Odysseyware®

# **CURRICULUM** OVERVIEW

## Geometry

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# Geometry Course Overview

*Geometry* is a full-year, high school math course for the student who has successfully completed the prerequisite course, Algebra I. The course focuses on the skills and methods of linear, quadratic, coordinate, and plane geometry. In it, students will gain solid experience with geometric calculations and coordinate plane graphing, methods of formal proof, and techniques of construction.

- **Introduction:** Student will solve problems using set theory and operations, identify characteristics of postulates and relate geometric theorems on points, lines, and planes
- **Logic:** Student will use inductive reasoning to draw reasonable conclusions, or deductive reasoning to prove basic theorems, and write conditional statements, converses, inverses and contrapositives.
- **Angles and Parallels:** Student will identify types of angles, categorize a shape as a polygon or non-polygon, identify different kinds of polygons, and find angle measures of polygons
- **Congruent Triangles and Quadrilaterals:** Student will identify corresponding parts of congruent triangles, prove congruent parts using different theorems and postulates, and solve for angle measures of congruent polygons.
- **Similar Polygons:** Student will use facts about similarity to calculate side and angle measures in similar polygons, and use sine, cosine, and tangent values to solve for missing values in triangles.
- **Circles:** Student will identify different parts of a circle, and angles and arcs created by different lines interacting with circles and calculate their measures.
- **Area and Volume:** Student will calculate the area, surface area, and volume of varying polygons by breaking them down into smaller and recognizable shapes.
- **Coordinate Geometry:** Student will graph linear equations and inequalities, use the distance and mid-point formulas to find lengths of segments and perimeters of geometric shapes, and find the equation of a line in various ways.
- **Transformations:** Student will understand rotations, reflections, dilations and translations in terms of angles, circles, perpendicular lines, and line segments, and find the result of combining multiple transformations.
- **Geometric Application:** Student will use the functions sine, cosine, and tangent, and the inverse trigonometric functions (sin-1, cos-1, and tan-1) to calculate unknown side lengths in right triangles, calculate densities, and use ratios to calculate unit scales.
- **Probability:** Student will determine the number of combinations, or permutations, in choosing elements from a set, explain the concept of conditional probability as found in everyday situations, and analyze decisions and strategies using probability concepts.

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## Unit 1: Introduction

**Assignments**

1. Course Overview
2. Mathematic System: Set Theory Review
3. Mathematic System: Operations with Sets
4. Quiz 1: Set Theory
5. Geometry Undefined Terms: Point
6. Geometry Undefined Terms: Line
7. Geometry Undefined Terms: Plane
8. Quiz 2: Undefined Terms
9. Defined Terms: Definitions
10. Quiz 3: Defined Terms
11. Geometric Postulates
12. Review of Algebraic Postulates
13. Geometric Theorems
14. Review of Properties of Algebra
15. Quiz 4: Postulates and Theorems
16. Performance Task
17. Alternate Performance Task*
18. Special Project*
19. Test
20. Alternate Test*
21. Glossary and Credits

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## Unit 2: Logic

**Assignments**

1. Logic
2. Conjunctions
3. Disjunctions
4. Negation
5. Conditional or Implication Statements
6. Converse, Inverse, Contrapositive
7. Quiz 1: Principles of Logic
8. Inductive Reasoning
9. Deductive Reasoning
10. Using Deductive Reasoning
11. Quiz 2: Inductive and Deductive Reasoning
12. Proof Formats: Statement of the Theorem
13. Proof Formats: The Figure
14. Proof Formats: The Given Statement
15. Proof Formats: To Prove Statement
16. Proof Formats: The Plan of the Proof
17. Indirect Proof Format: The Paragraph Proof
18. Quiz 3: Proof Formats
19. Performance Task
20. Alternate Performance Task*
21. Special Project*
22. Test
23. Alternate Test*
24. Glossary and Credits

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## Unit 3: Angles and Parallels

