



OFFICE OF CURRICULUM, INSTRUCTION & PROFESSIONAL DEVELOPMENT

HIGH SCHOOL COURSE OUTLINE

(Revised October 2010)

Department	Mathematics	Course Title		Geometry 1-2		Course Code		3035	
Grade Level	8-12	Short Title		GEOMETRY 1-2		Grad Requirement			
Course Length	2 semesters	Credits per Semester	5	Approved for Honors	No	Required	No	Elective	No
Prerequisites	C or better in Algebra 1-2								
Co-requisites	None								
Articulated with LBCC		No		Articulated with CSULB				No	
Meets UC "a-g" Requirement		Yes (c)		Meets NCAA Requirement				Yes	

COURSE DESCRIPTION:

This course consists of a study of the basic elements of geometry, i.e., lines, planes, space, angles, curves, figures, and transformations with extensions into three dimensions and coordinate geometry. Throughout this course, reasoning skills are developed starting with conjectures, then progressing to logical arguments and proofs. Properties and relationships of polygons, circles, and solids are studied where problem solving is emphasized.

COURSE PURPOSE: GOALS

CONTENT

- Students will attain proficiency in the California state standards for geometry. The geometry skills and concepts developed in this discipline are useful to all students.

SKILLS

- Students will be able to develop their ability to construct formal, logical arguments and proofs in geometric settings and problems, apply conjectures and theorems to solve for unknowns, derive and use formulas and properties of geometric figures, perform constructions, and compute the areas and volume of 2- and 3- dimensional figures.
- In addition to algebra skills and concepts, students are expected to apply the following common skills that are relevant across all curriculum areas and career pathways: students will use technology, apply problem-solving and critical thinking skills, adapt to varied roles and responsibilities while working together in teams, understand and apply ethical behavior in the classroom and workplace, and understand and apply the characteristics of teamwork, leadership and citizenship in the school, community and workplace.

LITERACY

- Students communicate precisely about quantities, logical relationships, and unknown values through the use of signs, symbols, models, graphs, and mathematical vocabulary. Regular opportunities are provided for students to communicate through oral and written explanations of math concepts.
- Students are expected to produce legible work, using correct spelling and grammar, and will formulate judgments about ideas and support those judgments with evidence.
- Students will use visual aids, including graphs and step-by-step solutions, in oral explanations and presentations.

APPLICATIONS

- Students learn to apply mathematics to everyday life and develop an interest in pursuing advance studies in mathematics and in a wide array of mathematically related career choices.

COURSE PURPOSE: EXPECTED OUTCOMES

Students are expected to perform at a proficient level on a variety of tasks and assessments addressing both the content and skill standards for Geometry 1-2. Levels of proficiency are defined near the end of this course outline under Performance Criteria.

- 1.0* Students demonstrate understanding by identifying and giving examples of undefined terms, axioms, theorems, and inductive and deductive reasoning. (CST)
- 2.0* Students write geometric proofs, including proofs by contradiction. (CST)
- 3.0* Students construct and judge the validity of a logical argument and give counterexamples to disprove a statement. (CST) (PSAT)
- 4.0* Students prove basic theorems involving congruence and similarity. (CST)
- 5.0 Students prove that triangles are congruent or similar, and they are able to use the concept of corresponding parts of congruent triangles. (CST) (PSAT)
- 6.0 Students know and are able to use the triangle inequality theorem. (CST) (PSAT)
- 7.0* Students prove and use theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals, and the properties of circles. (CST) (PSAT)
- 8.0* Students know, derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures. (CST) (PSAT)
- 9.0 Students compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders. (CST) (PSAT)
- 10.0* Students compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids. (CST) (PSAT)
- 11.0 Students determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids. (CST) (PSAT)
- 12.0* Students find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems. (CST) (PSAT)
- 13.0 Students prove relationships between angles in polygons by using properties of complementary, supplementary, vertical, and exterior angles. (CST) (PSAT)
- 14.0* Students prove the Pythagorean theorem. (CST)
- 15.0 Students use the Pythagorean theorem to determine distance and find missing lengths of sides of right triangles. (CST) (PSAT)
- 16.0* Students perform basic constructions with a straightedge and compass, such as angle bisectors, perpendicular bisectors, and the line parallel to a given line through a point off the line. (CST)
- 17.0* Students prove theorems by using coordinate geometry, including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles. (CST)
- 18.0* Students know the definitions of the basic trigonometric functions defined by the angles of a right triangle. They also know and are able to use elementary relationships between them. For example, $\tan(x) = \sin(x)/\cos(x)$, $(\sin(x))^2 + (\cos(x))^2 = 1$. (CST)
- 19.0 Students use trigonometric functions to solve for an unknown length of a side of a right triangle, given an angle and a length of a side. (CST)
- 20.0 Students know and are able to use angle and side relationships in problems with special right triangles, such as 30° , 60° , and 90° triangles and 45° , 45° , and 90° triangles. (CST) (PSAT)
- 21.0* Students prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles. (CST)
- 22.0* Students know the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections. (CST) (PSAT)

* Key standards (*Mathematics Framework for California Public Schools*) comprise a minimum of 70% of the California Standards Test

CST Standard assessed on the California Standards Test

PSAT Standard assessed on the Preliminary Scholastic Aptitude Test

COURSE PURPOSE: EXPECTED INTEGRATED OUTCOMES

Students are also expected to proficiently apply common skills that are relevant across curriculum areas and career pathways. The following are those skills most applicable to Geometry 1-2.

CTE Foundation Standards: from the California Career Technical Education Model Curriculum Standards, adopted by the California State Board of Education in May, 2005.

Foundation Standard 2: CommunicationsWritten and Oral English Language Conventions (Grades Nine and Ten)

- 1.4 Produce legible work that shows accurate spelling and correct use of the conventions of punctuation and capitalization.
- 1.1 Formulate judgments about the ideas under discussion and support those judgments with convincing evidence.
- 1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.
- 1.12 Evaluate the clarity, quality, effectiveness, and general coherence of a speaker's important points, arguments, evidence, organization of ideas, delivery, diction, and syntax.

