

NORTH HAVEN HIGH SCHOOL
CURRICULUM GUIDES
MATHEMATICS
APPLIED GEOMETRY L1

Applied Geometry L1

320

Credits: 1

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

Prerequisites: Completion of Algebra I and teacher recommendation

Course Description

This course is designed for students for whom abstract and logical reasoning pose a difficulty. In place of the proof of a standard geometry course, a discovery and application approach is utilized. Previous arithmetic and geometric knowledge is built upon and developed in a systematic manner.

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
- #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
- 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, planes, segments, rays, collinear points, coplanar points, and angles
2. Draw and describe parallel lines and parallel planes and intersecting lines and planes
3. Measure length using the customary and metric systems
4. Construct congruent segments, congruent angles, segment bisectors, perpendicular bisectors, and angle bisectors
5. Use inductive and deductive reasoning to draw conclusions

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: Prentice Hall *Informal Geometry* Chapter 1 or Allyn and Bacon *Geometry: An Informal Approach* Chapter 1
- Workbook: Prentice Hall *Informal Geometry Practice* Chapter 1
- Workbook: McDougal Littell *Geometry Resource Book* Chapter 1
- Teacher created materials

UNIT 2: ANGLES

The student will:

1. Use amount of turn to measure angles as fractional parts of circles
2. Measure angles in degrees
3. Draw and classify angles
4. Write and solve algebraic equations to determine angle measures
5. Develop and recognize relationships among vertical angles, complementary angles, supplementary angles, and linear pairs of 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: Prentice Hall *Informal Geometry* Chapter 2 or Allyn and Bacon *Geometry: An Informal Approach* Chapter 2
- Workbook: Prentice Hall *Informal Geometry Practice* Chapter 2
- Workbook: McDougal Littell *Geometry Resource Book* Chapter 2
- Teacher created materials

UNIT 3: POLYGONS AND POLYHEDRONS

The student will:

1. Identify convex and concave polygons
2. Identify triangles and classify them by sides and angles
3. Identify types of quadrilaterals and other polygons
4. Identify and draw polyhedrons and prisms
5. Draw figures in one-point and two-point perspective

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: Prentice Hall *Informal Geometry* Chapter 3 or Allyn and Bacon *Geometry: An Informal Approach* Chapter 1, Sections 5-11 and Chapter 3, Section 6
- Workbook: Prentice Hall *Informal Geometry* Practice Chapter 3
- Teacher created materials

UNIT 4: TRANSFORMATIONS

The student will:

1. Identify corresponding parts of congruent triangles
2. Name and draw reflection, translation, and rotation images
3. Find reflection, translation, and rotation images in the coordinate plane
4. Identify line symmetry and rotational symmetry of figures

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: Prentice Hall *Informal Geometry* Chapters 4 and 18 or Allyn and Bacon *Geometry: An Informal Approach* Chapter 3, Sections 4, 5 and Chapter 11, Section 10
- Workbook: Prentice Hall *Informal Geometry* Practice Chapters 4 and 18
- Teacher created materials

UNIT 5: TRIANGLES

The student will:

1. Discover and apply theorems about properties of isosceles triangles
2. Name and draw medians, altitudes, perpendicular bisectors and angle bisectors in triangles
3. Apply theorems about inequalities in a triangle
4. Apply theorems about inequalities in two triangles
5. Discover and apply the SSS, ASA, SAS, AAS and HL postulates and theorems to show that two triangles are congruent
6. Show that sides or angles of triangles are congruent because they are corresponding parts of congruent 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: Prentice Hall *Informal Geometry* Chapters 5 and 6 or Allyn and Bacon *Geometry: An Informal Approach* Chapter 4
- Workbook: Prentice Hall *Informal Geometry* Practice Chapters 5 and 6
- Workbook: McDougal Littell *Geometry* Resource Book Chapters 4 and 5
- Teacher created materials

UNIT 6: PARALLEL LINES

The student will:

