



Geometry (#1206310)

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Course Number: 1206310	Course Path: Section: Grades PreK to 12 Education Courses > Grade Group: Grades 9 to 12 and Adult Education Courses > Subject: Mathematics > SubSubject: Geometry >
Number of Credits: One (1) credit	Abbreviated Title: GEO Course Length: Year (Y)
Course Type: Core Academic Course	Course Attributes: <ul style="list-style-type: none">• Class Size Core Required
Course Status: Course Approved	Course Level: 2
Graduation Requirement: Geometry	

VERSION DESCRIPTION

The fundamental purpose of the course in Geometry is to formalize and extend students' geometric experiences from the middle grades. Students explore more complex geometric situations and deepen their explanations of geometric relationships, moving towards formal mathematical arguments. Important differences exist between this Geometry course and the historical approach taken in Geometry classes. For example, transformations are emphasized early in this course. Close attention should be paid to the introductory content for the Geometry conceptual category found in the high school standards. The Standards for Mathematical Practice apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations. The critical areas, organized into five units are as follows.

Unit 1-Congruence, Proof, and Constructions: In previous grades, students were asked to draw triangles based on given measurements. They also have prior experience with rigid motions: translations, reflections, and rotations and have used these to develop notions about what it means for two objects to be congruent. In this unit, students establish triangle congruence criteria, based on analyses of rigid motions and formal constructions. They use triangle congruence as a familiar foundation for the development of formal proof. Students prove theorems using a variety of formats and solve problems about triangles, quadrilaterals, and other polygons. They apply reasoning to complete geometric constructions and explain why they work.

Unit 2- Similarity, Proof, and Trigonometry: Students apply their earlier experience with dilation and proportional reasoning to build a formal understanding of similarity. They identify criteria for similarity of triangles, use similarity to solve problems, and apply similarity in right triangles to understand right triangle trigonometry, with particular attention to special right triangles and the Pythagorean theorem. Students develop the Laws of Sines and Cosines in order to find missing measures of general (not necessarily right) triangles, building on students work with quadratic equations done in the first course. They are able to distinguish whether three given measures (angles or sides) define 0, 1, 2, or infinitely many triangles.

Unit 3- Extending to Three Dimensions: Students' experience with two-dimensional and three-dimensional objects is extended to include informal explanations of circumference, area and volume formulas. Additionally, students apply their knowledge of two-dimensional shapes to consider the shapes of cross-sections and the result of rotating a two-dimensional object about a line.

Unit 4- Connecting Algebra and Geometry Through Coordinates: Building on their work with the Pythagorean theorem in 8th grade to find distances, students use a rectangular coordinate system to verify geometric relationships, including properties of special triangles and quadrilaterals and slopes of parallel and perpendicular lines, which relates back to work done in the first course. Students continue their study of quadratics by connecting the geometric and algebraic definitions of the parabola.

Unit 5-Circles With and Without Coordinates: In this unit students prove basic theorems about circles, such as a tangent line is perpendicular to a radius, inscribed angle theorem, and theorems about chords, secants, and tangents dealing with segment lengths and angle measures. They study relationships among segments on chords, secants, and tangents as an application of similarity. In the Cartesian coordinate system, students use the distance formula to write the equation of a circle when given the radius and the coordinates of its center. Given an equation of a circle, they draw the graph in the coordinate plane, and apply techniques for solving quadratic equations, which relates back to work done in the first course, to determine intersections between lines and circles or parabolas and between two circles.

GENERAL NOTES

English Language Development ELD Standards Special Notes Section:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate information, ideas and concepts for academic success in the content area of Mathematics. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link:

<http://www.cpalms.org/uploads/docs/standards/eld/MA.pdf>

For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition at sala@fldoe.org.

Additional Instructional Resources:

A.V.E. for Success Collection is provided by the Florida Association of School Administrators: [http://www.fasa.net/4DCGI/cms/review.html?](http://www.fasa.net/4DCGI/cms/review.html?Action=CMS_Document&DocID=139)

[Action=CMS_Document&DocID=139](http://www.fasa.net/4DCGI/cms/review.html?Action=CMS_Document&DocID=139). Please be aware that these resources have not been reviewed by CPALMS and there may be a charge for the use of some of them in this collection.

