

GEOMETRY CP B CURRICULUM GUIDE

NUMBER: 313
LEVEL; College Prep. B
TEXTBOOK: GEOMETRY CONCEPTS and SKILLS, McDougal Littell, 2003
CREDITS: 5 Credits
REVISED: August 2008

Midterm Exam Revised: January 2008

Final Exam Revised: June 2008

PREREQUISITE

Students must have successfully completed Algebra 1 at a modified level or, if they failed Algebra 1, they must take it simultaneously with Geometry. Students who received a “D” in Academic Algebra 1 should also schedule Geometry Modified instead of Geometry Academic.

COURSE DESCRIPTION

This course is the second year of the modified level mathematics sequence. Algebra 1 and Geometry satisfy the minimal requirements for college and form the basis for the questions on the SAT. This course is correlated to the Core Curriculum Content Standards and the HSPA proficiencies.

Topics covered in Geometry Modified are the basic terms of geometry, inductive and deductive reasoning, angle relationships, parallel and perpendicular lines, polygons, circles, congruent and similar figures, right triangles, trigonometry, area and volume, transformations and the application of these concepts. HSPA practice problems will be integrated throughout the course.

The computer program, *The Geometer's Sketchpad*, will be used throughout the course, as students make and test geometric conjectures. The emphasis is on the process of problem solving, understanding and applying the concepts, not on formal proofs, although basic justification of the reasons why conjectures are true will be included.

Students are to be active participants in the learning process, learning by doing. An informal discovery approach will frequently be used whereby students work with a computer program and the tools of geometry to discover geometric properties by experimentation and observation. Cooperative learning, which encourages interaction and communication, will also be used throughout the course.

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: Discrimination

High Point Regional High School's curriculum and instruction are aligned to the State's Core Curriculum Content 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-economical status.

Course Objectives

Students will be able to:

1. Sketch points, lines, planes and their intersections; measure segment lengths, measure and classify angles.
2. Identify the relationships between the angles formed by two lines and a transversal; use properties of parallel and perpendicular lines.
3. Classify triangles by angles and sides; identify the properties of angles and segments in relation to triangles.
4. Identify corresponding parts of congruent triangles and understand the conditions and shortcuts for showing triangles are congruent; use angle bisectors and perpendicular bisectors to compute measures involving triangles.
5. Identify special quadrilaterals and use their respective properties to calculate measurements.
6. Identify and show polygons are similar; use ratio and solve proportions in relation to similar figures.
7. Use the Pythagorean Theorem.
8. Find the areas of different figures and understand how the formulas can be derived.
9. Identify and name solid figures and find their surface area and volume.
10. Find and use trigonometric ratios in right triangles and real life applications; solve a right triangle.
11. Identify parts of a circle, and understand the properties and relationships of angles and segments connected to a circle.
12. Identify and perform transformations on figures in plane and coordinate geometry; identify line and rotational symmetry in figures; identify and construct tessellations in a plane.
13. Identify fractals and understand some of their properties.
14. Visualize objects in 2 and 3 dimensions.

COURSE POLICIES

Homework will usually be assigned daily and is an important part of the course, providing students with the opportunity to apply skills learned in class, strengthen conceptual understanding, and identify areas of weakness. It is *imperative* that students do homework regularly and conscientiously. Assignments will be reviewed in class and it is the student's responsibility during that time to ask questions about problems he/she may not understand, to identify specific mistakes, and to take notes on any further explanations concerning these problems. Students will be responsible to

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make up any missed class work (tests, quizzes, homework) in a timely manner and according to teacher established policies, which will be discussed in class. It is the student's responsibility to obtain materials (notes, homework) for any extended absence

and meet with the teacher upon return to class.

Students are expected to bring their textbook, homework, and a pen/pencil to class. They are expected to take notes during class and to keep these notes along with homework, quizzes, and tests, in an organized manner.

STUDENT EVALUATION

Quizzes, based on the course proficiencies, will be given about once a week, with a major test, based on the proficiencies, given at the end of each unit. An exam covering the semester's work will be given at the end of the semester.

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. Sometimes an assignment given for homework may be collected and graded as a quiz. This will occur only when the concepts have been thoroughly reviewed. Class work/group work may also be graded. Projects and other forms of alternate assessment will also be assigned and graded throughout the year.