1. Identify angles formed when two lines are cut by a transversal
2. Discover and apply theorems about angles formed when parallel lines are cut by a transversal
3. Discover and apply the Triangle Interior Angle Sum Theorem
4. Discover and apply relationships between interior and exterior angles of a triangle
5. Calculate the interior and exterior angle sums of any 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: Prentice Hall *Informal Geometry* Chapter 7 or Allyn and Bacon *Geometry: An Informal Approach* Chapter 5
- Workbook: Prentice Hall *Informal Geometry* Practice Chapter 7
- Teacher created materials

UNIT 7: QUADRILATERALS

The student will:

1. Discover and apply theorems about properties of parallelograms
2. Discover and apply theorems about rectangles, rhombuses, squares, and trapezoids
3. Determine whether a quadrilateral must be a parallelogram, rectangle, rhombus or square

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: Prentice Hall *Informal Geometry* Chapter 8 or Allyn and Bacon *Geometry: An Informal Approach* Chapter 3, Sections 8 - 11
- Workbook: Prentice Hall *Informal Geometry* Practice Chapter 8
- Workbook: McDougal Littell *Geometry* Resource Book Chapter 8
- Teacher created materials

UNIT 8: PERIMETER AND AREA

The student will:

1. Develop and apply formulas for perimeter and area of rectangles, parallelograms, triangles, trapezoids, and other polygons
2. Determine and apply the formula for circumference of a circle
3. Determine and apply formulas for area of a circle and area of a sector of a circle

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: Prentice Hall *Informal Geometry* Chapter 9 or Allyn and Bacon *Geometry: An Informal Approach* Chapter 6
- Workbook: Prentice Hall *Informal Geometry* Practice Chapter 9
- Workbook: McDougal Littell *Geometry* Resource Book Chapter 11
- Teacher created materials

UNIT 9: SIMILARITY

The student will:

1. Express ratios in simplest form
2. Write and solve proportions
3. Identify corresponding parts of similar polygons
4. Create scale drawings and find actual lengths represented on scale drawings
5. Use the AA, SAS and SSS Similarity Postulates to draw conclusions about triangles
6. Find missing measures of sides and angles of two similar figures
7. Develop and apply relationships involving ratios of areas and perimeters of similar polygons

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: Prentice Hall *Informal Geometry* Chapters 10 and 11 or Allyn and Bacon *Geometry: An Informal Approach* Chapter 9 and Chapter 10, Sections 1 – 3, 5
- Workbook: Prentice Hall *Informal Geometry* Practice Chapters 10 and 11
- Workbook: McDougal Littell *Geometry* Resource Book Chapter 6
- Teacher created materials

UNIT 10: RIGHT TRIANGLES

The student will:

1. Find squares and square roots
2. Simplify square roots, products of square roots, and square root expressions
3. Develop and apply the Pythagorean Theorem
4. Use the Pythagorean Theorem Converse
5. 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: Prentice Hall *Informal Geometry* Chapter 12 or Allyn and Bacon *Geometry: An Informal Approach* Chapter 8
- Workbook: Prentice Hall *Informal Geometry* Practice Chapters 12
- Workbook: McDougal Littell *Geometry* Resource Book Chapter 7, Sections 1 - 4
- Teacher created materials

UNIT 11: CIRCLES

The student will:

1. Apply basic definitions and concepts related to circles
2. State and apply theorems regarding central angles, arc measures and arc lengths of circles
3. State and apply theorems regarding inscribed angles
4. State and apply theorems regarding circles and tangents
5. State and apply theorems regarding chords of circles
6. Display data using a circle graph

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: Prentice Hall *Informal Geometry* Chapter 13 or Allyn and Bacon *Geometry: An Informal Approach* Chapter 2
- Workbook: Prentice Hall *Informal Geometry* Practice Chapter 13
- Workbook: McDougal Littell *Geometry* Resource Book Chapter 10
- Teacher created materials

UNIT 12: 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. Apply relationships between the surface areas and volumes of similar solids
5. Convert a measure of volume or capacity from one unit to another

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: Prentice Hall *Informal Geometry* Chapters 14 and 15 or Allyn and Bacon *Geometry: An Informal Approach* Chapter 7
- Workbook: Prentice Hall *Informal Geometry* Practice Chapters 14 and 15
- Workbook: McDougal Littell *Geometry* Resource Book Chapter 12
- Teacher created materials