**Assignments**

1. Angle Definitions
2. Angle Measurement
3. Quiz 1: Angles
4. Geometric Proof
5. Angle Relationship Definitions
6. Angle Relationship Theorems (1)
7. Angle Relationship Theorems (2)
8. Quiz 2: Angle Theorems
9. Construction: Copying Figures
10. Construction: Bisecting Figures
11. Basic Properties of Parallels
12. Transversals and Special Angles
13. More Proofs: Transversals and Special Angles
14. Continued Proofs: Transversals and Special Angles
15. More Proofs for Postulates 9 and 10
13. Quiz 3: Parallels and Transversals
14. Construction: Perpendiculars
15. Construction: Tangents to Circles
16. Construction: Parallels
17. Classifying Triangles by Sides and Angles
18. Exterior and Remote Interior Angles of a Triangle
19. Proofs Involving Triangles
20. Other Polygons
21. Quiz 4: Triangles, Polygons, and Angle Properties
22. Performance Task
23. Alternate Performance Task*
24. Special Project*
25. Test
26. Alternate Test*
27. Glossary and Credits

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## Unit 4: Congruent Triangles and Quadrilaterals

**Assignments**

1. Defining Congruent Triangles
2. Proving Triangles Congruent (1)
3. Proving Triangles Congruent (2)
4. Proving Triangles Congruent (3)
5. Proving Right Triangles Congruent
6. Quiz 1: Congruent Triangles
7. Independent Triangles (1)
8. Independent Triangles (2)
9. Overlapping Triangles (1)
10. Overlapping Triangles (2)
11. Isosceles Triangles (1)
12. Isosceles Triangles (2)
13. Construction of Triangles 30-60-90
14. Construction of Triangles 45-45-90
15. Constructing Inscribed Shapes
16. Quiz 2: Types of Triangles
17. Inequality Theorem in One Triangle Part 1
18. Inequality Theorem in One Triangle Part 2
19. Inequality Theorem in Two Triangles
20. Quadrilateral Parallelograms Theorems Part 1
21. Quadrilateral Parallelograms Theorems Part 2
22. Quiz 3: Inequalities; Quadrilaterals
23. Triangles that Use Parallelograms in Proofs
24. Parallelograms: Rectangles
25. Parallelograms: Rhombus
26. Trapezoids-Definitions and Proofs
27. Quiz 4: Parallelograms; Trapezoids
28. Performance Task
29. Alternate Performance Task*
30. Special Project*
31. Test
32. Alternate Test*
33. Glossary and Credits

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## Unit 5: Similar Polygons

**Assignments**

1. Algebra and Ratios
2. Algebra Properties and Proportions
3. Properties of Proportions
4. Quiz 1: Ratios, Properties, and Proportions
5. Meaning of Similarity
6. Meaning of Similarity-Theorems
7. Meaning of Similarity-Proofs
8. Theorems-Similar Polygons
9. Theorems-Special Segments in Triangles
10. Similar Right Triangles
11. The Pythagorean Theorem
12. Theorem about 30-60-90 Right Triangles
13. Theorem about 45-45-90 Right Triangles
14. Quiz 2: Similarity; Triangle Theorems
15. Using Triangles: Rectangular Solids
13. Using Triangles: Regular Square Pyramid
14. Trigonometry-Sine Ratio
15. Trigonometry-Cosine Ratio
16. Trigonometry-Tangent Ratio
17. Using Similar Triangles in Indirect Measurement
18. Using Trigonometry in Indirect Measure
19. Quiz 3: Triangles and Trigonometry
20. Project: Model and Scale Drawing
21. Performance Task
22. Alternate Performance Task*
23. Special Project*
24. Test
25. Alternate Test*
26. Glossary and Credits
27.

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## Unit 6: Semester Review and Exam

**Assignments**

1. Review
2. Exam
3. Alternate Exam - Form A*
4. Alternate Exam - Form B*

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## Unit 7: Circles

**Assignments**

1. Characteristics of Circles
2. Characteristics of Spheres
3. Quiz 1: Circles and Spheres
4. Tangents
5. Arcs
6. Chords
7. Theorems (1)
8. Theorems (2)
9. Quiz 2: Tangents, Arcs, and Chords
10. Special Angles Type 1
11. Special Angles Type 2
12. Special Angles Type 3
13. Special Segments
14. Quiz 3: Special Angles and Segments
15. Construction: Circles
16. Performance Task
17. Alternate Performance Task*
18. Special Project*
19. Test
20. Alternate Test*
21. Glossary and Credits