Foundation Standard 3: Career Planning and Management

- 3.5 Understand the past, present, and future trends that affect careers, such as technological developments and societal trends, and the resulting need for lifelong learning.
- 3.6 *Know important strategies for self-promotion in the hiring process, such as job applications, resume writing, interviewing skills, and preparation of a portfolio.*

Foundation Standard 4: Technology

- 4.2 Understand the use of technological resources to gain access to, manipulate, and produce information, products, and services.

Foundation Standard 5: Problem Solving and Critical Thinking

- 5.1 Apply appropriate problems-solving strategies and critical thinking skills to work-related issues and tasks.
- 5.3 *Use critical thinking skills to make informed decisions and solve problems.*

Foundation Standard 7: Responsibility and Flexibility

- 7.1 Understand the qualities and behaviors that constitute a positive and professional work demeanor.
- 7.2 *Understand the importance of accountability and responsibility in fulfilling personal, community, and workplace roles.*
- 7.3 Understand the need to adapt to varied roles and responsibilities.
- 7.4 Understand that individual actions can affect the larger community.

Foundation Standard 8: Ethics and Legal Responsibilities

- 8.2 Understand the concept and application of ethical and legal behavior consistent with workplace standards.
- 8.3 *Understand the role of personal integrity and ethical behavior in the workplace.*

Foundation Standard 9: Leadership and Teamwork

- 9.1 Understand the characteristics and benefits of teamwork, leadership, and citizenship in the school, community, and workplace setting.
- 9.3 *Understand how to organize and structure work individually and in teams for effective performance and the attainment of goals.*
- 9.4 Know multiple approaches to conflict resolution and their appropriateness for a variety of situations in the workplace.
- 9.5 Understand how to interact with others in ways that demonstrate respect for individual and cultural differences and for the attitudes and feelings of others.

The italicized standards are the CTE "Power" Standards addressed across the content areas.

OUTLINE OF CONTENT AND SUGGESTED TIME ALLOTMENT:

The Task Analysis and Key Vocabulary presented here are drawn from the Mathematics Framework for California Public Schools, which defines the intent and scope of the Mathematics Content Standards. For additional information on the context and the benchmark standards to assess, refer to the Blueprints for the Geometry Content Standards Test (CST). Content sequencing, activities, and time allocations are only suggestions and may be adjusted to suit school site curriculum plans, available materials, and student needs.

- G** refers to the Geometry standards of the CA Mathematics Content Standards
- A** refers to the Algebra I standards of the CA Mathematics Content Standards
- FS** refers to the Foundation Standards of the CA CTE Pathway Standards

Tools of Geometry		13 Days (6.5 Blocks)																													
<p><i>Sample Essential Question:</i> <i>How can points, lines, and planes be used to construct geometric figures?</i></p>																															
Content Standards		Performance Standard Measures <i>(Reflects rigor and integration of CTE Foundation Standards and may vary by SLC)</i>	Instructional Support																												
Students Know... (Content)	Students are Able to... (Skill)	Students Demonstrate Knowledge and Skill																													
<p>... the basic terms, properties, and concepts of geometry. (G1.0, G3.0, G16.0, G17.0)</p>	<p>Use inductive reasoning to make conjectures. (G1.0)</p>	<p>Suggested Activity:</p> <ul style="list-style-type: none"> • Out of this World Constructions (Available on LBUSD Math Intranet/ Instructional tools) 	<p>BASIC TEXTBOOK CORRELATION: 1-1, 1-2, 1-3, 1-4, 1-5, 1-6</p> <p>KEY VOCABULARY:</p> <table style="width: 100%; border: none;"> <tr> <td>acute angle</td> <td>midpoint</td> </tr> <tr> <td>angle</td> <td>parallel</td> </tr> <tr> <td>angle bisector</td> <td>obtuse angle</td> </tr> <tr> <td>axiom</td> <td>plane</td> </tr> <tr> <td>collinear points</td> <td>perpendicular</td> </tr> <tr> <td>compass</td> <td>point</td> </tr> <tr> <td>congruent</td> <td>postulate</td> </tr> <tr> <td>conjecture</td> <td>ray</td> </tr> <tr> <td>construction</td> <td>right angle</td> </tr> <tr> <td>coordinate</td> <td>segment</td> </tr> <tr> <td>counterexample</td> <td>skew lines</td> </tr> <tr> <td>coplanar</td> <td>space</td> </tr> <tr> <td>inductive reasoning</td> <td>straight angle</td> </tr> <tr> <td>line</td> <td></td> </tr> </table> <p>SUPPLEMENTAL MATERIALS CORRELATION: Prentice Hall Chapter 1 Support File</p>	acute angle	midpoint	angle	parallel	angle bisector	obtuse angle	axiom	plane	collinear points	perpendicular	compass	point	congruent	postulate	conjecture	ray	construction	right angle	coordinate	segment	counterexample	skew lines	coplanar	space	inductive reasoning	straight angle	line	
	acute angle			midpoint																											
	angle			parallel																											
	angle bisector			obtuse angle																											
	axiom			plane																											
	collinear points			perpendicular																											
compass	point																														
congruent	postulate																														
conjecture	ray																														
construction	right angle																														
coordinate	segment																														
counterexample	skew lines																														
coplanar	space																														
inductive reasoning	straight angle																														
line																															
<p>Understand basic terms of geometry, such as points, lines, planes, segments, rays, and parallel lines and planes; and understand basic geometry postulates. (G1.0)</p>																															
<p>Use tools of geometry to measure segments and angles, and perform basic constructions. (G16.0)</p>																															
<p>Calculate the distance between two points in the coordinate plane, and find the coordinates of the midpoint of a segment in the coordinate plane. (G17.0)</p>																															
<p>Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations. (FS1.7)</p>																															
<p>Understand how to interact with others in ways that demonstrate respect for individual and cultural differences and for the attitudes and feelings of others. (FS9.5)</p>																															

