Geometry
College Prep B
CURRICULUM GUIDE

Number: 313
Level: College Prep B
Revised: July, 2012
Textbook: GEOMETRY CONCEPTS AND SKILLS, McDougal Littell, 2003
Credits: 5 Credits

Midterm Exam Revised: January 2012
Final Exam Revised: June 2012

Prerequisites:

Students enrolling in this course must have successfully completed CP Algebra 1B, or if they failed Algebra 1, they must take it simultaneously with Geometry. Students who received a “D” in Algebra 1A should also schedule Geometry B.

Course Description:

This course is the second year of college preparatory level mathematics at the B level. Geometry describes the shapes we see in the world which enables us to describe our environment. It is also the student’s first serious study of the concepts of inductive and deductive reasoning, sharpening logical thinking skills. Every career uses the logical reasoning learned in geometry. Some topics covered are basic terms of geometry, angle relationships, parallel and perpendicular lines, triangles, polygons, congruency, similarity, right triangles, trigonometry, circles, area and volume, and transformations. Through a study of these areas and their applications, students should come to better understand and appreciate the role of mathematics in their lives.

Students are expected to be active participants in the learning process. The teacher will involve them in the introduction and development of material through question and class discussions. The chalkboard, overhead projector, models, collaborative group work, power point lesson presentations, and the computer program, “The Geometer’s Sketchpad,” will be used to help students visualize geometric concepts. Understanding of concepts is stressed rather than rote memorization of skills. When appropriate, students will be expected to apply the concepts they learn to new situations and problem solving. Students will be encouraged to think and communicate mathematically.

Homework will usually be given daily and is an important part of the course, providing students with the opportunity to apply skills learned in class, strengthen their understanding of the concepts and identify areas they don’t understand. It is imperative that students do their homework regularly and conscientiously. Homework will be reviewed in class and it is the student’s responsibility during that time to ask questions about problems he/she doesn’t understand, to identify specific mistakes, and to take notes on any further explanations concerning these problems. Some of the homework will be based on the sample problems done in
class and students are expected to study these examples and use them as a guide when doing their homework. Other problems will require the student to extend the concepts learned in class to new situations. Students may also be given reading assignments either to preview new material or to learn new procedures independently.

**District Policy: ACADEMIC INTEGRITY**

Pupils are expected to be honest in all of their academic work. This means that the students in this course will not engage in any of the following acts:

- Cheating on examinations or other school assignments, including but not limited to, the non-authorized use of books or notes, the use of crib sheets, copying from other students’ papers, exchanging information with other students orally, in writing, or by signals, obtaining copies of the examination illegally and other similar activities. Cheating through the use of technology to exchange information on any school assignment, examination, etc. is prohibited. Technology is defined as, but not limited to, computers, telephones, text messaging, palm pilots, calculators, cameras or any other hand held device.
- Plagiarism is not permitted in term papers, themes, essays, reports, images, take-home examinations, and other academic work. Plagiarism is defined as stealing or use without acknowledgment of the ideas, words, formulas, textual materials, on-line services, computer programs, etc. of another person, or in any way presenting the work of another person as one’s own.
- Falsifications, including forging signatures, altering answers after they have been graded, inserting answers after the fact, erasing of grader’s markings, and other acts that allow for falsely taking credit.

A pupil found guilty of academic dishonesty may be subjected to a full range of penalties including, but not limited to reprimand and loss of credit for all of the work that is plagiarized. Disciplinary action may also be a consequence of such behavior. Additional consequences may apply as defined in specific department policies and guidelines.

