

NORTH HAVEN HIGH SCHOOL
CURRICULUM GUIDES
MATHEMATICS
GEOMETRY L3

Geometry L3

324

Credits: 1

Open to: 9th, 10th, 11th, 12th grades

Prerequisites: Completion of Algebra I L3 with a B- average or Algebra I L2 with an A average

Course Description

This course enables students to use the basic terms and ideas of geometry as they relate to familiar figures and objects. The properties of plane and three-dimensional figures are developed under definitions, postulates and theorems in a deductive mathematical system. In addition to this placement in the total mathematical sequence, the course shows the connection between mathematics and other areas such as art, architecture, and drafting.

Learning Expectations for Graduation

Students will:

- #1 Demonstrate conceptual understanding and provide support in solving a problem
- #3 Collect and analyze evidence in support of a position
- #5 Employ the conventions of language in communication
- #6 Evaluate and improve their work
- #7 Employ computer-related technology to evaluate and present ideas

Social and Civic Expectations

- #2 Develop and maintain behavior that promotes a healthy and responsible lifestyle
- #3 Exhibit respect for themselves and others

Mathematics Performance Expectations

In addition to completing homework for every class, students are expected to:

- complete one problem set per class
- keep an organized notebook
- complete constructions using a variety of tools
- organize and write proofs
- complete at least one application based project per term
- take frequent quizzes
- take two to four major tests per term

Units

UNIT 1: BASIC IDEAS OF GEOMETRY

The student will:

1. Name, describe, and draw models for points, lines, and planes
2. Calculate the distance between points on the number line and on the coordinate plane
3. Apply the Segment Addition Postulate
4. Name angles and find their measure
5. Define and construct a midpoint of a segment, a segment bisector, and an angle bisector
6. Construct congruent segments, congruent angles, perpendicular bisectors, and angle bisectors
7. Identify triangles and classify them by sides and angles
8. State the converse, inverse, and contrapositive of a conditional statement
9. Use inductive reasoning to analyze patterns
10. Use properties of equality and deductive reasoning to draw conclusions
11. Find the image of a figure under a translation

12. Find the rotation image of a figure
13. Find the image of a figure under a composition of transformations

Instructional Strategies

- Presentation of information by various techniques
- Individual and cooperative group discovery activities
- Individual guided practice
- Cooperative group practice
- Geometers' Sketchpad activities

Assessments

- Quizzes
- Chapter Test
- Homework
- Class work and participation
- Project(s)

Resources

- Textbook: Addison-Wesley *Geometry* Chapters 1, 9, 13
- Workbook: Addison-Wesley *Geometry* Practice and Mixed Review Chapters 1, 9, and 13
- Workbook: McDougal Littell *Geometry* Resource Book Chapters 1, 2 and 3
- Teacher created materials

UNIT 2: INTRODUCTION TO PROOF

The student will:

1. Define, understand and use angle pair relationships
2. State, prove and use theorems about perpendicular lines
3. Draw and use appropriate diagrams
4. Analyze, plan and write two-column proofs
5. Prove and apply theorems about segments, lines and angles

Instructional Strategies

- Presentation of information by various techniques
- Individual and cooperative group discovery activities
- Individual guided practice
- Cooperative group practice
- Geometers' Sketchpad activities

Assessments

- Quizzes
- Chapter Test
- Homework
- Class work and participation
- Project(s)

Resources

- Textbook: Addison-Wesley *Geometry* Chapter 2
- Workbook: Addison-Wesley *Geometry* Practice and Mixed Review Chapter 2
- Workbook: McDougal Littell *Geometry* Resource Book Chapter 2
- Teacher created materials

UNIT 3: PARALLEL LINES AND PLANES

The student will:

1. Identify parallel planes, parallel lines and skew lines
2. State and apply theorems about angles formed when parallel lines are cut by a transversal
3. State and apply theorems that can be used to prove lines parallel
4. Prove and apply triangle sum theorems and corollaries
5. Develop and apply angle sum theorems for the interior and exterior angles of a polygon

Instructional Strategies

- Presentation of information by various techniques
- Individual and cooperative group discovery activities
- Individual guided practice
- Cooperative group practice
- Geometers' Sketchpad activities

Assessments

- Quizzes
- Chapter Test
- Homework
- Class work and participation
- Project(s)

Resources

- Textbook: Addison-Wesley *Geometry* Chapter 3
- Workbook: Addison-Wesley *Geometry* Practice and Mixed Review Chapter 3
- Workbook: McDougal Littell *Geometry* Resource Book Chapters 3 and 4
- Teacher created materials

UNIT 4: CONGRUENT TRIANGLES

The student will:

1. Identify corresponding parts of congruent triangles
2. State and apply the SSS, ASA, SAS, AAS and HL postulates and theorems
3. Use definitions and congruence postulates to prove triangles congruent
4. Deduce that segments and angles are congruent by first proving triangles congruent
5. Prove triangles congruent using overlapping triangles
6. Develop, prove and apply theorems about isosceles triangles
7. Develop, prove and apply theorems about medians, altitudes, angle bisectors, and perpendicular bisectors in triangles

Instructional Strategies

- Presentation of information by various techniques
- Individual and cooperative group discovery activities
- Individual guided practice
- Cooperative group practice
- Geometers' Sketchpad activities

Assessments

- Quizzes
- Chapter Test
- Homework
- Class work and participation
- Project(s)

Resources

- Textbook: Addison-Wesley *Geometry* Chapter 4
- Workbook: Addison-Wesley *Geometry* Practice and Mixed Review Chapter 4
- Workbook: McDougal Littell *Geometry* Resource Book Chapters 4 and 5
- Teacher created materials