Reasoning and Proof			11 Days (5.5 Blocks)
<p><i>Sample Essential Question:</i> How is inductive and deductive reasoning used to form conclusions and/or justify their validity?</p>			
Content Standards		Performance Standard Measures <i>(Reflects rigor and integration of CTE Foundation Standards and may vary by SLC)</i>	Instructional Support
Students Know... (Content)	Students are Able to... (Skill)	Students Demonstrate Knowledge and Skill	
...how to reason and how to identify angle pairs. (G1.0 , G2.0, G3.0, G4.0, G 13.0)	Recognize conditional statements and write converses of conditional statements. (G1.0, G3.0)	<p>Suggested Activities:</p> <ul style="list-style-type: none"> Steps for Buying Your Lunch (Available on LBUSD Math Intranet/ Instructional tools) Tangrams and Angles (Activity 6 in Prentice Hall Hands-On Activities) 	<p>BASIC TEXTBOOK CORRELATION: 2-1, 2-2, 2-3, 2-4, 2-5</p> <p>KEY VOCABULARY: adjacent \angles biconditional complementary \angles conclusion conditional converse deductive reasoning hypothesis Law of Detachment</p> <p>Law of Syllogism paragraph proof Reflexive Prop. supplementary \angles Symmetric Prop. theorem Transitive Property truth value vertical \angles</p> <p>SUPPLEMENTAL MATERIALS CORRELATION: Prentice Hall Chapter 2 Support File Prentice Hall Hands-On Activities</p>
	Write biconditionals and recognize good definitions. (G1.0)		
	Recognize and use the Law of Detachment and the Law of Syllogism. (G1.0)		
	Use algebra properties to justify each step in solving an equation and proving angles congruent. (G1.0)		
	Formulate judgments about the ideas under discussion and support those judgments with convincing evidence. (FS1.1)		
Use critical thinking skills to make informed decisions and solve problems. (FS5.3)			

Parallel and Perpendicular Lines			15 Days (7.5 Blocks)
<p><i>Sample Essential Question:</i> How are angles important in the study of parallel and perpendicular lines and polygons?</p>			
Content Standards		Performance Standard Measures <i>(Reflects rigor and integration of CTE Foundation Standards and may vary by SLC)</i>	Instructional Support
Students Know... (Content)	Students are Able to... (Skill)	Students Demonstrate Knowledge and Skill	
... the properties of parallel and perpendicular lines, and know about angle measures in triangles and other polygons. (G1.0 , G2.0, G3.0, G4.0, G7.0, G12.0, G13.0)	To identify angles formed by two lines and a transversal, and to prove and use theorems involving properties of parallel lines. (G2.0, G7.0)	<p>Key Assignment:</p> <ul style="list-style-type: none"> Bridge City (Available on LBUSD Math Intranet/ Instructional tools) (Described in Key Assignments following the Outline of Content) <p>Assessment: District Geometry Quarter 1 Exam</p> <p>Suggested Activities:</p> <ul style="list-style-type: none"> Investigation: The Sum of Three Angle Measures (p. 131 textbook) Investigation: The Sum of Polygon Angle Measures (p. 145 textbook) 	<p>BASIC TEXTBOOK CORRELATION: 3-1, 3-2, p. 130, 3-3, 3-4 (supplement definition of heptagon), p. 151, 3-5 & 3-6 (together covering ex. 1 & 3 from 3-5 and ex. 1, 2, & 4 from 3-6), 3-7</p> <p>KEY VOCABULARY: acute triangle alternate interior \angles concave polygon convex polygon corresponding \angles equiangular triangle equilateral triangle equilateral polygon exterior angle of a polygon flow proof isosceles triangle obtuse triangle</p> <p>point-slope form polygon regular polygon remote interior \angles right triangle same-side interior \angles scalene triangle slope-intercept form standard form of an equation transversal two-column proof</p> <p>SUPPLEMENTAL MATERIALS CORRELATION: Prentice Hall Chapter 3 Support File</p>
	Use theorems to prove lines are parallel. (G2.0, G7.0)		
	Find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems. (G12.0)		
	Students graph lines on a coordinate plane and examine slope of parallel and perpendicular lines. (A6.0, A7.0, A8.0)		
	Use geometry tools to construct parallel and perpendicular lines. (G16.0)		
	Produce legible work that shows accurate spelling and correct use of the conventions of punctuation and capitalization. (FS1.4)		
	Understand that individual actions can affect the larger community. (FS7.4)		
	Understand the characteristics and benefits of teamwork, leadership, and citizenship in the school, community, and workplace setting. (FS9.1)		

Quadrilaterals			14 Days (7 Blocks)
<p><i>Sample Essential Question:</i> <i>What characteristics make each polygon different?</i></p>			
Content Standards		Performance Standard Measures <i>(Reflects rigor and integration of CTE Foundation Standards and may vary by SLC)</i>	Instructional Support
Students Know... (Content)	Students are Able to... (Skill)	Students Demonstrate Knowledge and Skill	
<p>...the properties of parallelograms and other special quadrilaterals. Students will classify quadrilaterals, and verify properties of figures by placing them on a coordinate plane and using coordinate proof techniques. (G7.0, G12.0, G13.0, G17.0)</p>	Define and classify special types of quadrilaterals. (G7.0)	<p>Assessment: District Geometry Semester Exam</p> <p>Suggested Activities:</p> <ul style="list-style-type: none"> Sorting Quadrilaterals (Available on LBUSD Math Intranet/ Instructional tools) Investigation: Is it a Parallelogram? (p. 303 textbook) 	<p>BASIC TEXTBOOK CORRELATION: 6-1, 6-2, 6-3, 6-4, 6-5, 6-6, 6-7</p> <p>KEY VOCABULARY: base angles parallelogram consecutive angles rectangle isosceles trapezoid rhombus kite square midsegment trapezoid</p> <p>SUPPLEMENTAL MATERIALS CORRELATION: Prentice Hall Chapter 6 Support File</p>
	Know relationships among sides and angles of parallelograms, and diagonals and transversals of parallelograms and use these to solve for values and prove statements true. (G7.0)		
	Know and use the properties of diagonals of rhombuses and rectangles to determine whether a parallelogram is a rhombus or rectangle. (G12.0)		
	Verify and use the properties of trapezoids and kites. (G13.0)		
	Place figures on the coordinate plane, and use their properties to prove theorems. (G17.0)		
	Understand how to organize and structure work individually and in teams for effective performance and the attainment of goals. (FS9.3)		