A teacher who believes that a pupil has been academically dishonest in his/her class should resolve the matter in the following manner:
- Reprimand the student orally and/or in writing. The teacher is also authorized to withhold credit in the work due to academic dishonesty.
- If warranted, the teacher shall file a written complaint against the student with the Administration, requesting a more stringent form of discipline. The complaint must describe in detail the academic dishonesty that is alleged to have taken place, and must request that the matter be reviewed by the Administration.
- The Administration will determine if further discipline of the pupil is appropriate, and will determine the nature of the discipline on a case-by-case basis.
- If the pupil is not in agreement with the disciplinary action of the Administration, he/she may appeal the action first to the Principal and secondly to the Superintendent. If
the pupil is dissatisfied with the Superintendent’s disposition of the case, he/she may grieve the action in accordance with Policy No. 5710, Pupil Grievance.

**District Policy: Equal Opportunity**

High Point Regional High School’s curriculum and instruction are aligned to the **Common Core State Standards** and address the elimination of discrimination by narrowing the achievement gap, by providing equity in educational programs and by providing opportunities for students to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, religion, disability or socio-economic status.

**COMMON CORE STATE STANDARDS – HIGH SCHOOL GEOMETRY**

An understanding of the attributes and relationships of geometric objects can be applied in diverse contexts—interpreting a schematic drawing, estimating the amount of wood needed to frame a sloping roof, rendering computer graphics, or designing a sewing pattern for the most efficient use of material.

Although there are many types of geometry, school mathematics is devoted primarily to plane Euclidean geometry, studied both synthetically (without coordinates) and analytically (with coordinates). Euclidean geometry is characterized most importantly by the Parallel Postulate, that through a point not on a given line there is exactly one parallel line. (Spherical geometry, in contrast, has no parallel lines.)

During high school, students begin to formalize their geometry experiences from elementary and middle school, using more precise definitions and developing careful proofs. Later in college some students develop Euclidean and other geometries carefully from a small set of axioms.

The concepts of congruence, similarity, and symmetry can be understood from the perspective of geometric transformation. Fundamental are the rigid motions: translations, rotations, reflections, and combinations of these, all of which are here assumed to preserve distance and angles (and therefore shapes generally). Reflections and rotations each explain a particular type of symmetry, and the symmetries of an object offer insight into its attributes—as when the reflective symmetry of an isosceles triangle assures that its base angles are congruent.

In the approach taken here, two geometric figures are defined to be congruent if there is a sequence of rigid motions that carries one onto the other. This is the principle of superposition. For triangles, congruence means the equality of all corresponding pairs of sides and all corresponding pairs of angles. During the middle grades, through experiences drawing triangles from given conditions, students notice ways to specify enough measures in a triangle to ensure that all triangles drawn with those measures are
congruent. Once these triangle congruence criteria (ASA, SAS, and SSS) are established using rigid motions, they can be used to prove theorems about triangles, quadrilaterals, and other geometric figures.

Similarity transformations (rigid motions followed by dilations) define similarity in the same way that rigid motions define congruence, thereby formalizing the similarity ideas of "same shape" and "scale factor" developed in the middle grades. These transformations lead to the criterion for triangle similarity that two pairs of corresponding angles are congruent.

The definitions of sine, cosine, and tangent for acute angles are founded on right triangles and similarity, and, with the Pythagorean Theorem, are fundamental in many real-world and theoretical situations. The Pythagorean Theorem is generalized to non right triangles by the Law of Cosines. Together, the Laws of Sines and Cosines embody the triangle congruence criteria for the cases where three pieces of information suffice to completely solve a triangle. Furthermore, these laws yield two possible solutions in the ambiguous case, illustrating that Side-Side-Angle is not a congruence criterion.

Analytic geometry connects algebra and geometry, resulting in powerful methods of analysis and problem solving. Just as the number line associates numbers with locations in one dimension, a pair of perpendicular axes associates pairs of numbers with locations in two dimensions. This correspondence between numerical coordinates and geometric points allows methods from algebra to be applied to geometry and vice versa. The solution set of an equation becomes a geometric curve, making visualization a tool for doing and understanding algebra. Geometric shapes can be described by equations, making algebraic manipulation into a tool for geometric understanding, modeling, and proof. Geometric transformations of the graphs of equations correspond to algebraic changes in their equations.