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## Unit 8: Area and Volume

**Assignments**

1. Area Concepts of Polygons
2. Area of Rectangles
3. Area of Parallelograms
4. Area of Triangles and Rhombuses
5. Area of Trapezoids
6. Area of Regular Polygons
7. Area Comparisons of Polygons
8. Quiz 1: Area of Polygons
9. Construction: Polygons
10. Circles: Circumference and PI
11. Circles: Area of Circles
12. Circles: Area of Sectors
13. Circles: Area of Segments
14. Quiz 2: Area of Circles
15. Solids: Prisms
16. Solids: Pyramids
17. Solids: Cylinders
18. Solids: Cones
19. Solids: Spheres
20. Quiz 3: Volume of Solids
21. Two- and Three-Dimensional Shapes
22. Project: Rotating a Two Dimensional Shape
23. Geometric Probability
24. Construction: Dividing a Segment
25. Construction: 4th Proportion
26. Construction: The Geometric Mean
27. Performance Task
28. Alternate Performance Task*
29. Special Project*
30. Test
31. Alternate Test*
32. Glossary and Credits

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## Unit 9: Coordinate Geometry

**Assignments**

1. Symmetry
2. Ordered Pairs: Points in a Plane
3. Graphs of Algebraic Sentences
4. Quiz 1: Symmetry, Ordered Pairs, and Graphs
5. Distance Formula
6. Perimeter and Area
7. Equation of a Circle
8. Midpoint Formula
9. Quiz 2: Distance Formula and Applications
10. Slope
11. Parallel and Perpendicular Lines
12. Equations of Lines
13. Quiz 3: Slope and Lines
14. Figures in the Coordinate Plane
15. Proofs with Coordinate Geometry (1)
16. Proofs with Coordinate Geometry (2)
17. Quiz 4: Figures and Proofs
18. Performance Task 2
19. Alternate Performance Task 2*
20. Special Project*
21. Test
22. Alternate Test*
23. Glossary and Credits

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## Unit 10: Transformations

**Assignments**

1. Introduction: Rigid Motion, or Isometry
2. Isometry: Reflection
3. Isometry: Translation
4. Isometry: Rotation
5. Quiz 1: Isometry
6. Transformation Sequences
7. Similarity Transformation: Dilation
8. Product Transformation
9. Inverse and Identity Transformation
10. Quiz 2: Transformations
11. Performance Task
12. Alternate Performance Task*
13. Special Project*
14. Test
15. Alternate Test*
16. Glossary and Credits

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## Unit 11: Geometric Application

**Assignments**

1. Using SOH CAH TOA in Trigonometry
2. Finding the Values of Trigonometric Functions
3. Law of Sines
4. Quiz 1: Sines
5. Ambiguity and Area of a Triangle
6. Law of Cosines: Finding a Side
7. Law of Cosines: Finding an Angle
8. Quiz 2: Cosines
9. Modeling with Geometric Figures
10. Density
11. Geometry in Design
12. Quiz 3: Modeling Geometry
13. Special Project*
14. Test
15. Alternate Test*
16. Glossary and Credits

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## Unit 12: Probability

**Assignments**

1. Definitions, Sample Spaces, and Probability
2. Addition of Probabilities
3. Multiplication of Probabilities
4. Quiz 1: Using Probability
5. Definitions
6. Permutations of N Things: Different
7. Permutations of N things: Not All Different
8. Combinations
9. Quiz 2: Probability
10. Conditional Probability
11. Conditional Probability in Real-World Situations
12. Two-Way Frequency Tables
13. Using Probability in Decision Making
14. Quiz 3: Conditional Probability
15. Special Project*
16. Test
17. Alternate Test*
18. Glossary and Credits

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## Unit 13: Semester Review and Exam

**Assignments**

1. Review
2. Exam
3. Alternate Exam - Form A*
4. Alternate Exam - Form B*

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## Unit 14: Final Exam

**Assignments**

1. Final Exam
2. Alternate Exam - Form A*
3. Alternate Exam - Form B*
4. Performance Task 1
5. Performance Task 2

| Geometry | Unit 15: End of Course Exam | |
|---|---|---|
| | **Assignments** | |
| | 1. Exam | 3. Alternate Exam - Form B* |
| | 2. Alternate Exam - Form A* | |

(*) Indicates alternative assignment