Grades will be calculated according to the school grading policy and the following guidelines:

A. Marking Period

- | | |
|----------------------------|----------|
| 1. Tests and Quizzes | 70 – 80% |
| 2. Homework and class work | 20 – 30% |
- (Each teacher will explain his/her policy to the class)

B. Final Grade

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

NOTES TO THE TEACHER

The proficiencies, not the textbook, are to be used as a guide for this course. Teachers must develop materials for topics not covered in the textbook. At the end of each unit a list of resources and activities are given. The textbook is a major resource and will be listed first. For each unit there are also extensive supplementary materials from which the teacher should select appropriate activities for their class. Resources listing pages from the book, **Exploring Geometry with the Geometer's Sketchpad**, will appear at the end of each unit and coordinate with the proficiencies. The computer should be used on a regular basis.

These materials include:

1. **Resource Books** for each unit which include: "Tips for New Teachers", "Parent

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Guide for Student Success”, “Strategies for Reading Mathematics,” “Warm-Up Exercises and Daily Homework Quiz,” Technology Activities, Practice, Reteaching, and “Quick Catch Up for Absent Students.

2. **Warm Up Transparencies and Daily Homework Quiz Book**
3. **Visualize It! Transparencies**
4. **Practice Workbook with Examples**
5. **Interactive Review Games CD ROM**
6. **Electronic Teacher Tools, and Test and Practice Generator CD ROM**
7. On-line resources at www.classzone.com both for teachers and students (access code for teachers: **MCD2WZXLQ24HY**)
8. **Understanding MATH Program:** worksheets are available online at www.neufeldmath.com
9. **HSPA Resource Book**
10. **Exploring Geometry with the Geometer’s Sketchpad (Version 4)**

Cooperative learning groups and discovering Geometric concepts and properties are an integral part of this course. Activities which promote discovery should be chosen from the textbook and other supplementary sources. The teacher should take time to discuss with the class appropriate behavior for group activities and develop methods to evaluate group activities. Projects as additional and alternative methods of assessment should be used throughout the year.

Communicating mathematics needs to be stressed. Open-ended questions should be asked frequently in class and students should be asked to give written explanations to support their answers.

The **HSPA Departmental Resource Book** noted in the list of resources contains practice worksheets which should be used at the teacher’s discretion. The worksheets listed in the resources are enrichment worksheets, which extend the concepts and include HSPA activities. These must be included in the course. If time constraints make it impossible to include all these activities, teachers should jointly decide which ones to omit.

Testing should reflect the emphasis on problem solving, open ended questions, written explanations, patterns and discovery.

New Jersey Core Curriculum Content Standards for Mathematics – High School

STANDARD 4.2 (Geometry and Measurement)

All students will develop spatial sense and the ability to use Geometric properties, relationships, and measurement to model, describe and analyze phenomenon.

STANDARD 4.3 (Patterns and Algebra)

All students will represent and analyze relationships among variable quantities and solve problems involving patterns, functions, and algebraic concepts and processes.

STANDARD 4.4 (Data Analysis, Probability, and Discrete Mathematics)

All students will develop an understanding of the concepts and techniques of data analysis, probability, and discrete mathematics, and will use them to model situations, solve problems, and analyze and draw appropriate inferences from data.

STANDARD 4.5 (Mathematical Processes)

All students will use mathematical processes of problem solving, communication, connections, reasoning, representations, and technology to solve problems and communicate mathematical ideas.

COURSE PROFICIENCIES

Unit 1: Basics of Geometry

14 Days

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

Objectives: Students will be able to:

1. Demonstrate appropriate behavior for cooperative learning groups.
2. Find patterns and use them to make predictions.
3. Use inductive reasoning to make conjectures; combine inductive reasoning with visual thinking skills.
4. Demonstrate an understanding of counterexamples and their use.
5. Demonstrate an understanding of the terminology and notation for points, segment, lines, rays, angles, planes and congruence.
6. Demonstrate an understanding of postulates and their use in justifying statements about geometric figures.
7. Sketch simple figures and their intersections.
8. Use a protractor, compass and straightedge.
9. Measure and add segments and angles; classify angles as acute, right, obtuse or straight.
10. Use *The Geometer's Sketchpad* to investigate and discover geometric properties.
11. Recognize and analyze patterns produced by iterations, recursions, and fractals.