Dynamic geometry environments provide students with experimental and modeling tools that allow them to investigate geometric phenomena in much the same way as computer algebra systems allow them to experiment with algebraic phenomena.

Connections to Equations. The correspondence between numerical coordinates and geometric points allows methods from algebra to be applied to geometry and vice versa. The solution set of an equation becomes a geometric curve, making visualization a tool for doing and understanding algebra. Geometric shapes can be described by equations, making algebraic manipulation into a tool for geometric understanding, modeling, and proof.
Geometry overview and Course Objectives

Congruence - Students will be able to:

- Experiment with transformations in the plane
- Understand congruence in terms of rigid motions
- Prove geometric theorems
- Make geometric constructions

Similarity, Right Triangles, and Trigonometry – Students will be able to:

- Understand similarity in terms of similarity transformations
- Prove theorems involving similarity
- Define trigonometric ratios and solve problems involving right triangles
- Apply trigonometry to general triangles

Circles – Students will be able to:

- Understand and apply theorems about circles
- Find arc lengths and areas of sectors of circles

Expressing Geometric Properties with Equations – Students will be able to:

- Translate between the geometric description and the equation for a conic section
- Use coordinates to prove simple geometric theorems algebraically

Geometric Measurement and Dimension - Students will be able to:

- Explain volume formulas and use them to solve problems
- Visualize relationships between two-dimensional and three-dimensional objects

Modeling with Geometry – Students will be able to:

- apply geometric concepts in modeling situations
Mathematical Practices – Students will be able to:

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.

Congruence G.CO

Experiment with transformations in the plane

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.

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).

3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

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. Understand congruence in terms of rigid motions

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.

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.
8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. Prove geometric theorems.

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.

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.

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. 

Make geometric constructions

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.

13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

**Similarity, right triangles, and trigonometry G.SRT**

**Understand similarity in terms of similarity transformations**

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.
   b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

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.

3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
Prove theorems involving similarity

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.

5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. Define trigonometric ratios and solve problems involving right triangles.

6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

7. Explain and use the relationship between the sine and cosine of complementary angles.

8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Apply trigonometry to general triangles

9. Derive the formula $A = \frac{1}{2} ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.

10. Prove the Laws of Sines and Cosines and use them to solve problems.

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).

Circles G.C

Understand and apply theorems about circles

1. Prove that all circles are similar.

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.

3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

4. Construct a tangent line from a point outside a given circle to the circle.
Find arc lengths and areas of sectors of circles

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.

Expressing Geometric Properties with Equations G.GPE

Translate between the geometric description and the equation for a conic section

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.

2. Derive the equation of a parabola given a focus and directrix.

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).

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).

6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

Geometric Measurement and Dimension G.GMD

Explain volume formulas and use them to solve problems

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.

2. Give an informal argument using Cavalieri’s principle for the formulas for the volume of a sphere and other solid figures.

3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
Visualize relationships between two-dimensional and three-dimensional objects

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.

Modeling with Geometry G.MG

Apply geometric concepts in modeling situations

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).

2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

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).

Student Evaluation:

A major test will be given at mid-chapter and at the completion of each chapter of the textbook; quizzes will be given at least once a week. An exam covering the semester’s work will be given at the end of each semester. Small projects, lab work, group activities and class participation will also be used to evaluate the student’s understanding of concepts.

Homework will be checked daily. It will usually not be graded, but will be considered satisfactory if the work shown indicates the student has made a conscientious effort to complete the assignment. If a student did not understand the work and was not able to complete an assignment, he/she may be asked to redo the assignment for credit.

