A. DESCRIPTION

This is the traditional geometry course with emphasis on the student's understanding of the characteristics and properties of two- and three-dimensional geometry. Focus areas include problem solving using visualization, spatial reasoning, and geometric modeling, coordinate geometry, transformations, and the relationship between algebraic and geometric concepts. The pace of this course is slower than Geometry Level 1 CP, but much of the same material is covered.

B. OBJECTIVES

The student should be able to:
1. restate the definitions of the basic terms used in geometry;
2. demonstrate a few geometric constructions;
3. solve geometric problems commensurate with his/her ability by applying the appropriate formulae or techniques,
4. develop basic proofs for various geometric theorems, and
5. appreciate the cumulative structure of geometry.

C. OUTLINE
1. Inductive reasoning
   a. defining and applying the process of inductive reasoning to various types of problems [G.MG.1]
   b. picture and number patterns
   c. finding the nth term of number sequences
   d. undefined terms of points, lines, and planes [G.CO.1]
   e. sketching intersections
   f. segments and their measures
   g. angles (types) and their measures
2. Segments and Angles
   a. segment bisectors
   b. angle bisectors [G.CO.12]
   c. complementary and supplementary angles
   d. vertical angles
   e. if-then statements and deductive reasoning (intro to proofs)
   f. properties of congruence and equality

3. Parallel and Perpendicular Lines
   a. relationships between lines
   b. theorems about perpendicular lines
   c. angles formed by transversals [G.CO.9]
   d. parallel lines and transversals
   e. showing lines are parallel
   f. using perpendicular and parallel lines [G.CO.4]
   g. transformations including translations and rotations [G.CO.2]; [G.CO.3]; [G.CO.5]
4. Triangles
   a. classification of types of triangles
   b. angle measures of triangles
   c. isosceles and equilateral triangle properties [G.CO.10]
   d. Pythagorean Theorem [G.SRT.8]
      i. review of radicals
      ii. distance and midpoint formulae in the coordinate plane [G.CO.1]
      iii. derivation of Pythagorean Theorem
      iv. converse of Pythagorean Theorem
   e. medians of a triangle (centroid)
   f. triangle inequalities involving angles and sides
5. Congruence of Triangles
   a. recognizing and identifying congruent polygons [G.CO.6]
   b. postulates and theorems for proving congruence of triangles (SSS, SAS, ASA, , CPCTC) including basic proofs [G.CO.7]; [G.CO.8]
   c. angle bisectors and perpendicular bisectors (including constructions if time)
   d. reflections and symmetry [G.CO.5]
6. Quadrilaterals
   a. polygons
   b. properties of parallelograms [G.CO.11]
   c. showing quadrilaterals are parallelograms
   d. rhombus, rectangle and square properties
   e. trapezoids and their properties
   f. reasoning with special quadrilaterals
   g. creating tesselations
7. Similarity
   a. ratio and proportion
   b. similar polygons [G.SRT.2]
   c. showing triangles are similar using AA [G.SRT.3]; [G.SRT.5]
8. Areas of polygons and circles [G.GPE.7]
   a. classifying polygons
   b. interior and exterior angle sums in polygons [G.CO.10]
   c. areas of squares and rectangles
   d. areas of triangles, parallelograms and trapezoids

    e. calculating the area and circumference of a circle, and area of sectors [G.C.5]
9. Volume and Surface Area [G.GMD.1]; [G.GMD.2]; [G.GMD.3]; [G.GMD.4]
    a. Defining and recognizing three-dimensional solids (prism, cylinder, pyramid, cone, sphere)
    b. calculating volume of the prism, cylinder, pyramid, cone and sphere
    c. calculating the surface areas of prisms, cylinders, pyramids, cones and spheres
10. Right Triangles and Trigonometry
    a. simplifying square roots
    b. 45-45-90 right triangle
    c. 30-60-90 right triangle
    d. tangent ratio
    e. sine and cosine ratio [G.SRT.6]; [G.SRT.7]
    f. solving right triangles [G.SRT.8]
11. Circles [G.C.1]; [G.C.2]; [G.C.3]; [G.C.4]; [G.GPE.1]
    a. definitions: diameter, radius, central angle, minor arc, major arc, chord, segment, sector, semicircle, tangent, secant, inscribed and circumscribed triangles, common tangents, concentric circles [G.CO.1]
    b. properties of tangents
    c. arcs and central angles
    d. arcs and chords
    e. inscribed angles and polygons
    f. properties of chords
    g. equations of circles