New Jersey Core Curriculum Content Standards (CCCS)

4.2.A.1, 3; 4.2.B.4; 4.2.C.1; 4.2.D. 2; 4.5.A.1 – 5; 4.5.E. 1 – 3; 4.5.F.5.

References:

1. Textbook, Chapter 1.
2. *Warm Up Transparencies and Homework Quiz* transparencies.
3. *Visualize It! Transparencies*: pages 1 - 5
4. *Chapter 1 Resource Book*: “Strategies for Reading Mathematics,” p.5,6; Real Life Applications: “Number Theory” p. 15; “Astronomical Units” p.52; “Project: Creating a Border Pattern” p. 73; Chapter Review Games and Activities, p. 65.
5. *Interactive Review Games* “Deep Sea Diving”
6. *Exploring Geometry with The Geometer's Sketchpad*: “Introducing Points, Segments, Rays, and Lines” p. 3 – 6; “Introducing Angles” p.7 – 9
7. Fractals: Internet Fractals Activity; NCTM Fractals for the Classroom; worksheets attached; <http://math.rice.edu/~lanius/fractals/>; HSPA fractals worksheet.
8. *Understanding Math* Program: “An Introduction to Measurement”, “Angles and Their Measure”
9. In this unit the student's are introduced to the computer program, *The Geometer's Sketchpad*. Students should work in small groups (2 – 4 students at the computer so that they all become familiar with the program.

Unit 2: Segments and Angles

14 Days

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 relationships.
4. Recognize and use conditional and bi-conditional statements and basic laws of logic.
5. Demonstrate an understanding of theorems and how they are used.
6. Write justifications for steps in determining or verifying geometric properties, using properties of equality and congruence, postulates and theorems.
7. Apply these concepts to solving real life problems.
8. Determine whether a network is an Euler Path or Circuit.
9. Use networks to describe topological problems.

CCCS: 4.2.A.1, 4; 4.2.C.1; 4.4.D.1, 2; 4.5. A.1, 2, 3; 4.5. B.1 – 4; 4.5.C.1, 3; 4.5.D.1 – 6; 4.5.E.1; 4.5.F.5.

References:

1. Textbook, Chapter 2.
2. *Warm Up Transparencies and Homework Quiz* transparencies.
3. *Visualize It! Transparencies*; pages 6 - 10
4. *Chapter 2 Resource Book*: “Strategies for Reading Mathematics,” p.5,6; “Learning Activity” p. 15; Real Life Applications: “Billiards” p. 25; “Wallpaper Border” p.35; “Brain Games Support: Logic Puzzle” p. 65; Chapter Review Games and Activities, p. 66.
5. *Geometry in Motion Video*: Lesson 2.4: Linear Pair Postulate and Vertical Angles Theorem.
6. *Interactive Review Games* “Bike Racer”
7. *Exploring Geometry with The Geometer’s Sketchpad*: “Angles formed by Intersecting Lines” p. 15 – 16; “Duplicating a Line Segment” p. 13; “Duplicating an Angle” p. 14.
8. Networks and Topology HSPA worksheets.

Unit 3: Parallel and Perpendicular Lines

16 Days

Goals: Students will be able to identify relationships formed between the angles formed 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 interior angles and the relationship between the angle pairs.
4. Use algebra to calculate the measures of angle pair relationships involving parallel lines and transversals, and perpendicular lines.
5. Identify and apply the converse of bi-conditional statements.
6. Determine whether two lines are parallel or perpendicular using slope.
7. Apply these concepts to solving real life problems.
8. Visualize objects and relationships in two and three dimensions.

CCCS: 4.2.A.1, 2, 3, 4; 4.2.C.1; 4.5.A.1, 2, 3; 4.5.B.1, 2, 3,4; 4.5.C.3, 4; 4.5.D.1, 2, 3,4; 4.5.E.1, 2, 3; 4.5.F.5.