Area			17 Days (8.5 Blocks)
<p><i>Sample Essential Question:</i> <i>Using the area formulas for basic geometric figures and the Pythagorean Theorem, how can the area of special quadrilaterals and regular polygons be discovered?</i></p>			
Content Standards		Performance Standard Measures <i>(Reflects rigor and integration of CTE Foundation Standards and may vary by SLC)</i>	Instructional Support
Students Know... (Content)	Students are Able to... (Skill)	Students Demonstrate Knowledge and Skill	
<p>... how the area of a triangle and parallelogram are related to the area of a rectangle. Students will know and use the Pythagorean Theorem and its converse, and prove the Pythagorean Theorem. They will know and be able to use angle and side relationships in problems with special right triangles, such as 30°, 60°, and 90° triangles and 45°, 45°, and 90° triangles. (G8.0, G10.0, G14.0, G15.0, G20.0, G21.0)</p>	Derive, know and use the formulas for area of a triangle and parallelogram. (G8.0)	<p>Suggested Activities:</p> <ul style="list-style-type: none"> Enrichment 7-1: An Area Proof of the Pythagorean Theorem (Available in Prentice Hall Chapter 7 Support File) Investigation: Area of a Parallelogram (p. 348 textbook) Investigation: Finding the Area of a Trapezoid (p. 373 textbook) Investigation: Exploring the Area of a Circle (p. 395 textbook) 	<p>BASIC TEXTBOOK CORRELATION: 7-1, p. 355, 7-2, 7-3, 7-4, 7-5, 7-6, 7-7</p> <p>KEY VOCABULARY: adjacent arcs diameter altitude geometric apothem probability arc length height base major arc center minor arc central angle pi circle Pythagorean triple circumference radius concentric sector congruent arcs semicircle congruent circles</p> <p>SUPPLEMENTAL MATERIALS CORRELATION: Prentice Hall Chapter 7 Support File</p>
	Prove, know and use the Pythagorean Theorem. Use the converse of the Pythagorean Theorem. (G14.0, G15.0)		
	Know and use the properties of special right triangles, such as 30°, 60°, and 90° triangles and 45°, 45°, and 90° triangles. (G20.0)		
	Derive, know and use the formulas for area of a trapezoid, rhombus and kite. (G8.0, G10.0)		
	Find the area of regular polygons. (G8.0, G10.0)		
	Find the measures of central angles and arcs, and find the circumference and arc length on circles. (G21.0)		

Similarity			12 Days (6 Blocks)
<p><i>Sample Essential Question:</i> <i>How can using similar triangles lead to discovering additional relationships within triangles?</i></p>			
Content Standards		Performance Standard Measures <i>(Reflects rigor and integration of CTE Foundation Standards and may vary by SLC)</i>	Instructional Support
Students Know... (Content)	Students are Able to... (Skill)	Students Demonstrate Knowledge and Skill	
<p>...that similar polygons are polygons that have the same shape but not necessarily the same size, and learn how to prove triangles similar. Students will learn about proportional relationships formed by parallel segments, and by angle bisectors within triangles as well as by altitudes to the hypotenuse in right triangles. Students will also learn how the perimeters and areas of similar figures are related. (G4.0, G5.0, G11.0, G12.0)</p>	<p>Use the concept of corresponding parts of similar polygons to write ratios and solve proportions to find missing side lengths in similar polygons. (G4.0, G5.0)</p>	<p>Suggested Activities:</p> <ul style="list-style-type: none"> Investigation: Triangles with Two Pairs of Congruent Angles (p. 432 textbook) Investigation: Similarity in Right Triangles (p. 439 textbook) Investigation: Perimeters and Areas of Similar Rectangles (p. 454 textbook) Proportions in Overlapping Triangles (Activity 24 in Prentice Hall Hands-On Activities) 	<p>BASIC TEXTBOOK CORRELATION: 8-1, 8-2, 8-3, 8-4, 8-5, 8-6</p> <p>KEY VOCABULARY: Cross-product indirect Property measurement extended proportion scale geometric mean scale drawing golden ratio similar golden rectangle similarity ratio</p> <p>SUPPLEMENTAL MATERIALS CORRELATION: Prentice Hall Hands-On Activities</p>
	<p>Prove basic theorems involving similarity, including those involving right triangles. (G4.0)</p>		
	<p>Find and use relationships in similar right triangles to find missing measures. (G5.0)</p>		
	<p>Use the Side-Splitter Theorem and the Triangle-Angle-Bisector Theorem to find missing measures. (G12.0)</p>		
	<p>Prove triangles are similar using the AA Postulate and the SAS and SSS Theorems. (G4.0)</p>		
	<p>Find the perimeters and areas of similar figures. (G11.0)</p>		
	<p>Use critical thinking skills to make informed decisions and solve problems. (FS5.3)</p>		