Grades will be calculated according to the school grading policy. The following guidelines will apply:

A. Marking Period Grade

   1. Tests and Quizzes (includes projects, notebook, lab work, etc) 80%
   2. Homework, class participation 20%

B. Final Grade

   1. Each Marking Period 20%
   2. Midterm Exam 10%
   3. Final Exam 10%

July, 2012, CP Geometry B, p 10
Notes to the Teacher

The course is based on the textbook. However, in some units material is added to the textbook or deleted. Therefore, the teacher should use the proficiencies as a guide for the course. At the end of each unit the appropriate textbook chapter is listed. For each unit there are also extensive supplementary materials from which the teacher should select appropriate activities for their class. These materials include:

1. Chapter Resource Books for each unit which includes parent letter, three levels of practice worksheets, reteach, challenge, problem solving, reading strategies and answers pages.
2. Alternate Openers: Explorations Transparencies
3. Homework and Practice Teacher's Guide
4. Know-It Notebook Teacher's Guide (to correspond with the Know-It Notebook for students)
5. Lesson Transparencies and Countdown to Testing Transparencies
6. Problem Solving Workbook Teacher's Guide
7. Solutions Key
8. Assessment Resources
9. Practice SAT Worksheets

We will also be using the Geometer’s Sketchpad. Sample activities can be found in the book, Exploring Geometry with the Geometer’s Sketchpad.

Cooperative learning groups, problem solving, communicating mathematics and discovery should be used on a regular basis. The resources above provide sample activities. The textbook has many suggestions for these types of activities to be incorporated into the classroom.

SAT type questions should be used on a regular basis throughout the year.

Scientific calculators are required. Correct methods of using calculators should be discussed emphasizing number sense and estimation so the student can recognize calculator error. However, the emphasis remains on the process, not the answer. Thus, students should be required to show work, indicating the operations they performed with their calculators.
Unit 1: Basics of Geometry

Goals: Students will be able to identify, classify and measure where applicable, points, lines, planes, line segments and angles.

Objectives: Students will be able to:

1. Identify patterns and use them to make predictions.
2. Use inductive reasoning to make conjectures; combine inductive reasoning with visual thinking skills.
3. Demonstrate an understanding of counterexamples and their use.
4. Demonstrate an understanding of the terminology and notation for points, segments, lines, rays, angles, planes and congruence.
5. Demonstrate an understanding of postulates and theorems and their use in justifying statements.
6. Sketch simple figures and their intersections.
7. Measure and add segments and angles, classify angles as acute, right, obtuse or straight.
8. Use The Geometer’s Sketchpad to investigate and discover geometric properties.
9. Visualize the surfaces of a 3-dimensional object that are not visible in a 2-dimensional drawing.

COMMON CORE STATE STANDARDS:

G.CO.1, G.GPE.6, G.GPE.7

Resources:

1. Textbook. Chapter 1
2. Warm Up Transparencies and Homework Quiz transparencies
3. Visualize It!Transparencies: pages 1-5
4. Chapter 1 Resource Book
5. Exploring Geometry with the Geometer’s Sketchpad, pp 3-9, 7-9
6. Uniflex cubes for objective 9
Unit 2: Segments and Angles

Goals: Students will be able to identify and analyze special angles and segments and begin to justify mathematical statements.

Objectives: Students will be able to:

1. Bisect segments and angles; find the coordinates of the midpoint of a segment and use this to determine geometric properties.
2. Write and demonstrate an understanding of the definitions of segment bisector, angle bisector, complementary angles, supplementary angles, adjacent angles, vertical angles and linear pair of angles.
3. Use algebra to determine the measures of angles in angle pair relationship.
5. Recognize and determine the truth value of related conditional statements (inverse, converse, contrapositive and negation).
6. Write a conditional statement whose converse is also true, and, thus, to write a definition.
7. Write justifications for steps in determining or verifying geometric properties using properties of equality and congruence, postulates and theorems.
8. Use geometry tools to perform constructions.
9. Begin doing simple 2-column and paragraph proofs.

