side length; apply these relationships to solve real-world and mathematical problems. CA
4	*Conditional Probability and the Rules of Probability*	**Understand independence and conditional probability and use them to interpret data** 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"). 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. 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*. 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.* ★ S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.
5	*Conditional Probability and the Rules of Probability* *Use Probability to Make Decisions*	**Use the rules of probability to compute probabilities of compound events in a uniform probability model** 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. 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. 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. S.CP.9 (+) Use permutations and combinations to compute probabilities of compound events and solve problems. **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). 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).

★**Indicates a modeling standard linking mathematics to everyday life, work, and decision-making.**
(+) Indicates additional mathematics to prepare students for advanced courses.

Mathematical Practices
1.   **Make sense of problems and persevere in solving them.**
2.   **Reason abstractly and quantitatively.**
3.   **Construct viable arguments and critique the reasoning of others.**
4.   **Model with mathematics.**
5.   **Use appropriate tools strategically.**
6.   **Attend to precision.**
7.   **Look for and make use of structure.**
8.   **Look for and express regularity in repeated reasoning.**

Resources

Illustrative Mathematics
- Right triangles inscribed in circles II: G.C.2a **http://www.illustrativemathematics.org/illustrations/1093**
- Inscribing a triangle in a circle : G.C.**3a** **http://www.illustrativemathematics.org/illustrations/1013**
- Two Wheels and a Belt : G.C. B **http://www.illustrativemathematics.org/illustrations/621**
- Equal Area Triangles on the Same Base II : G.GPE.5b **http://www.illustrativemathematics.org/illustrations/1348**
- Geometry Problems: Circles and Triangles – G-SRT http://map.mathshell.org/materials/lessons.php?taskid=222#task222
- Inscribing and Circumscribing Right Triangles **-** http://map.mathshell.org/materials/lessons.php?taskid=403&subpage=problem
- Modeling: Rolling Cups- http://map.mathshell.org/materials/lessons.php?taskid=428&subpage=problem
- Solving Geometry Problems: Floodlights – G-SRT.5, G-MG.1-3 http://map.mathshell.org/materials/lessons.php?taskid=429&subpage=problem
- Analyzing Congruence Proofs – G-CO.6-8 http://map.mathshell.org/materials/lessons.php?taskid=452&subpage=concept
- Calculating Volumes of Compound Objects – G-MD http://map.mathshell.org/materials/lessons.php?taskid=216&subpage=concept
- Proofs of the Pythagorean Theorem http://map.mathshell.org/materials/lessons.php?taskid=419&subpage=concept

Illustrative Mathematics
- Right triangles inscribed in circles I: G.C.2 **http://www.illustrativemathematics.org/illustrations/1091**
- Tangent Lines and the Radius of a Circle : G.C.2a, 9 **http://www.illustrativemathematics.org/illustrations/963**
- Locating Warehouse : G.C.3a, G.CO.13 **http://www.illustrativemathematics.org/illustrations/507**
- Tangent to a circle from a point : G.C.4a **http://www.illustrativemathematics.org/illustrations/1096**
- A Midpoint Miracle : G.GPE.4b, 5b **http://www.illustrativemathematics.org/illustrations/605**
- Slopes and Circles : G.GPE.1 **http://www.illustrativemathematics.org/illustrations/479**
- Explaining the equation for a circle : G.GPE.1 **http://www.illustrativemathematics.org/illustrations/1425**
- Finding triangle coordinates : G.GPE.6, G.SRT.**5** **http://www.illustrativemathematics.org/illustrations/1685**
- **The Bermuda Triangle**; **http://math.lausd.net**

- **Awesome Amanda**; **http://math.lausd.net**

Mathematics Assessment Project (MARS Tasks):
- Inscribing and Circumscribing Right Triangles - G.C.3 http://map.mathshell.org/materials/lessons.php?taskid=403&subpage=problem
- Geometry Problems: Circles and Triangles-http://map.mathshell.org/materials/lessons.php?taskid=222&subpage=problem
- Finding Equations of Parallel and Perpendicular Lines –G.GPE.5 http://map.mathshell.org/materials/lessons.php?taskid=226&subpage=concept
- Sectors of Circles-G.C.5 http://map.mathshell.org/materials/lessons.php?taskid=441&subpage=concept
- Equations of Circles 1-G.GPE.1 http://map.mathshell.org/materials/lessons.php?taskid=406&subpage=concept
- Equations of Circles 2: G.GPE.3.1; MP 1,7: http://map.mathshell.org/materials/lessons.php?taskid=425#task425

Illustrative Mathematics
- Defining Trigonometric Ratios: G.SRT.6 http://www.illustrativemathematics.org/illustrations/1635
- Sine and Cosine of Complementary Angles: G.SRT.7 http://www.illustrativemathematics.org/illustrations/1443
- Shortest line segment from a point *P* to a line *L:* G.SRT.8 http://www.illustrativemathematics.org/illustrations/962
- Doctor's Appointment: G.GMD.3http://www.illustrativemathematics.org/illustrations/527
- Centerpiece: G.GMD.3 http://www.illustrativemathematics.org/illustrations/514
- Area of a circle: G.GMD.1 http://www.illustrativemathematics.org/illustrations/1567
- Global Positioning System: G.GMD.4, A.CED.2 I http://www.illustrativemathematics.org/illustrations/1215
- Rain and Lightning:S.CP.2,3,5, and 7 http://www.illustrativemathematics.org/illustrations/1112
- Lucky Envelopes: S.CP.3 http://www.illustrativemathematics.org/illustrations/944
- Random Walk: S.CP.9 http://www.illustrativemathematics.org/illustrations/689

Illuminations
- Trigonometry for Solving Problems**;** http://illuminations.nctm.org/LessonDetail.aspx?id=L383

Mathematics Assessment Project
- Funsize cans: G-GMD.3 **http://map.mathshell.org/materials/download.php?fileid=756**
- Glasses: G-GMD.3 http://map.mathshell.org/materials/tasks.php?taskid=259#task259
- Bestsize Cans: G-GMD.3 http://map.mathshell.org/materials/tasks.php?taskid=284#task284
- Propane Tanks: G-GMD.3
- http://map.mathshell.org/materials/tasks.php?taskid=288#task288
- Hopewell Geometry: G-SRT.5 , 6, and 8 http://map.mathshell.org/materials/tasks.php?taskid=127#task127

Illustrative Mathematics
- Coins in a circular pattern: G.SRT.8, G.MG http://www.illustrativemathematics.org/illustrations/720
- Seven Circles III: G.SRT.8, G.SRT.D, G.MG.1 http://www.illustrativemathematics.org/illustrations/710
- Ask a pilot: G.SRT.8 http://www.illustrativemathematics.org/illustrations/1638

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- Use Cavalieri's Principle to Compare Aquarium: G.GMD.2, G.MG.1. http://www.illustrativemathematics.org/illustrations/530
- Tennis Balls in a Can: G.GMD.4, G.MG.1 http://www.illustrativemathematics.org/illustrations/512
- Global Positioning System II: G.GMD.4, G.MG.1 http://www.illustrativemathematics.org/illustrations/1202
- The Titanic 1: S.CP.1,4, and 6 http://www.illustrativemathematics.org/illustrations/949
- The Titanic II: S.CP.2-6 http://www.illustrativemathematics.org/illustrations/950
- Return to Fred's Fun Factory (with 50 cents): S.CP.1,2, and 9 http://www.illustrativemathematics.org/illustrations/1198
- Law of Sines and Law of Cosines: http://illuminations.nctm.org/LessonDetail.aspx?ID=L703