Right Triangle Trigonometry			11 Days (5.5 Blocks)
<p><i>Sample Essential Question:</i> <i>How can the trigonometric ratios be used to find the height and distance of objects that cannot be measured?</i></p>			
Content Standards		Performance Standard Measures <i>(Reflects rigor and integration of CTE Foundation Standards and may vary by SLC)</i>	Instructional Support
Students Know... (Content)	Students are Able to... (Skill)	Students Demonstrate Knowledge and Skill	
<p>... the sine, cosine and tangent ratios, and how they are used to solve real-world problems involving angles of elevation, angles of depression and polygon area. (G18.0)</p>	<p>Students know the definitions of the basic trigonometric functions defined by the angles of a right triangle, and use these functions to solve for missing angles and side lengths. (G18.0)</p>	<p>Key Assignment:</p> <ul style="list-style-type: none"> Chapter 9 Project: Measure for Measure (Available in Prentice Hall Chapter 9 Support File) <p>(Described in Key Assignments following the Outline of Content)</p> <p>Assessment: District Geometry Quarter 3 Exam</p> <p>Suggested Activities:</p> <ul style="list-style-type: none"> Right Triangle Ratios (Activity 25 in Prentice Hall Hands-On Activities) 	<p>BASIC TEXTBOOK CORRELATION: 9-1, 9-2, 9-3, 9-5</p> <p>KEY VOCABULARY: angle of depression resultant angle of elevation sine cosine tangent identity</p> <p>SUPPLEMENTAL MATERIALS CORRELATION: Prentice Hall Hands-On Activities Prentice Hall Chapter 9 Support File</p>
	<p>Use the trigonometric functions to solve problems involving angles of elevation and angles of depression. (G18.0)</p>		
	<p>Use the trigonometric functions to find areas of triangles and other polygons. (G18.0)</p>		
	<p>Understand how to interact with others in ways that demonstrate respect for individual and cultural differences and for the attitudes and feelings of others. (FS9.5)</p>		

Circles			13 Days (6.5 Blocks)
<p><i>Sample Essential Question:</i> How can properties of circles and of lines and segments that intersect circles help us in the field of transportation, archaeology, photography, and communications?</p>			
Content Standards		Performance Standard Measures <i>(Reflects rigor and integration of CTE Foundation Standards and may vary by SLC)</i>	Instructional Support
Students Know... (Content)	Students are Able to ... (Skill)	Students Demonstrate Knowledge and Skill	
... properties of circles and of lines and segments that intersect circles. Students will learn about the relationship between angles formed by chords, tangents, and secants and the arcs they intercept on a circle. (G7.0, G21.0)	Prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles. (G21.0)	<p>Suggested Activities:</p> <ul style="list-style-type: none"> Investigation: Exploring Inscribed Angles (p. 598 textbook) Tangent Segments and Angle Measure (Activity 31 in Prentice Hall Hands-On Activities) Finding the Center of a Circle (Activity 33 in Prentice Hall Hands-On Activities) Enrichment 11-4: Ten Angles (Available in Prentice Hall Chapter 11 Support File) 	<p>BASIC TEXTBOOK CORRELATION: 11-1, 11-2, 11-3, 11-4</p> <p>KEY VOCABULARY: chord secant circumscribed about standard form inscribed angle of an equation inscribed in of a circle intercepted arc tangent to a circle point of tangency</p> <p>SUPPLEMENTAL MATERIALS CORRELATION: Prentice Hall Hands-On Activities Prentice Hall Chapter 11 Support File</p>
	Prove and use theorems involving the properties of circles. (G7.0)		
	Understand how to organize and structure work individually and in teams for effective performance and the attainment of goals. (FS9.3)		

Surface Area and Volume			15 Days (7.5 Blocks)
<p><i>Sample Essential Question:</i> How can we use the perimeter and area formulas from 2-dimensional figures to find the surface area and volume of 3-dimensional figures?</p>			
Content Standards		Performance Standard Measures <i>(Reflects rigor and integration of CTE Foundation Standards and may vary by SLC)</i>	Instructional Support
Students Know... (Content)	Students are Able to... (Skill)	Students Demonstrate Knowledge and Skill	
...and derive the formulas for area and surface area of prisms, pyramids, and cylinders, and know how to use them in calculations. Students will know how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids. (G8.0, G9.0, G11.0)	Derive and solve problems involving the volume, lateral area, and surface area of common geometric figures. (G8.0, G9.0, G11.0)	<p>Key Assignment:</p> <ul style="list-style-type: none"> Chapter 10 Project: The Place is Packed (Available in Prentice Hall Chapter 10 Support File) (Described in Key Assignments following the Outline of Content) <p>Suggested Activities:</p> <ul style="list-style-type: none"> Investigation: Finding Volume with Unit Cubes (p. 544 textbook) Investigation: Exploring Volume of a Pyramid (p. 551 textbook) A Colossal Task Activity 2 (textbook page 579) 	<p>BASIC TEXTBOOK CORRELATION: 10-1, 10-3, 10-4, 10-5, 10-6, 10-7, 10-8</p> <p>KEY VOCABULARY: altitude oblique prism base polyhedron composite space figure pyramid cone right cone cube right cylinder cylinder right prism edge similar solids face similarity ratio great circle slant height hemisphere sphere lateral area surface area lateral faces vertex net volume oblique cylinder</p> <p>SUPPLEMENTAL MATERIALS CORRELATION: Prentice Hall Chapter 10 Support File</p>
	Compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and commit to memory the formulas for prisms, pyramids, and cylinders. (G8.0, G9.0, G11.0)		
	Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations. (FS1.7)		
	Understand how to interact with others in ways that demonstrate respect for individual and cultural differences and for the attitudes and feelings of others. (FS9.5)		

Transformations

11 Days (5.5 Blocks)

Sample Essential Question:

Transformations help us to discover relationships between congruent shapes. How does knowledge of transformations allow us to understand symmetry and tessellation?