References:

1. Textbook, Chapter 3.
2. *Warm Up Transparencies and Homework Quiz* transparencies.
3. *Visualize It! Transparencies*: pages 11 – 14.
4. *Chapter 3 Resource Book*: “Strategies for Reading Mathematics,” p.5,6; Real Life Applications: “Nine Men’s Morris” p. 15; “Playing Pool” p.55; “Brain Games Support: Playing Cards” p. 78 -79; Chapter Review Games and Activities, p. 80; Sketchpad: p. 45, p. 48, p. 61, p. 71.
5. *Geometry in Motion Video*: Lesson 3.3: Definition of Angles formed by a Transversal; 3.4: Corresponding Angles, Alternate Interior Angles, Consecutive Interior Angles, and Alternate Exterior Angles formed by parallel lines; 3.5: Congruent Corresponding Angles form Parallel Lines.
6. *Interactive Review Games* “Flying Acrobats”
7. *Exploring Geometry with The Geometer’s SKetchpad*: “Angles Formed by Intersecting Lines” p. 15 – 16; “Properties of Parallel Lines” p.17 – 18.
8. *Understanding Math* Program: “Projective Geometry”

Unit 4: Triangle Relationships

16 Days

Goals: Students will be able to classify triangles, use several theorems related to triangles, and discover the relationship between the medians of a triangle and its centroid.

Objectives: Students will be able to:

1. Understand and use triangle classifications: equilateral, isosceles, scalene, right, acute, and obtuse.
2. Use the terminology associated with triangles.
3. Describe the properties of exterior and interior angles
4. Use the properties of isosceles and equilateral triangles.
5. Explain the Pythagorean Theorem, its converse, and its use, both in plane and coordinate geometry.
6. Identify medians, and the centroid in a triangle, and use their relationship to calculate segment lengths.
7. Describe the relationship between the measures of the sides and angles of a triangle.
8. Use the triangle inequality to determine the shortest and longest sides or the smallest and largest angles in a triangle.
9. Use algebra and theorems to calculate angle and side measures in a triangle.
10. Apply these concepts to solving real life problems.

CCCS: 4.2.A.1, 3, 4; 4.2.C.1; 4.2.E.1; 4.5.A.1, 2, 3, 4; 4.5.B.4; 4.5.C.3, 4; 4.5.D.1, 2, 3, 4, 5, 6; 4.5.F. 5.

References:

1. Textbook, Chapter 4.
2. *Warm Up Transparencies and Homework Quiz* transparencies.
3. *Visualize It! Transparencies*; pages 17 - 20
4. *Chapter 4 Resource Book*: “Strategies for Reading Mathematics,” p.5,6; “Learning Activity” p. 15; Real Life Applications: “Seychelles” p. 25; “Baseball” p. 44; Learning Activity: Applying the Distance Formula, p.43; “Brain Games Support: Logic Puzzle” p. 65; Chapter Review Games and Activities, p. 75; Sketchpad, p. 18; p. 50; p. 67,68.
5. *Geometry in Motion Video*: Lesson 4.2: Triangle Angle Sum, Exterior Angle Sum; 4.3: Base Angles and its Converse; 4.6: Centroid; 4.7 Comparing Angles in a Triangle with Unequal sides.
6. *Interactive Review Games* “Mummy Chase”
7. *Exploring Geometry with The Geometer’s Sketchpad*: “Defining Triangles p. 63,64; “Triangle Sum” p. 65; “Exterior Angles in a Triangle” p. 66; “Triangle Inequalities” p. 67; “Properties of Isosceles Triangles” p. 69; “Medians in a Triangle”, p. 71-72.

Unit 5: Congruent Triangles

16 days

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

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. Understand and do simple two column proofs.
4. Show corresponding parts of a triangle are congruent using postulates and theorems.
5. Understand and use angle bisectors and perpendicular bisectors.
6. Find the distance from a point to a line.
7. Use the properties for congruent figures in practical applications.

CCCS: 4.2.A.1, 3, 4; 4.2.B.1; 4.2.C.1; 4.5.A.1, 2, 3, 4; 4.5.B. 2,4; 4.5.D. 1, 2,3, 4, 5, 6; 4.5.F.5.