D. TEXT

Geometry, Concepts and Skills (McDougal Littell, 2005)
ISBN 0-618-50157-6

E. SUPPLEMENTARY MATERIALS
1. Geometer's Sketchpad
2. Class notes
3. Web sites
4. Calculators
5. Geometry tools (rulers, straightedge, protractor, compass, patty paper)

Course Title: <u>Geometry – Level 2</u>   Grade: <u>10</u>

Unit: <u>Inductive Reasoning</u>

Month Presented: <u>September</u>   Unit Length (in weeks):   <u>2-3</u>

Essential Question(s):
- What is inductive reasoning?
- How do we use inductive reasoning to solve various types of problems?
- How can we use inductive reasoning to make predictions and conjectures?
- How do we measure segments and angles?
- How can you classify angles based on their angle measures?

Learning Objectives:
- Find patterns and use them to make predictions
- Use inductive reasoning to make conjectures
- Use postulates and undefined terms
- Sketch simple figures and their intersections
- Measure segments and add segment lengths
- Measure and classify angles and add angel measures

Instructional Strategies & Activities:
- Note taking
- Cooperative learning/group work
- Competitive review games

Materials Utilized:
- Textbook
- Teacher generated worksheets/class notes
- Geometry tools (rulers, straightedge, protractor, compass, patty paper)
- SmartBoard

Assessment Strategies:
- Daily homework
- Class participation
- Tests and quizzes

Course Title: Geometry – Level 2   Grade: 10

Unit: Segments and Angles

Month Presented: September-October   Unit Length (in weeks):   2-3

Essential Question(s):
- How do we write precise definitions for geometric terms?
- How do we calculate the midpoint of two points?
- How can you bisect an angle?
- What is the relationship between the angles formed by 2 intersecting lines?
- What is deductive reasoning?
- What is the difference between properties of congruence and equality?

Learning Objectives:
- Bisect a segment and find the coordinates of the midpoint
- Bisect angles
- Find measures of complementary and supplementary angles
- Find the measure of angles formed by intersecting lines
- Use deductive reasoning
- Use if-then statements and apply laws of logic
- Use properties of equality and congruence (intro to proofs)

Instructional Strategies & Activities:
- Note taking
- Cooperative learning/group work
- Competitive review games

Materials Utilized:
- Textbook
- Teacher generated worksheets/class notes
- Geometry tools (rulers, straightedge, protractor, compass, patty paper)
- SmartBoard

Assessment Strategies:
- Daily homework
- Class participation
- Tests and quizzes

Course Title: Geometry – Level 2   Grade: 10

Unit: Parallel and Perpendicular Lines

Month Presented: October - November   Unit Length (in weeks):   2-3

Essential Question(s):
- What are relationships between lines?
- How can we show two lines are parallel?
- Are there special relationships between angles formed by parallel lines?
- How are lines related in space?
- How is slope used to show that two lines are parallel?

Learning Objectives:
- Identify relationships between lines
- Use theorems about perpendicular lines
- Identify angles formed by transversals
- Find congruent/supplementary angles formed by transversals cutting parallel lines
- Show that two lines are parallel lines
- Construct parallel and perpendicular lines
- Use properties of parallel and perpendicular lines
- Identify and use translations

Instructional Strategies & Activities:
- Note taking
- Cooperative learning/group work
- Competitive review games

Materials Utilized:
- Textbook
- Teacher generated worksheets/class notes
- Geometry tools (rulers, straightedge, protractor, compass, patty paper)
- SmartBoard

Assessment Strategies:
- Daily homework
- Class participation
- Tests and quizzes

Course Title: Geometry – Level 2   Grade: 10

Unit: Triangles

Month Presented: November - December   Unit Length (in weeks):   2-3

Essential Question(s):
- How can we classify all of the different types of triangles?
- What is the angle sum of a triangle?
- What is the relationship among the lengths of the sides of a right triangle?
- How can we use the distance formula?
- What are the relationships between a triangle's sides and angles?