Content Standards		Performance Standard Measures <i>(Reflects rigor and integration of CTE Foundation Standards and may vary by SLC)</i>	Instructional Support																										
Students Know... (Content)	Students are Able to... (Skill)	Students Demonstrate Knowledge and Skill																											
...the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections. (G22.0)	<p>Draw and identify rotation, translation and reflection images. (G22.0)</p> <p>Apply appropriate problems-solving strategies and critical thinking skills to work-related issues and tasks. (FS5.1)</p>	<p><u>Assessment:</u> District Geometry End-of-Course Exam</p> <p><u>Suggested Activities:</u></p> <ul style="list-style-type: none"> Investigation: Making Designs with Rotations (p. 647 textbook) Enrichment 12-4: Patty Paper Compositions (Available in Prentice Hall Chapter 12 Support File) 	<p><u>BASIC TEXTBOOK CORRELATION:</u> 12-1, p. 640, 12-2, 12-3, 12-4</p> <p><u>KEY VOCABULARY:</u></p> <table style="width: 100%; border: none;"> <tr> <td>composition</td> <td>reflectional</td> </tr> <tr> <td>dilation</td> <td>symmetry</td> </tr> <tr> <td>enlargement</td> <td>rotation</td> </tr> <tr> <td>glide reflection</td> <td>rotational symmetry</td> </tr> <tr> <td>glide reflectional</td> <td>scalar multiplication</td> </tr> <tr> <td>symmetry</td> <td>symmetry</td> </tr> <tr> <td>image</td> <td>tessellation</td> </tr> <tr> <td>isometry</td> <td>tiling</td> </tr> <tr> <td>line symmetry</td> <td>transformation</td> </tr> <tr> <td>point symmetry</td> <td>translation</td> </tr> <tr> <td>preimage</td> <td>translational</td> </tr> <tr> <td>reduction</td> <td>symmetry</td> </tr> <tr> <td>reflection</td> <td></td> </tr> </table> <p><u>SUPPLEMENTAL MATERIALS CORRELATION:</u> Prentice Hall Chapter 12 Support File</p>	composition	reflectional	dilation	symmetry	enlargement	rotation	glide reflection	rotational symmetry	glide reflectional	scalar multiplication	symmetry	symmetry	image	tessellation	isometry	tiling	line symmetry	transformation	point symmetry	translation	preimage	translational	reduction	symmetry	reflection	
composition	reflectional																												
dilation	symmetry																												
enlargement	rotation																												
glide reflection	rotational symmetry																												
glide reflectional	scalar multiplication																												
symmetry	symmetry																												
image	tessellation																												
isometry	tiling																												
line symmetry	transformation																												
point symmetry	translation																												
preimage	translational																												
reduction	symmetry																												
reflection																													

KEY ASSIGNMENTS/ASSESSMENTS:

Daily Homework and In-class Assignments	Throughout the course, students will complete daily homework and in-class assignments from the math textbook and supplemental materials that will be used to assess their knowledge of the information learned during class time.
Content-Based Activities	Students will participate in a variety of in-class rigorous and relevant standards-based activities which may include investigations, discovery activities, cooperative group activities, and creative ways to summarize concepts learned.
Unit Tests	Common unit tests are developed by a team of Geometry teachers at each high school site and administered to each student enrolled in the course. Tests include a variety of free-response and multiple choice items. Free-response items may be graded allowing an opportunity for students to receive partial credit if they demonstrate conceptual understanding, but make arithmetic errors. Tests include a variety of objective questions that assess basic knowledge of content, vocabulary, procedures, skills, conceptual understanding, or problem-solving ability.
Quarter Exams	Students taking Geometry in LBUSD take a district-developed 20-item multiple-choice quarter 1 and quarter 3 exam assessing proficiency in the state standards taught in the given quarter.
Comprehensive Semester Exam	Students taking Geometry in LBUSD take a district-developed 50-item multiple-choice exam assessing proficiency in the state standards taught in the first semester.
Comprehensive End of Course Exam	Students taking Geometry in LBUSD take a district-developed 50-item multiple-choice exam assessing proficiency in all of the state standards for Geometry.
Performance-Based Projects – especially Quad D and Service Learning	Students may complete rigorous and relevant standards-based projects which may integrate more than one subject area, relate to real-life or a career application, and may include service learning. The projects can be completed individually or in a small group, and can be completed during class time and/or at home. The projects can include a presentation to a small or group or the whole class. Service Learning activities involve research, preparation, action/demonstration, and reflection of experiential applications of the content and will be credited toward the district's high school Service Learning requirement. Students are expected to complete a Service Learning activity with a minimum of 5 hours, prior to the completion of this course. The learning (any products developed, reflection on the service) will be graded by the instructor as one of the performance based assessments; the service itself will not be graded or judged.

Key Assignments (Performance-Based Projects)**Quarter 1**Bridge City (LBUSD Math Intranet/Instructional Tools)

Students use their knowledge of transversals and parallel lines to organize the placement of buildings and landmarks within a faux city. Working in small groups, students will use a map, angle measurements, and reasoning to determine the design of the city. Students will explain their final layout in the form of a letter to the City Council, analyzing their work with geometry theorems.

Quarter 2Tri, Tri Again (Prentice Hall Chapter 4 Support File; Chapter 4 Project)

Students will explore how engineers use triangles to construct bridges, towers or other such structures. Students will make square and triangular frames from various materials, both 2-dimensional and 3-dimensional. They will analyze and record the strength of their models, keeping records of their attempts. Finally, students analyze which prototype has the greatest strength, and why, using correct geometric analysis. A written explanation of each part of the problem is required, including visual aids to represent each step of the solution.

Quarter 3Measure for Measure (Prentice Hall Chapter 9 Support File; Chapter 9 Project)

Students will work in small groups to use a protractor, straw, cardboard, string, tape and a small weight (such as a key) to construct a clinometer, and angle-measuring device. Students will use the clinometer to measure the angle of elevation to an object that cannot be reached. Students will measure the distance on the ground and their height, and use trigonometric formulas to determine the height of the object. The group will prepare a written solution for finding the height of the object including a drawing a step by step solution with justification for each step.