UNIT 5: TRIANGLES AND PARALLEL LINES

The student will:

1. Discover and apply theorems about properties of parallelograms
2. Prove some quadrilaterals are parallelograms with coordinate and two-column proofs
3. Discover and apply definitions and theorems about rectangles, rhombuses, squares, trapezoids and kites

4. Discover and apply theorems about midsegments of triangles and trapezoids
5. Use the indirect method of proof
6. Develop and apply theorems about inequalities in a triangle
7. Develop and apply theorems about inequalities in two triangles

Instructional Strategies

- Presentation of information by various techniques
- Individual and cooperative group discovery activities
- Individual guided practice
- Cooperative group practice
- Geometers' Sketchpad activities

Assessments

- Quizzes
- Chapter Test
- Homework
- Class work and participation
- Project(s)

Resources

- Textbook: Addison-Wesley *Geometry* Chapters 5 and 12
- Workbook: Addison-Wesley *Geometry* Practice and Mixed Review Chapters 5 and 12
- Workbook: McDougal Littell *Geometry* Resource Book Chapter 5
- Teacher created materials

UNIT 6: SIMILARITY

The student will:

1. Express ratios in simplest form and write and solve proportions
2. Express ratios in equivalent forms
3. Find measures of sides and angles of two similar figures
4. Use the AA Similarity Postulate and the SAS and SSS Similarity Theorems to draw conclusions about triangles
5. Write and solve proportions related to parallel lines, transversals, and triangles

Instructional Strategies

- Presentation of information by various techniques
- Individual and cooperative group discovery activities
- Individual guided practice
- Cooperative group practice
- Geometers' Sketchpad activities

Assessments

- Quizzes
- Chapter Test
- Homework
- Class work and participation
- Project(s)

Resources

- Textbook: Addison-Wesley *Geometry* Chapter 6
- Workbook: Addison-Wesley *Geometry* Practice and Mixed Review Chapter 6
- Workbook: McDougal Littell *Geometry* Resource Book Chapter 6
- Teacher created materials

UNIT 7: RIGHT TRIANGLES

The student will:

1. Identify and apply proportions in right triangles
2. Develop and apply the Pythagorean Theorem

3. Develop and apply the Pythagorean Theorem Converse
4. Develop and apply relationships in 45° - 45° - 90° and 30° - 60° - 90° right triangles

Instructional Strategies

- Presentation of information by various techniques
- Individual and cooperative group discovery activities
- Individual guided practice
- Cooperative group practice
- Geometers' Sketchpad activities

Assessments

- Quizzes
- Chapter Test
- Homework
- Class work and participation
- Project(s)

Resources

- Textbook: Addison-Wesley *Geometry* Chapter 7, Sections 1 - 4
- Workbook: Addison-Wesley *Geometry* Practice and Mixed Review Chapter 7
- Workbook: McDougal Littell *Geometry* Resource Book Chapter 7
- Teacher created materials

UNIT 8: CIRCLES

The student will:

1. Apply basic definitions and concepts related to circles
2. Develop and apply theorems regarding circles and tangents
3. Develop and apply theorems about arcs and central angles
4. Develop and apply theorems about chords
5. Develop and apply theorems about inscribed angles

Instructional Strategies

- Presentation of information by various techniques
- Individual and cooperative group discovery activities
- Individual guided practice
- Cooperative group practice
- Geometers' Sketchpad activities

Assessments

- Quizzes
- Chapter Test
- Homework
- Class work and participation
- Project(s)

Resources

- Textbook: Addison-Wesley *Geometry* Chapter 8, Sections 1 - 6
- Workbook: Addison-Wesley *Geometry* Practice and Mixed Review Chapter 8
- Workbook: McDougal Littell *Geometry* Resource Book Chapter 10
- Teacher created materials

UNIT 9: AREA AND PERIMETER

The student will:

1. Develop and apply formulas for perimeter and area of rectangles, parallelograms, triangles, trapezoids, other quadrilaterals, and regular polygons
2. Develop and apply theorems involving ratios of areas and perimeters of similar polygons
3. Develop and apply formulas for the circumference and arc length of a circle
4. Develop and apply formulas for finding areas of circles, sectors, and segments

Instructional Strategies

- Presentation of information by various techniques
- Individual and cooperative group discovery activities
- Individual guided practice
- Cooperative group practice
- Geometers' Sketchpad activities

Assessments

- Quizzes
- Chapter Test
- Homework
- Class work and participation
- Project(s)

Resources

- Textbook: Addison-Wesley *Geometry* Chapter 9
- Workbook: Addison-Wesley *Geometry* Practice and Mixed Review Chapter 9
- Workbook: McDougal Littell *Geometry* Resource Book Chapter 11
- Teacher created materials

UNIT 10: SURFACE AREA AND VOLUME

The student will:

1. Identify the name, bases, and lateral faces of prisms and pyramids
2. Develop and apply formulas to determine the lateral area, surface area, and volume of prisms, pyramids, cylinders and cones
3. Apply formulas to determine the surface area and volume of spheres
4. Compare surface area and volume of similar solids

Instructional Strategies

- Presentation of information by various techniques
- Individual and cooperative group discovery activities
- Individual guided practice
- Cooperative group practice
- Geometers' Sketchpad activities

Assessments

- Quizzes
- Chapter Test
- Homework
- Class work and participation
- Project(s)

Resources

- Textbook: Addison-Wesley *Geometry* Chapter 11
- Workbook: Addison-Wesley *Geometry* Practice and Mixed Review Chapter 11
- Workbook: McDougal Littell *Geometry* Resource Book Chapter 12
- Teacher created materials