Florida Standards Implementation Guide Focus Section:

The [Mathematics Florida Standards Implementation Guide](#) was created to support the teaching and learning of the Mathematics Florida Standards. The guide is compartmentalized into three components: focus, coherence, and rigor. Focus means narrowing the scope of content in each grade or course, so students achieve higher levels of understanding and experience math concepts more deeply. The Mathematics standards allow for the teaching and learning of mathematical concepts focused around major clusters at each grade level, enhanced by supporting and additional clusters. The major, supporting and additional clusters are identified, in relation to each grade or course. The cluster designations for this course are below.

Major Clusters

MAFS.912.G-CO.2 Understand congruence in terms of rigid motions.

MAFS.912.G-CO.3 Prove geometric theorems.

MAFS.912.G-SRT.1 Understand similarity in terms of similarity transformations.

MAFS.912.G-SRT.2 Prove theorems involving similarity.

MAFS.912.G-SRT.3 Define trigonometric ratios and solve problems involving right triangles.

MAFS.912.G-GPE.2 Use coordinates to prove simple geometric theorems algebraically.

MAFS.G-MG.1 Apply geometric concepts in modeling situations.

Supporting Clusters

MAFS.912.G-CO.1 Experiment with transformations in the plane.

MAFS.G-CO.4 Make geometric constructions.

Additional Clusters

MAFS.912.G-C.1 Understand and apply theorems about circles.

MAFS.912.G-C.2 Find arc lengths and areas of sectors of circles.

MAFS.912.G-GPE.1 Translate between the geometric description and the equation of a conic section.

MAFS.912.G-GMD.1 Explain volume formulas and use them to solve problems.

MAFS.912.G-GMD.2 Visualize relationships between two-dimensional and three-dimensional objects.

Note: Clusters should not be sorted from major to supporting and then taught in that order. To do so would strip the coherence of the mathematical ideas and miss the opportunity to enhance the major work of the grade with the supporting and additional clusters.

Course Standards

Name	Description
MAFS.912.G-C.1.1:	Prove that all circles are similar.
MAFS.912.G-C.1.2:	Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central,...
MAFS.912.G-C.1.3:	Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in...
MAFS.912.G-C.2.5:	Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the...
MAFS.912.G-CO.1.1:	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of...
MAFS.912.G-CO.1.2:	Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions...
MAFS.912.G-CO.1.3:	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto...
MAFS.912.G-CO.1.4:	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines,...
MAFS.912.G-CO.1.5:	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper,...
MAFS.912.G-CO.2.6:	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given...
MAFS.912.G-CO.2.7:	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding...
MAFS.912.G-CO.2.8:	Explain how the criteria for triangle congruence (ASA, SAS, SSS, and Hypotenuse-Leg) follow from the definition of congruence in...
MAFS.912.G-CO.3.9:	Prove theorems about lines and angles; use theorems about lines and angles to solve problems. Theorems include: vertical angles...
MAFS.912.G-CO.3.10:	Prove theorems about triangles; use theorems about triangles to solve problems. Theorems include: measures of interior angles of...
MAFS.912.G-CO.3.11:	Prove theorems about parallelograms; use theorems about parallelograms to solve problems. Theorems include: opposite sides are...
MAFS.912.G-CO.4.12:	<p>Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices,...</p> <p>Remarks/Examples: Geometry - Fluency Recommendations</p> <p>Fluency with the use of construction tools, physical and computational, helps students draft a model of a geometric phenomenon and can lead to conjectures and proofs.</p>
MAFS.912.G-CO.4.13:	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.
MAFS.912.G-GMD.1.1:	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid,...
MAFS.912.G-GMD.1.3:	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
MAFS.912.G-GMD.2.4:	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects...
MAFS.912.G-GPE.1.1:	Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center...
MAFS.912.G-GPE.2.4:	<p>Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four...</p> <p>Remarks/Examples: Geometry - Fluency Recommendations</p> <p>Fluency with the use of coordinates to establish geometric results, calculate length and angle, and use geometric representations as a modeling tool are some of the most valuable tools in mathematics and related fields.</p>