References:

1. Textbook, Chapter 5.
2. *Warm Up Transparencies and Homework Quiz* transparencies.
3. *Visualize It! Transparencies*; pages 21 – 24.
4. *Chapter 5 Resource Book*: “Strategies for Reading Mathematics,” p.5,6; Learning Activity: “Exploring Congruent Triangles,” p. 53; Real Life Applications: “Truss Bridge” p. 23; “Mirrors” p. 33; Learning Activity: Applying the Distance Formula, p.43; “Brain Games Support: Images” p. 74; Chapter Review Games and Activities, p. 75; Sketchpad, p. 38; p. 57; p. 67.
5. *Geometry in Motion Video*: Lesson 5.6: Points on Angle Bisector and Perpendicular Bisector; Points Equidistant from the Sides of an Angle and the Endpoints of a Segment.
6. *Interactive Review Games* “Triangle Factory.”
7. *Exploring Geometry with The Geometer’s Sketchpad*: “Triangle Congruence,” p. 68.

Unit 6: Polygons

14 days

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

Objectives: Students will be able to:

1. Identify and classify polygons, and use the terminology connected with polygons.
2. Determine the angle measures of any quadrilateral.
3. Describe the general properties of a parallelogram and the properties of the special parallelograms (rhombus, rectangle, and square).
4. Show that a quadrilateral is a parallelogram.
5. Describe the properties of kites and trapezoids.
6. Describe the properties of a midsegment of a trapezoid.
7. Apply the properties of the quadrilaterals to real life situations.
8. Recognize tessellations with regular polygons and describe their properties.
9. Create a tessellation.

CCCS: 4.2.A.1, 3, 4; B. 3; 4.2.C.1; 4.5.A.1, 2, 3, 4, 5; 4.5.B. 2,4; 4.5.D. 1, 2,3, 4, 5, 6; 4.5.F.5.

References:

1. Textbook, Chapter 6.
2. *Warm Up Transparencies and Homework Quiz* transparencies.
3. *Visualize It! Transparencies*; pages 26 – 30.
4. *Chapter 6 Resource Book*: “Strategies for Reading Mathematics,” p.5, 6; Learning Activity: “Exploring Congruent Triangles,” p. 53; Real Life Applications: “Quilting” p. 46; “United States of America” p. 65; Chapter Review Games and Activities, p. 67; Sketchpad, p. 28; p. 38; p. 39; p. 50; p. 59.
5. *Geometry in Motion Video*: Lesson 6.2 and 6.4: Diagonals in Parallelograms; 6.3 and 6.4: Quadrilaterals Determined by Diagonals.
6. *Interactive Review Games* “Shapes in Space.”
7. *Exploring Geometry with The Geometer’s Sketchpad*: “Defining Special Quadrilaterals,” p. 89 - 90; “Properties of Parallelograms”, p. 91; “Properties of Rectangles”, p. 93; “Properties of Rhombuses”, p. 95; “Properties of Isosceles Trapezoids”, p. 97 - 98; “Summarizing Properties of Quadrilaterals”, p.104 -105.
8. Supplementary materials on tessellations.

Unit 7: Similarity

12 days

Goals: Students will be able to use ratio and proportions, identify similar triangles, and identify and draw dilations.

Objectives: Students will be able to:

1. Use the properties ratio and proportions.
2. Use ratio and proportions to solve word problems.
3. Explain the mathematical definition of similarity; use the notation for similarity.
4. Use similar triangles to solve word problems.
5. Use the AA Similarity Postulate and the SSS and SAS Similarity Theorems to determine if figures are similar.
6. State the relationship between corresponding parts of similar triangles and use this to solve problems.
7. Use the Triangle Proportionality Theorem and its converse.
8. Explain and use the properties of a mid segment of a triangle.
9. Calculate the perimeter of polygons; understand the relationship between the perimeters of similar figures and apply it to solving problems.

CCCS: 4.2.A.1, 4; 4.2.B. 1; 4.2.E. 1; 4.5.A.1, 2, 3, 4, 5; 4.5.B. 2,4; 4.5.D. 1, 2, 3, 4, 5, 6; 4.5.F.5.