Learning Objectives:
- Classification of triangles by their sides and their angles
- The triangle sum theorem and finding the angle measures in triangles
- Use properties of isosceles and equilateral triangles
- Use the Pythagorean Theorem and the distance formula
- Use the converse of Pythagorean Theorem
- Use side lengths to classify triangles
- Identify medians in triangles and locate the centroid of a triangle
- Use triangle measurements to decide which side is longest and which angle is largest

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Instructional Strategies & Activities:
- Note taking
- Cooperative learning/group work
- Competitive review games

Materials Utilized:
- Textbook
- Teacher generated worksheets/class notes
- Geometry tools (rulers, straightedge, protractor, compass, patty paper)
- SmartBoard

Assessment Strategies:
- Daily homework
- Class participation
- Tests and quizzes

Course Title: Geometry – Level 2   Grade: 10

Unit: Congruence of Triangles

Month Presented: December - January   Unit Length (in weeks):   2-3

Essential Question(s):
- How can we identify corresponding parts in congruent polygons?
- How can we show triangles are congruent?
- Can you determine that two triangles are congruent without listing all of the corresponding congruent sides and angles?
- How do we write triangle congruence proofs?
- Is there an AA and a SSA congruence theorem?

Learning Objectives:
- Indentify congruent triangles and corresponding parts
- Showing triangles are congruent using SSS and SAS
- Showing triangles are congruent using ASA and AAS
- Using the HL congruence theorem
- Showing that corresponding parts of congruent triangles are congruent
- Use angle bisectors and perpendicular bisectors
- Identify and use reflections and lines of symmetry
- Identify rotations and rotational symmetry

Instructional Strategies & Activities:
- Note taking
- Cooperative learning/group work
- Competitive review games

Materials Utilized:
- Textbook
- Teacher generated worksheets/class notes
- Geometry tools (rulers, straightedge, protractor, compass, patty paper)
- SmartBoard

Assessment Strategies:
- Daily homework
- Class participation
- Tests and quizzes

Course Title: <u>Geometry – Level 2</u>　　　　　　　　Grade: <u>10</u>

Unit: 　　　　　<u>Quadrilaterals</u>

Month Presented: <u>January - February</u>　　　Unit Length (in weeks): <u>2-3</u>

Essential Question(s):
- How do we classify various polygons?
- What are convex and concave polygons?
- What is the interior and exterior angle sum of a polygon?
- What are the properties of special parallelograms?
- What are some properties of a midsegment of a trapezoid?

Learning Objectives:
- Identify and classify polygons
- Find angle measures of quadrilaterals
- Use properties of parallelograms
- Show that a quadrilateral is a parallelogram
- Use properties of special parallelograms
- Use properties of trapezoids

Instructional Strategies & Activities:
- Note taking
- Cooperative learning/group work
- Competitive review games

Materials Utilized:
- Textbook
- Teacher generated worksheets/class notes
- Geometry tools (rulers, straightedge, protractor, compass, patty paper)
- SmartBoard

Assessment Strategies:
- Daily homework
- Class participation
- Tests and quizzes

Course Title: <u>Geometry – Level 2</u>　　　　　　　Grade: <u>10</u>

Unit: 　　　　　<u>Similarity</u>

Month Presented: <u>February - March</u>　　　Unit Length (in weeks): <u>2-3</u>

Essential Question(s):
- What are similar polygons and how do we show two triangles are similar?
- How can we use ratios and proportions in similarity?
- What is a dilation?

Learning Objectives:
- Use ratios and proportions
- Identify similar polygons
- Show two triangles are similar using the AA Similarity Postulate
- Show that two triangles are similar using the SSS and SAS Similarity Theorems
- Use the triangle proportionality theorem and its converse
- Identify and draw dilations

Instructional Strategies & Activities:
- Note taking
- Cooperative learning/group work
- Competitive review games

Materials Utilized:
- Textbook
- Teacher generated worksheets/class notes
- Geometry tools (rulers, straightedge, protractor, compass, patty paper)
- SmartBoard

Assessment Strategies:
- Daily homework
- Class participation
- Tests and quizzes

Course Title: ___Geometry – Level 2___   Grade: ___10___

Unit: ___Polygons & Area___

Month Presented: ___March-April___   Unit Length (in weeks): ___2-3___

Essential Question(s):
- What are the measures of the interior and exterior angles of polygons?
- How do we calculate the area of various polygons?
- How do we calculate the circumference and area of a circle?