COMMON CORE STATE STANDARDS:

G.CO.1, G.CO.9, C.GO.12

Resources:

1. Textbook. Chapter 2
2. *Warm Up Transparencies and Homework Quiz* transparencies
3. *Visualize It!*Transparencies: pages 6-10
4. Chapter 2, Resource Book
5. Exploring Geometry with the Geometer’s Sketchpad, pp 15 – 16, 13, 14
6. Proof worksheets.
Unit 3: Parallel and Perpendicular Lines

Goals: Students will be able to identify relationships formed between the angles form by two lines cut by a transversal, use the properties of parallel and perpendicular lines to find angle measures, and determine if two lines are parallel.

Objectives: Students will be able to:

1. Identify relationships between lines in a plane, and planes in space.
2. Understand and apply theorems about perpendicular and parallel lines, coplanar and non coplanar.
3. Identify corresponding, alternate interior, alternate exterior and same side angles and the relationship between the angle pairs.
4. Use algebra to calculate the measures of angle pair relationships involving parallel lines, transversals and perpendicular lines.
5. Identify and apply the converse of biconditional statements.
6. Prove and apply theorems about perpendicular lines.
7. Use coordinate geometry to determine whether two lines are parallel or perpendicular using slope and the equation of a line (y = mx + b).
8. Apply these concepts to solving real life problems.
9. Do simple proofs involving angle relationships.

COMMON CORE STATE STANDARDS:

G.CO.1, G.CO.9, G.CO.10, G.CPE.5, G.MG.3

Resources:

1. Textbook. Chapter 3
2. Warm Up Transparencies and Homework Quiz transparencies
3. Visualize It! Transparencies: pages 11-14
4. Know-It-Notebook
5. Chapter 3, Resource Book
6. Exploring Geometry with the Geometer’s Sketchpad, pp 17 – 18
Unit 4: Triangle Relationships

Goals: Students will be able to classify triangles, use several theorems related to triangles, and discover the relationship between special segments in a triangle and their points of concurrency.

Objectives: Students will be able to:

1. Classify triangle according to angle and side measures, and use classified triangles to determine angle and side measures.
2. Find the measures of and apply theorems about interior and exterior angles of a triangle.
3. Use properties of isosceles and equilateral triangles.
4. Identify the special segments in a triangle and apply their properties (medians, angle bisector, perpendicular bisector, and altitudes).
5. Describe the relationship between the measures of the sides and angles of a triangle.
6. Use the triangle inequality theorems to determine the shortest and longest sides, or the smallest and largest angles in a triangle.
7. Explain and use the properties of midsegments of a triangle.
8. Apply these concepts to solving real life problems.

COMMON CORE STATE STANDARDS:

G.CO.9, G.CO.10, G.CO.12, G.SRT.5

Resources:

1. Textbook. Chapter 4
2. Warm Up Transparencies and Homework Quiz transparencies
3. Visualize It!Transparencies: pages 17-20
4. Know-It-Notebook
5. Chapter 4, Resource Book
6. Exploring Geometry with the Geometer’s Sketchpad, pp 63 – 68
Unit 5: Congruent Triangles

Goals: Students will be able to identify congruent triangles using congruence shortcuts, and use angle bisectors and perpendicular bisectors.

Objectives: Students will be able to:

1. Identify congruent triangles and corresponding parts, use the notation for congruence.
2. Use SSS, SAS, ASA, AAS, and HL to determine whether triangles are congruent.
3. Do simple proofs involving congruent triangles and corresponding parts using postulates and theorems.
4. Understand and use the properties of angle bisectors and perpendicular bisectors.
5. Recognize and apply the inequality relationships between angles and segments in one and two triangles.
6. Find the distance from a point to a line.
7. Use the properties of congruent figures in practical applications.