MAFS.912.G-GPE.2.5:	<p>Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation...</p> <p>Remarks/Examples: Geometry - Fluency Recommendations</p> <p>Fluency with the use of coordinates to establish geometric results, calculate length and angle, and use geometric representations as a modeling tool are some of the most valuable tools in mathematics and related fields.</p>
MAFS.912.G-GPE.2.6:	<p>Find the point on a directed line segment between two given points that partitions the segment in a given ratio.</p> <p>Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.</p>
MAFS.912.G-GPE.2.7:	<p>Remarks/Examples: Geometry - Fluency Recommendations</p> <p>Fluency with the use of coordinates to establish geometric results, calculate length and angle, and use geometric representations as a modeling tool are some of the most valuable tools in mathematics and related fields.</p>
MAFS.912.G-MG.1.1:	Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a...
MAFS.912.G-MG.1.2:	Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).
MAFS.912.G-MG.1.3:	Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or...
MAFS.912.G-SRT.1.1:	Verify experimentally the properties of dilations given by a center and a scale factor: A dilation takes a line not passing...
MAFS.912.G-SRT.1.2:	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar: explain...
MAFS.912.G-SRT.1.3:	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
MAFS.912.G-SRT.2.4:	Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally,...
MAFS.912.G-SRT.2.5:	<p>Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.</p> <p>Remarks/Examples: Geometry - Fluency Recommendations</p> <p>Fluency with the triangle congruence and similarity criteria will help students throughout their investigations of triangles, quadrilaterals, circles, parallelism, and trigonometric ratios. These criteria are necessary tools in many geometric modeling tasks.</p>
MAFS.912.G-SRT.3.6:	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to...
MAFS.912.G-SRT.3.7:	Explain and use the relationship between the sine and cosine of complementary angles.
MAFS.912.G-SRT.3.8:	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
MAFS.K12.MP.1.1:	Make sense of problems and persevere in solving them. Mathematically proficient students start by explaining to themselves the...
MAFS.K12.MP.2.1:	Reason abstractly and quantitatively. Mathematically proficient students make sense of quantities and their relationships in...
MAFS.K12.MP.3.1:	Construct viable arguments and critique the reasoning of others. Mathematically proficient students understand and use stated...
MAFS.K12.MP.4.1:	Model with mathematics. Mathematically proficient students can apply the mathematics they know to solve problems arising in...
MAFS.K12.MP.5.1:	Use appropriate tools strategically. Mathematically proficient students consider the available tools when solving a mathematical...
MAFS.K12.MP.6.1:	Attend to precision. Mathematically proficient students try to communicate precisely to others. They try to use clear definitions...
MAFS.K12.MP.7.1:	Look for and make use of structure. Mathematically proficient students look closely to discern a pattern or structure. Young...
MAFS.K12.MP.8.1:	Look for and express regularity in repeated reasoning. Mathematically proficient students notice if calculations are repeated,...
LAFS.910.RST.1.3:	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks,...
LAFS.910.RST.2.4:	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific...
LAFS.910.RST.3.7:	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and...
LAFS.910.SL.1.1:	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with...
LAFS.910.SL.1.2:	Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally)...
LAFS.910.SL.1.3:	Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or...
LAFS.910.SL.2.4:	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line...
LAFS.910.WHST.1.1:	Write arguments focused on discipline-specific content. Introduce precise claim(s), distinguish the claim(s) from alternate or...
LAFS.910.WHST.2.4:	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and...
LAFS.910.WHST.3.9:	Draw evidence from informational texts to support analysis, reflection, and research.
ELD.K12.ELL.MA.1:	English language learners communicate information, ideas and concepts necessary for academic success in the content area of...
ELD.K12.ELL.SI.1:	English language learners communicate for social and instructional purposes within the school setting.

Related Certifications

[Mathematics \(Grades 6-12\)](#)

[Middle Grades Mathematics \(Middle Grades 5-9\)](#)

There are more than 1017 related instructional/educational resources available for this on CPALMS. Click on the following link to access them: <https://www.cpalms.org/Public/PreviewCourse/Preview/13029>