References:

1. Textbook, Chapter 7.
2. *Warm Up Transparencies and Homework Quiz* transparencies.
3. *Visualize It! Transparencies*; pages 31 – 35.
4. *Chapter 7 Resource Book*: “Strategies for Reading Mathematics,” p.5, 6; Learning Activity: “Exploring Similar Triangles,” p. 36; Brain Games Support: “Tangrams”, p. 70; Real Life Applications: ” Cooking,” p. 15; “Architecture” p. 27; Chapter Review Games and Activities, p. 71; Sketchpad, p. 19; p. 21; p. 39; p. 41; p. 43-44; p. 53; p. 63.
5. *Geometry in Motion Video*: Lesson 7.5, Mid segment of a Triangle
6. *Interactive Review Games* “Car Jam.”
7. *Exploring Geometry with The Geometer’s Sketchpad*: “Similar Triangles – AA Similarity,” p. 170; “Similar Triangles – SSS, SAS, SSA,” P. 171; “Finding the Width of a River,” p. 174 –175. “Finding the Height of a Tree”, p. 176 –178.

Unit 8: Transformations

8 Days

Goals: Students will recognize and be able to perform transformations.

Objectives: Students will be able to:

1. Identify and use translations.
2. Identify and use reflections and reflectional symmetry.
3. Identify and use dilations.
4. Identify and use rotations and rotational symmetry.
5. Identify and use compositions of transformations.

CCCS: 4.2B

References:

1. Discovering Geometry, pp. 373-378
- 2.

Unit 9: Polygons and Area

16 days

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 polygons and circles.

Objectives: Students will be able to:

1. Classify polygons as convex, concave, equilateral, equiangular and regular.
2. Determine the measures of the interior and exterior angles of polygons.
3. Derive and use the formulas for the area of squares, rectangles, triangles, parallelograms, and trapezoids.
4. Explain the relationship between the areas of similar figures and apply it to solving problems.
5. Derive and use the formula for the area of a circle; understand and use the formula for circumference.
6. Explain and use the formula for finding the area of a sector of a circle.
7. Find the area of complex regions.
8. Calculate geometric probability related to area.
9. Apply the formulas for area to solve real life problems.

CCCS: 4.2.A.1, 4; 4.2.D. 1, 2; 4.4.B.2; 4.5.A.1, 2, 3, 4, 5; 4.5.B. 2,4; 4.5.D. 1, 2, 3, 4, 5, 6; 4.5.F.5.

References:

1. Textbook, Chapter 8.
2. *Warm Up Transparencies and Homework Quiz* transparencies.
3. *Visualize It! Transparencies*; pages 36 - 40.
4. *Chapter 8 Resource Book*: “Strategies for Reading Mathematics,” p.5, 6; Learning Activity: “Make a Game,” p. 23; Brain Games Support: “Puzzles”, p. 76 - 77; Real Life Applications: “Bluebird Houses,” p. 65; “Meteorology” p. 74; Chapter Review Games and Activities, p. 78; Sketchpad, p. 37; p. 47; p. 49; p. 59; p. 43-44; p. 53.
5. *Geometry in Motion Video*: Lesson 8.2, Exterior Angles of a Polygon.
6. *Interactive Review Games* “Operation Clean Beach.”
8. *Exploring Geometry with The Geometer’s Sketchpad*: “Areas of Parallelograms and Triangles”, p. 133-134; “A Triangle Area Problem”, p. 135; “Triangle Area/Perimeter”, p. 136; “A Rectangle with Maximum Area”, p. 140-141; “Area of a Trapezoid”, p. 142 – 143; “The Circumference/Diameter Ratio,” p. 127 – 128.
7. Supplementary material on geometric probability.

Unit 10: Surface Area and Volume

12 days

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. Sketch three dimensional figures and identify the figure formed by a plane figure rotated on an axis.
3. Explain what is meant by the terms surface area, lateral face, lateral area and find the surface area of prisms and cylinders.
4. Demonstrate an understanding of the terms height and slant height and find the surface area of pyramids and cones.
5. Describe the units of measure involved in finding volume and find the volume of different three dimensional figures.
6. Find the surface area and volume of spheres.
7. Understand the relationship between the volumes of similar figures and apply it to solving problems.
8. Apply the formulas for surface area and volume to solve real life problems.