COMMON CORE STATE STANDARDS:

G.CO.7, G.CO.10, G.SRT.5

Resources:

1. Textbook. Chapter 5
2. Warm Up Transparencies and Homework Quiz transparencies
3. Visualize It! Transparencies: pages 21-24
4. Know-It-Notebook
5. Chapter 5, Resource Book
6. Exploring Geometry with the Geometer’s Sketchpad, pp 68
Unit 6: Polygons

Goals: Students will be able to classify polygons, identify the special quadrilaterals and use their properties.

Objectives: Students will be able to:

1. Classify polygons according to angle and side measurement.
2. Determine the angle measures of any quadrilateral.
3. Prove and apply properties of parallelograms, rectangles, rhombuses and squares and use these properties to solve problems.
4. Prove that a quadrilateral is a parallelogram, rectangle, rhombus or a square.
5. Identify and use the properties of kites and isosceles trapezoids to solve problems.
6. Use coordinate geometry to classify polygons.

COMMON CORE STATE STANDARDS:

G.CO.11, G.SRT.5, G.CPE.4, G.CPE.7

Resources:

1. Textbook. Chapter 6
2. *Warm Up Transparencies and Homework Quiz* transparencies
3. *Visualize It! Transparencies*: pages 26-30
4. Know-It-Notebook
5. Chapter 6, Resource Book
7. Supplementary proof worksheets as needed
Goals: Students will be able to use ratio and proportion, identify similar triangles and use their properties.

Objectives: Students will be able to:

1. Use ratios and proportions to represent quantities, find equivalent ratios and solve real life problems.
2. Apply the properties of similar triangles to solve problems.
3. Use the AA Similarity Postulate, and the SSS and SAS Similarity Theorems to determine whether two triangles are similar.
4. Identify the relationship between corresponding parts of similar triangles and use this to solve problems.
6. Use proofs of similar triangles to find segment lengths.
7. Apply proportionality and triangle angle bisector theorem.
8. Identify the relationship between similarity ratio, perimeter ratio and area ratio in similar polygons to solve problems.

New Jersey Common Core State Standards

G.SRT.4, G.SRT.5, G.GPE.5

Resources:

1. Textbook. Chapter 7
2. Warm Up Transparencies and Homework Quiz transparencies
3. Visualize It!Transparencies: pages 31-35
4. Know-It-Notebook
5. Chapter 7, Resource Book
Unit 8: Transformations

Goals: Students will be able to identify the rule for transformations in the coordinate plane, identify the properties of congruence and similarity transformations.

Objectives: Students will be able to:

1. Describe the congruence transformations.
2. Identify and draw reflections, translations and rotations and state their properties.
3. Identify the properties of and draw compositions of transformations.
4. Apply theorems about isometries.
5. Identify and draw compositions of transformations such as glide reflections.
6. Identify translations as composition of reflections over parallel lines, and rotations as a composition of reflections over intersecting lines.
7. Use coordinate notation to describe transformations.
8. Identify and draw dilations and state their properties.

COMMON CORE STATE STANDARDS:

G.CO.2, G.CO.3, G.CO.4, G.CO.5, G.CO.6, G.CO.7, G.CO.8, G.SRT.1, G.SRT.1a, G.SRT.1b, G.SRT.2, G.SRT.3

Resources:

2. Supplementary worksheets.
Goals: Students will be able to determine the measures of interior and exterior angles of polygons, and derive and use the formulas for the areas of several different polygons and circles.

Objectives: Students will be able to:

1. Classify polygons as convex, concave, equilateral, equiangular or regular.
2. Determine the measures of the interior and exterior angles of polygons.
3. Develop and apply the formulas for the area and circumference of circles.
4. Develop and apply the formulas for the area of squares, rectangles, triangles, parallelograms, and trapezoids.
5. Explain the relationship between the perimeters and areas of similar polygons and apply it to solving problems.
6. Derive and use the formula for the area of a circle; understand and apply the formula for circumference.
7. Explain and apply the formula for finding the area of a sector of a circle.
8. Calculate geometric probabilities and use them to make predictions in real world situations.