Learning Objectives:
- Classifying polygons
- Finding measures of the interior and exterior angles of different types of polygons
- Calculating the areas or squares, rectangles, triangles, parallelograms, trapezoids, circles and sectors
- Calculating the circumference of circles
- Calculating shaded areas

Instructional Strategies & Activities:
- Note taking
- Cooperative learning/group work
- Competitive review games

Materials Utilized:
- Textbook
- Teacher generated worksheets/class notes
- Geometry tools (rulers, straightedge, protractor, compass, patty paper)
- SmartBoard

Assessment Strategies:
- Daily homework
- Class participation
- Tests and quizzes

Dover-Sherborn High School
Mathematics Curriculum Road Maps
Geometry Level 2/CP

Course Title: Geometry – Level 2   Grade: 10

Unit: Volume & Surface Area

Month Presented: April - May   Unit Length (in weeks):   2-3

Essential Question(s): • What are prisms, cylinders, pyramids, cones, and spheres? • How do we calculate the volume of prisms, cylinders, pyramids, cones, and spheres? • How do we find surface area of solids? • How does the volume of a pyramid relate to the volume of a prism with the same base?
Learning Objectives: • Identify and name solid figures • Find the surface areas of prisms and cylinders • Find the surface areas of pyramids and cones • Find the volume of prisms and cylinders • Find the volumes of pyramids and cones • Find surface areas and volumes of spheres
Instructional Strategies & Activities: • Note taking • Cooperative learning/group work • Competitive review games
Materials Utilized: • Textbook • Teacher generated worksheets/class notes • Geometry tools (rulers, straightedge, protractor, compass, patty paper) • SmartBoard
Assessment Strategies: • Daily homework • Class participation • Tests and quizzes

Dover-Sherborn High School
Mathematics Curriculum Road Maps
Geometry Level 2/CP

Course Title: Geometry – Level 2   Grade: 10

Unit: Right Triangles and Trigonometry

Month Presented: May - June   Unit Length (in weeks):   2-3

Essential Question(s):
- How do you simplify square root?   - What special relationships exist between the side lengths of 45-45-90 and 30-60-90 triangles?   - How do you find the sine, cosine and tangent of acute angles?
Learning Objectives:
- Simplifying square roots   - Find the side lengths of the 45-45-90 triangle   - Find the side lengths of a 30-60-90 triangle   - Find the sine, cosine and tangent of acute angles (if time allows)
Instructional Strategies & Activities:
- Note taking   - Cooperative learning/group work   - Competitive review games
Materials Utilized:
- Textbook   - Teacher generated worksheets/class notes   - Geometry tools (rulers, straightedge, protractor, compass, patty paper)   - SmartBoard
Assessment Strategies:
- Daily homework   - Class participation   - Tests and quizzes

Course Title: <u>Geometry – Level 2</u>   Grade: <u>10</u>

Unit: <u>Circles</u>

Month Presented: <u>June</u>   Unit Length (in weeks): <u>2-3</u>

Essential Question(s):   • How do we identify and define various parts of a circle?   • What is the relationship between a tangent and a circle?   • How are inscribed angle related to central angles?   • How do we write equations of circles?   • How do we identify rotations in a plane?
Learning Objectives: • Identify segments and lines related to circles   • Use properties of a tangent to a circle   • Use properties of arcs of circles   • Use properties of chords of circles   • Use properties of inscribed angles   • Use properties of chords in a circle   • Write and graph the equation of a circle   • Identify rotations and rotational symmetry
Instructional Strategies & Activities: • Note taking   • Cooperative learning/group work   • Competitive review games
Materials Utilized: • Textbook   • Teacher generated worksheets/class notes   • Geometry tools (rulers, straightedge, protractor, compass, patty paper)   • SmartBoard
Assessment Strategies: • Daily homework   • Class participation   • Tests and quizzes