

## MATHEMATICS COURSE SYLLABUS

**Course Title:** Geometry H2

**Department:** Mathematics

**Textbook:** Geometry: A Common Core Curriculum

**Publisher:** Big Ideas Learning

**Author:** Larson & Boswell

### **Course Description:**

The course is designed to develop geometric thinking starting with the visual and progressing to the analytical, then developing concepts inductively and finally moving to deductive reasoning by using a variety of activities and investigations such as constructions with straightedge and compass, patty paper, and GSP software.

Students will work in a variety of settings (classroom, lab, school, home, etc) and configurations (alone, pairs, groups, etc) to continue the development of mathematical thinking and problem solving skills. They will use the language of geometry to study and form conjectures about geometric figures and concepts in both 2 dimensional and 3 dimensional space, as well as apply their knowledge to practical, real-life problems, which involve measurement, formulas, inductive reasoning, and deductive reasoning.

### **Essential Questions:**

1. What are the recognizable geometric elements that organize and affect our daily lives?
2. How are inductive and deductive reasoning used in mathematics and other disciplines?
3. What are the applications of geometric principles to other areas of mathematics, science, and practical life?
4. How does geometry influence our understanding of the 2 dimensional and 3 dimensional visual world?
5. How is the study of geometry unique in the field of mathematics? What is geometry's connection to other fields of mathematics?

### **Course Objectives:**

This course addresses the following common goals for Chelmsford High School:

### **Common Goals:**

#### **Thinking and Communicating**

- 1) Read information critically to develop understanding of concepts, topics and issues.
- 2) Write clearly, factually, persuasively and creatively in Standard English.
- 3) Speak clearly, factually, persuasively and creatively in Standard English.
- 4) Use computers and other technologies to obtain, organize and communicate information and to solve problems

5) Conduct research to interpret issues or solve complex problems using a variety of data and information sources.

### **Gain and Apply Knowledge in and across the Disciplines**

6) Gain and Apply Knowledge in:

- a) Literature and Language
- b) Mathematics
- c) Science and Technology
- d) Social Studies, History and Geography
- e) Visual and Performing Arts
- f) Health and Physical Education

### **Work and Contribute**

7) Demonstrate personal responsibility for planning one's future academic and career options.

8) Participate in a school or community service activity.

9) Develop informed opinions about current economic, environmental, political and social issues affecting Massachusetts, the United States and the world and understand how citizens can participate in the political and legal system to affect improvements in these areas.

### **Learning Standards from the Massachusetts Curriculum Framework:**

A chart is attached identifying which of the standards from the Massachusetts Curriculum Frameworks will be assessed in this course.

### **Additional Learning Objectives beyond the Curriculum Framework:**

#### **21st Century Skills:**

Instructional practices support the achievement of 21st C. Learning Expectations by:

- ✓ personalizing instruction
- ✓ engaging students in cross disciplinary learning
- ✓ engaging students as active and self-directed learners
- ✓ emphasizing inquiry, problem solving and higher order thinking
- ✓ applying knowledge and skills in authentic tasks
- ✓ engaging students in self-assessment and reflection
- ✓ integrating technology

## Content outline

### **Unit 1: Basics of Geometry**

**9 Days**

- Points, Lines and Planes (1.1)
- Measuring and Constructions segments (1.2)
- Using Midpoint and Distance Formulas (1.3)
- Perimeter and Area in the Coordinate Plane (1.4)
- Measuring and Constructing Angles (1.5)
- Describing Pairs of Angles (1.6)

### **Unit 2: Reasoning and Proofs**

**9 Days**

- Conditional Statements (2.1)
- Inductive and Deductive Reasoning (2.2)
- Postulates and Diagrams (2.3)
- Algebraic Reasoning (2.4)
- Proving Statements about Segments and Angles (2.5)
- Proving Geometric Relationships (2.6)

### **Unit 3: Parallel and Perpendicular Lines**

**8 Days**

- Pairs of Lines and Angles (3.1)
- Parallel Lines and Transversals (3.2)
- Proofs with Parallel Lines (3.3)
- Proofs with Perpendicular Lines (3.4)
- Equations of Parallel and Perpendicular Lines (3.5)

### **Unit 4: Transformations**

**9 days**

- Translations (4.1)
- Reflections (4.2)
- Rotations (4.3)
- Congruence and Transformations (4.4)
- Dilations (4.5)
- Similarity and Transformations (4.6)

### **Unit 5: Congruent Triangles**

**11 days**

- Angles of Triangles (5.1)
- Congruent Polygons (5.2)
- Proving Triangle Congruence by SAS (5.3)
- Equilateral and Isosceles Triangles (5.4)
- Proving Triangle Congruence by SSS (5.5)
- Proving Triangle Congruence by ASA and AAS (5.6)
- Using Congruence Triangles (5.7)
- Coordinate Proofs (5.8)

<b>Unit 6: Relationships Within Triangles</b>	<b>8 days</b>
• Perpendicular and Angle Bisectors	(6.1)
• Bisectors of Triangles	(6.2)
• Medians and Altitudes of Triangles	(6.3)
• The Triangle Midsegment Theorem	(6.4)
• Indirect Proof and Inequalities in One Triangle	(6.5)
• Inequalities in Two Triangles	(6.6)
<b>Unit 7: Quadrilaterals and Other Polygons</b>	<b>8 Days</b>
• Angles of Polygons	(7.1)
• Properties of Parallelograms	(7.2)
• Proving That a Quadrilateral is a Parallelogram	(7.3)
• Properties of Special Parallelograms	(7.4)
• Properties of Trapezoids and Kites	(7.5)
<b>Unit 8: Similarity</b>	<b>7 Days</b>
• Similar Polygons	(8.1)
• Proving Triangle Similarity by AA	(8.2)
• Proving Triangle Similarity by SSS and SAS	(8.3)
• Proportionality Theorems	(8.4)
<b>Unit 9: Right Triangles and Trigonometry</b>	<b>5 Days</b>
• The Pythagorean Theorem	(9.1)
• Special Right Triangles	(9.2)
• Similar Right Triangles	(9.3)
	<b>6 days</b>
• The Tangent Ratio*	(9.4)
• The Sine and Cosine Ratios*	(9.5)
• Solving Right Triangles*	(9.6)
• Law of Sines and Law of Cosines*	(9.7)
<b>Unit 11a: Circumference, Area, and Volume (Part 1)</b>	<b>8 Days</b>
• Areas of Polygons	(11.3)
• Three-Dimensional Figures	(11.4)
• Volumes of Prisms and Cylinders	(11.5)
• Volumes of Pyramids	(11.6)
• Surface Areas and Volumes of Cones	(11.7)
• Surface Areas and Volumes of Spheres	(11.8)
<b>Unit 10: Circles</b>	<b>9 days</b>
• Lines and Segments That Intersect Circles	(10.1)
• Finding Arc Measures	(10.2)
• Using Chords	(10.3)

- Inscribed Angles and Polygons (10.4)
- Angle Relationships in Circles (10.5)
- Segment Relationships in Circles (10.6)
- Circles in the Coordinate Plane (10.7)

**Unit 11b: Circumference, Area, and Volume (Part II)**

**4 days**

- Circumference and Arc Length (10.1)
- Areas of Circles and Sectors (10.2)

**\* Taught after MCAS**