CCCS: 4.2.A.1, 2, 4; 4.2.B. 2; 4.2.E.2; 4.5.A.1, 2, 3, 4, 5; 4.5.B. 2,4; 4.5.C.3, 4; 4.5.D.1, 2, 4, 5, 6; 4.5.F.5.

References:

1. Textbook, Chapter 9.
2. *Warm Up Transparencies and Homework Quiz* transparencies.
3. *Visualize It! Transparencies*: pages 41 - 45.
4. *Chapter 9 Resource Book*: “Strategies for Reading Mathematics,” p.5, 6; Learning Activity: “Make a Game,” p. 23; Brain Games Support: “Volume Cards”, p. 63 - 64; Real Life Applications: ” Saint Bernard,” p. 23; “The Great Pyramid” p. 52; Chapter Review Games and Activities, p. 65. .
5. *Interactive Review Games* “Clown House.”
6. *Exploring Geometry with The Geometer’s Sketchpad*: “ Constructing Templates for the Platonic Solids,” p. 115
7. HSPA worksheets.

Unit 11: Right Triangles and Trigonometry

14 days

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 $30 - 60 - 90$ triangles.
3. Find the sine, cosine and tangent of an angle given the side lengths of a right triangle.
4. Use trig ratios to find angle and side measures.
5. Solve a right triangle.
6. Apply trigonometry and the properties of the special right triangles to solve real life problems.

CCCS: 4.2.A.3, 4; 4.2.E.1; 4.5.A.1, 2, 3, 4, 5; 4.5.B. 2,4; 4.5.C.3; 4.5.D.1, 5, 6; 4.5.F.5.

References:

1. Textbook, Chapter 10.
2. *Warm Up Transparencies and Homework Quiz* transparencies.
3. *Visualize It! Transparencies*: pages 46 - 50.
4. *Chapter 10 Resource Book*: “Strategies for Reading Mathematics,” p.5, 6; Learning Activity: “Find the Height of a Difficult to Measure Object Using Trig Ratios,” p. 54; Brain Games Support: “Bingo Questions”, p. 65 - 67; Real Life Applications: ” Modular Homes,” p. 32; “Hubble Space Telescope” p. 63; Chapter Review Games and Activities, p. 69. Sketchpad: p. 18;p. 39; p. 48.
5. *Interactive Review Games* “Frog Swamp.”
6. *Exploring Geometry with The Geometer’s Sketchpad*: “Trigonometric Ratios, p. 195.
7. HSPA worksheets.

Unit 12: Circles

14 days

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 tangents to a circle.
3. Find the length of an arc of a circle and use this to solve problems.
4. Describe and apply the properties of chords in a circle.
5. Describe and apply the relationships of an inscribed angle and its intercepted arc.
6. Describe the measures of the angles of a quadrilateral inscribed in a circle.
7. Identify and use properties of rotations and rotational symmetry.
8. Use the properties of circles in coordinate geometry.
9. Apply the properties of circles to solving real life problems.

CCCS: 4.2.A.1, 2, 4; 4.2.B. 1; 4.5.A.1, 2, 3, 4, 5; 4.5.B.1, 2, 4; 4.5.C. 2, 3; 4.5.D. 1, 5, 6; 4.5.F.5.

References:

1. Textbook, Chapter 11 (Omit Section 11.7)
2. *Warm Up Transparencies and Homework Quiz* transparencies.
3. *Visualize It! Transparencies*: pages 51 - 54.
4. *Chapter 11 Resource Book*: “Strategies for Reading Mathematics,” p.5, 6; Brain Games Support: “Circle Cards”, p. 85; Real Life Applications: ” Saturn,” p. 23; “Satellite Television” p. 32; “Ferris Wheel,” p. 83; Chapter Review Games and Activities, p. 86. Sketchpad: p. 55.
5. *Interactive Review Games* “Frog Swamp.”
6. *Exploring Geometry with The Geometer’s Sketchpad*: “Introducing Circles”, p. 119 – 120; “Chords in a Circle”, p. 121 –122; “Tangents in a Circle,” p. 123; “Tangent Segments,” p. 124; “Arcs and Angles,” p. 125 – 126;
7. HSPA worksheets.