Quarter 4

The Place is Packed (Prentice Hall Chapter 10 Support File; Chapter 10 Project)

Students will explore package design and uncover some of the reasons for the shapes manufacturers have chosen.

- 1) Students will bring a container shaped like prisms or cylinders, measure each dimension, and calculate surface area of the prism or cylinder and compare that to the surface area of the entire packaging material.
- 2) Given a constant volume, student will create two different prisms to contain the same volume. Students will calculate the surface area for both prisms and develop a theory about why type of prism is most cost-efficient for packaging.
- 3) Students will design and construct a package for a product of their choice. They will draw a net, specify dimensions, surface area, amount of packaging material, and volume of the package. They will justify their design with mathematical arguments, and present this in written form and as a presentation with visual aids to the class.

INSTRUCTIONAL METHOD AND/OR STRATEGIES:

A variety of instructional strategies will be utilized to accommodate all learning styles:

Math-specific Methods: .

1. lectures, structured note-taking, justification of reasoning
2. cooperative problem-solving, pair-teaching
3. activities, projects
4. manipulatives, drawing visual representations

Lesson Design & Delivery: Teachers will incorporate these components of lesson design during direct instruction and inquiry activities. The order of components is flexible, depending on the teacher’s vision for the individual lesson. For instance, the objective and purpose, while present in the teacher’s lesson plan, are not made known to the students at the beginning of an inquiry lesson.

<p>Essential Elements of Effective Instruction Model for Lesson Design Using Task Analysis</p>	<p>Anticipatory Set Objective Standard Reference Purpose Input Modeling Check for Understanding Guided Practice Closure Independent Practice</p>
---	--

Some components may occur once in a lesson, but others will recur many times. Checking for understanding occurs continually; input, modeling, guided practice and closure may occur several times. There may even be more than one anticipatory set when more than one content piece is introduced.

Active Participation: Teachers will incorporate the principles of active participation and specific strategies to ensure consistent, simultaneous involvement of the minds of all learners in the classroom. Teachers should include both covert and overt active participation strategies, incorporating cooperative learning structures and brain research. Some of the possible active participation strategies include:

COVERT	OVERT (Oral)	OVERT (Written)	OVERT (Gestures)
• Recall	• Think (Write)/Pair/Share	• Restate in Notes	• Hand Signals
• Imagine	• Idea Wave	• Response Boards	• Model with Hand Motions
• Observe	• Choral Response	• Graphic Organizers	• Stand up/ Sit down
• Consider	• Give One, Get One	• Folded Paper	• Point to Examples
	• Socratic Seminar	• Ticket Out of Class	
	• Cooperative Discussion Groups		

Baldrige Quality Tools: Students can become more positively involved in their education through goal setting, self-assessment, and data tracking and analysis by making use of the following strategies:

BALDRIGE TOOL	PURPOSES
Affinity Diagram	– finding consensus, organizing complex information
Flowchart	– describing a process, planning a project, identifying problem steps in a process
Force Field Diagram	– identifying obstacles, finding causes and solutions to problems
Issues / Ideas Bin	– handling individual questions/requests without stopping a group activity, providing anonymous input, obtaining diverse input in specific areas.
Data Folder	– tracking goals and actual results
Plus / Delta	– tracking improvement efforts, identifying opportunities for change, finding out what's working and what's not working in a process, procedure, activity, etc.
Class Data Graphs	– displaying trends for goal setting

Diverse learning styles may be addressed by implementing combinations of the following:

Significant, Proven Strategies for all Geometry Students

- Cooperative Problem-solving
- Student Presentations
- Short/Long-term projects
- Peer Teaching
- Manipulatives
- Drawing visual representations
- Structured Note-taking

Reading Strategies in Geometry

- Vocabulary Development (including conceptual and non-linguistic components)
- Anticipation Guides
- Pre-teaching
- Pre-reading
- Text Structures
- Reciprocal Teaching
- Functional Text

SDAIE Strategies for English Learners

- Lower the Affective Filter (including Processing Time)
- Tapping/Building Prior Knowledge (Graphic Organizers, Schema)
- Acquisition Levels
- Language Sensitivity
- Grouping Strategies
- Home/School Connection (including Cultural Aspects)
- Multiple Intelligences
- Adapt the Text
- Manipulatives & Visuals

Strategies for Students with Disabilities

- IEP Accommodations (refer to student's IEP document or IEP summary sheet)
- Curricular Adaptations (e.g., quantity, input, participation, time, level of difficulty, level of support, output, substitute curriculum, alternate goals)
- Think Alouds
- Small Group Instruction / Learning Centers
- Manipulatives & Visuals
- Peer Assisted Learning

Differentiation for Advanced Learners

- Curriculum Compacting
- Depth and Complexity
- Flexible Grouping
- Acceleration
- Tiered Assignments
- Independent Study

Please note that these strategies often overlap and should not be limited to specifically defined courses or student populations.

TEXTBOOKS:

Basic Textbook: Read in entirety Excerpts used Geometry, Bass, Laurie, et al., Prentice Hall, © 2004.