COMMON CORE STATE STANDARDS:

G.CO.1, S.CP.6, G.C.5, G.MG.1

Resources:

1. Textbook. Chapter 8
2. *Warm Up Transparencies and Homework Quiz* transparencies
3. *Visualize It!/Transparencies*: pages 36-40
4. Know-It-Notebook
5. Chapter 8, Resource Book
6. Supplementary material on geometric probability
Goals: Students will be able to identify and name solid figures, and find the surface area and volume of prisms, cylinders, pyramids, cones, and spheres.

Objectives: Students will be able to:

1. Use the vocabulary associated with polyhedra (edge, face, and vertex) and classify polyhedra.
2. Use nets and cross sections to analyze three dimensional figures.
3. Draw and recognize three dimensional figures from given representations.
4. Explain what is meant by the terms surface area, lateral face, lateral area, height and slant height.
5. Understand and apply the formula for the surface areas of prisms, cylinders, pyramids and cones.
6. Understand and apply the formulas for the volumes of prisms, cylinders, pyramids and cones.
7. Understand and apply the formulas for the surface area and volume of spheres.
8. Apply the three dimensional formulas to solve complex problems and real life applications.
9. Introduce and apply Euler’s Theorem (F + V = E + 2)
10. Introduce and apply Cavalieri’s Principle: “If 2 space figures have the same height and the same cross sectional area at every level, then they have the same volume.”

COMMON CORE STATE STANDARDS:

G.GMD.1, G.GMD.2, G.GMD.3, G.GMD.4, G.MG.1, G.MG.2

Resources:

1. Textbook. Chapter 9
2. Warm Up Transparencies and Homework Quiz transparencies
3. Visualize It!Transparencies: pages 41-45
4. Know-It-Notebook
5. Chapter 9, Resource Book
Goals: Students will be able to identify the relationships in special right triangles and understand and use three basic trigonometric ratios.

Objectives: Students will be able to:

1. Use the terms involved with radicals and simplify square roots.
2. Understand and use the side relationships in 45°- 45° - 90° and 30° - 60° - 90° triangle.
3. Find the sine, cosine and tangent ratios of an angle given the side lengths of a right triangle.
4. Use trigonometric ratios to find side and angle measures in a right triangle, and solve real life problems.
5. Solve problems involving angles of elevation and depression.

COMMON CORE STATE STANDARDS:

G.SRT.4, G.SRT.7, G.SRT.8, G.SRT.10, G.SRT.11, G.MG.1

Resources:

1. Textbook. Chapter 10
2. *Warm Up Transparencies and Homework Quiz* transparencies
3. *Visualize It!Transparencies*: pages 46-50
4. Know-It-Notebook
5. Chapter 8, Resource Book
Goals: Students will be able to identify and use the properties of segments and angles in a circle, and identify and use rotations in a plane.

Objectives: Students will be able to:

1. Define a circle and use the related vocabulary: radius, diameter, center, congruent circles, concentric circles, chord, secant, tangent, inscribed angle, central angle, semicircle, arc, minor arc, and major arc.
2. Describe and apply the properties of chords and tangents to a circle.
3. Find the areas of sectors, and length of arcs.
4. Describe and apply the relationships of an inscribed angle and its intercepted arc.
5. Describe the measures of the angles of a quadrilateral inscribed in a circle.
6. Write equations of circles in the coordinate plane.
7. Write the equation of a parabola using focus and directrix.

COMMON CORE STATE STANDARDS:

G.C.2, G.C.3, G.C.4, G.GPE.1, G.GPE.2

Resources:

1. Textbook. Chapter 11,
2. Warm Up Transparencies and Homework Quiz transparencies
3. Visualize It! Transparencies: pages 51-54
4. Know-It-Notebook
5. Chapter 11, Resource Book
6. Exploring Geometry with the Geometer’s Sketchpad, pp 119 - 130
7. Supplementary worksheet for Objective 8.