SUPPLEMENTAL INSTRUCTIONAL MATERIALS:

In addition to the basic text, a variety of instructional tools will be used to meet the needs of all students

RESOURCES:

Documents

- LBUSD Pacing LBUSD Mathematics Curriculum Internet
- Geometry 1-2 Supplemental Resources LBUSD Mathematics Curriculum Intranet
- STAR Testing Blueprints <http://www.cde.ca.gov/ta/tg/sr/blueprints.asp>
- CST Released Items <http://www.cde.ca.gov/ta/tg/sr/css05rtq.asp>

ASSESSMENT METHODS AND/OR TOOLS:

Student achievement in this course will be measured using multiple assessment tools including but not limited to:

Suggested Evaluation Tools:

Source	Diagnostic (Diagnose)	Formative (Monitor)	Summative (Evaluate)
District Developed Assessments	Practice EOC Exam from previous math course	Practice Exams for Quarter 1, Quarter 2 or Semester 1, Quarter 3, and End-of-Course	Quarter 1 and 3 test Semester 1 test End-Of-Course Exam
Prentice Hall: <u>Geometry</u>	Check Skills You'll Need Lesson Quiz	Standardized Test Prep Mixed Review Lesson Quiz Mid-Chapter Quizzes Chapter Review	Chapter Test Cumulative Review Cumulative Chapter Test
Teacher Developed Assessments	Warm Up Quizzes Homework Checking for Understanding using Active Participation Techniques Cooperative Learning	Warm Up Quizzes Homework Checking for Understanding using Active Participation Techniques Cooperative Learning	Quizzes Chapter Tests

PERFORMANCE STANDARDS CRITERIA:

Defines how good is good enough on which measures to demonstrate achievement of content standards.

State Performance Standards:

The California State Board of Education has identified the following performance levels for the California Standards Test (CST) in Geometry. The objective of Long Beach Unified School District is to have all students achieve at or above the Proficient Performance Standard (Level). The table below indicates the number correct, the estimated percent correct and the Reported Scaled Score (SS) on the Content Standards Test (based on **2009** data).

Far Below Basic	Below Basic	Basic	Proficient	Advanced Proficient
0 – 19 Correct	20 – 32 Correct	33 – 43 Correct	44 – 55 Correct	56 – 65 Correct
0% – 29%	30% – 49%	50% – 66%	67% – 85%	86% – 100%
SS 150 – 246	SS 247 – 299	SS 300 – 349	SS 350 – 417	SS 418 – 600

District Performance Standards:

The Long Beach Unified School District has common assessments and key assignments that are required for Geometry. The Performance Standard Criteria is shown in the tables below. The goal is to have all students achieve at or above the Proficient Level and receive a C or better in the course.

Assessments

	Far Below Basic (FBB)	Below Basic (BB)	Basic (B)	Proficient (P)	Advanced Proficient (AP)
District Assessments: <ul style="list-style-type: none"> • Quarter 1 • Semester 1 • Quarter 3 • End-of-Course 	0% – 29%	30% – 49%	50% – 66%	67% – 85%	86% – 100%

Key Assignments/Performance-Based Projects

F	D	C	B	A
Not Proficient 0 – 59%	Partial Proficient 60% – 69 %	Proficient 70% – 84%	Advanced Proficient 85% – 100%	
The student response makes little or no progress toward accomplishing the task. <ul style="list-style-type: none"> Shows little or no grasp of the central mathematical idea(s) Includes mathematical computations that are incorrect or inappropriate Presents mathematical knowledge and ideas in a barely (if at all) comprehensible manner 	The student response partially accomplishes the task. <ul style="list-style-type: none"> Shows a limited grasp of the central mathematical ideas(s) May include incomplete and/or misdirected mathematical computations Presents mathematical knowledge and ideas in an unclear manner or without supporting evidence 	The student response substantially accomplishes the task. <ul style="list-style-type: none"> Shows an essential grasp of the central mathematical idea(s) Includes appropriate and generally correct mathematical computations Presents mathematical knowledge and ideas clearly with supporting evidence 	The student response thoroughly accomplishes the task. <ul style="list-style-type: none"> Shows thorough understanding and use of the central mathematical ideas(s) Includes appropriate and accurate mathematical computations Presents mathematical knowledge and ideas clearly and skillfully, using combinations of mathematical symbols and/or visual means as supporting evidence 	

Classroom Performance Standards

The objective of instruction is to help all students achieve at or above the Proficient Level and receive a C or better in the course.

	F	D	C	B	A
	Not Proficient	Partial Proficient	Proficient	Advanced Proficient	
Assessment Tests and Quizzes	Less than 60%	60% - 69%	70% - 84%	85% - 100%	
Classwork/Activities	Less than 60%	60% - 69%	70% - 84%	85% - 100%	
Activities/Performance-Based Projects	Less than 60%	60% - 69%	70% - 84%	85% - 100%	
Homework	Less than 60%	60% - 69%	70% - 84%	85% - 100%	

Standard Grading Scale:

Advanced Proficient	A	90 – 100%
	B	80 – 89%
Proficient	C	70 – 79%
Partial Proficient	D	60 – 69%
Not Proficient	F	0 – 59%

Suggested Grade Weighting:

1. Assessment	60%
<ul style="list-style-type: none"> ○ Tests (including quarter exam) 35 – 60% ○ Quizzes 0 – 25% 	
2. Semester Final Exam	10%
<ul style="list-style-type: none"> ○ First semester final exam in the first semester ○ End-of-course exam in the second semester 	
3. Classwork/Activities	10 – 20%
<ul style="list-style-type: none"> ○ Notes ○ In-class assignments and activities 	
4. Activities/Performance-Based Projects	5 – 10%
<ul style="list-style-type: none"> ○ Activities are standards-based and may include: <ul style="list-style-type: none"> ● Investigations ● discovery activities ● cooperative group activities ● creative ways to summarize concepts learned ○ Performance-Based Projects <ul style="list-style-type: none"> ● Rigorous, standards-based activities ● may integrate <ul style="list-style-type: none"> ◆ more than one subject area ◆ real-life or a career application ◆ service learning ● can be completed individually or in a small group ● can be completed during class time and/or at home ● can include a presentation to a small group or the whole class 	
5. Homework	5 – 10%

Submitted by:	Becky Afghani
Submission Date:	October 2010
School/Office:	Math Curriculum Office
Curriculum Writing Team Members:	Barbara Dodge, Lakewood High School Enrique Esparza, Lakewood High School Chris Giovanello, Math Curriculum Office Sharon Lanaghan, Math Curriculum Office
Original Board Approval Date:	
Revised Board Approval Date:	2/15/11