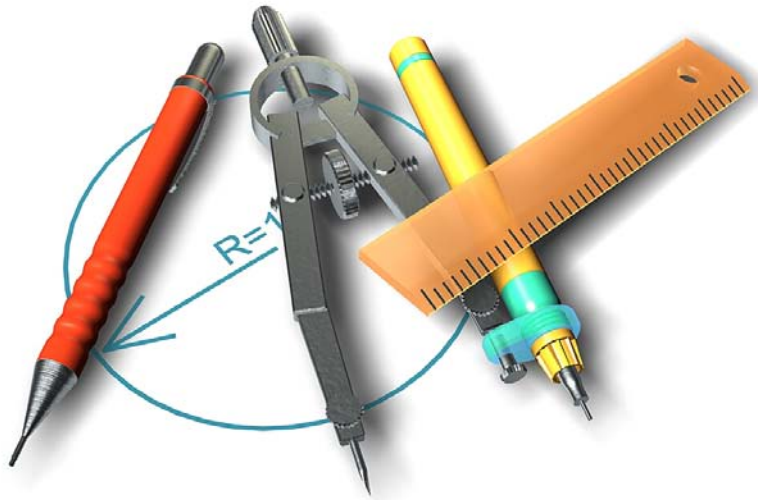


GEOMETRY



Geometry

Instructional Activities:

- A. Direct Instruction
- B. Cooperative Learning
- C. Technology Integration
- D. Study Guides
- E. Critical Thinking
- F. Textbook Activities
- G. Chapter Review
- H. Activity Worksheets
- I. Practical Applications

Assessment:

- A. Quizzes
- B. Skill Reviews
- C. Test Prep Questions
- D. Chapter Tests
- E. Open-Response Questions
- F. Homework Assessment
- G. Class Participation
- H. Teacher Observation
- I. Projects

Topical Guide

State Learning Standards are listed after the detailed list of topics.

Term 1

- 1. Basics of Geometry
- 2. Reasoning and Proof
- 3. Perpendicular and Parallel Lines
- 4. Congruent Triangles

Term 2

- 1. Using Congruent Triangles
- 2. Properties of Triangles
- 3. Quadrilaterals
- 4. Transformations

Term 3

- 1. Similarity
- 2. Right Triangles and Trigonometry
- 3. Surface Area and Volume

Term 4

- 1. Circles
- 2. Circles and Other Angle Relationships
- 3. Areas of Polygons and Circles

TERM 1

Topic 1: Basics of Geometry

- 1.1 Patterns and Inductive Reasoning (G.G.2)
- 1.2 Points, Lines, and Planes (G.G.1)
- 1.3 Segments and their Measure (G.G.1, **10.G.7**)
- 1.4 Angles and their Measure (G.G.6, **10.G.3**)
- 1.5 Segments and Angle Bisectors (G.G.1, G.G.2, G.G.6, **10.G.1**)
- 1.6 Angle Pair Relationships (G.G.6, **10.G.3**)
- 1.7 Introduction to Perimeter, Circumference, and Area (G.M.1, **10.M.1**)
- 1.8 Taxi Cab Geometry (G.G.17, **10.G.11**)

Topic 2: Reasoning and Proof

- 2.1 Conditional Statements (G.G.2)
- 2.2 Definitions and Biconditional Statements (G.G.2)
- 2.3 Deductive Reasoning (G.G.2)
- 2.4 Reasoning with Properties from Algebra (G.G.1)
- 2.5 Proving Statements about Segments (G.G.2)
- 2.6 Proving Statements about Angles (G.G.2)

Topic 3: Perpendicular and Parallel Lines

- 3.1 Lines and Angles (G.G.1, G.G.2, **10.G.3**)
- 3.2 Proof and Perpendicular Lines (G.G.2)
- 3.3 Parallel Lines and Transversals (G.G.6, **10.G.3**)
- 3.4 Proving Lines are Parallel (G.G.2, G.G.6, **10.G.3**)
- 3.5 Using Properties of Parallel Lines (G.G.6, **10.G.3**)
- 3.6 Parallel Lines in the Coordinate Plane (G.G.1, G.G.11, G.G.13, **10.G.7, 10.G.8**)
- 3.7 Perpendicular Lines in the Coordinate Plane (G.G.1, G.G.11, G.G.13, **10.G.7, 10.G.8**)

Topic 4: Congruent Triangles

- 4.1 Triangles and Angles (G.G.1, **10.G.5**)
- 4.2 Congruence and Triangles (G.G.4, G.G.5, **10.G.2, 10.G.4**)
- 4.3 Proving Triangles are Congruent: SSS and SAS (G.G.2, **10.G.4**)
- 4.4 Proving Triangles are Congruent: ASA and AAS (G.G.2, **10.G.4**)

TERM 2

Topic 1: Congruent Triangles Continued

- 1.1 Using Congruent Triangles (G.G.4, G.G.5, **10.G.2, 10.G.4**)
- 1.2 Isosceles, Equilateral, and Right Triangles (G.G.1, **10.G.5**)
- 1.3 Triangles and Coordinate Proof (G.G.3)

Topic 2: Properties of Triangles

- 2.1 Perpendiculars and Bisectors (G.G.2, **10.G.1**)
- 2.2 Bisectors of a Triangle (G.G.1, G.G.2, **10.G.1, 10.G.4**)
- 2.3 Medians and Altitudes of a Triangle (G.G.1, G.G.2, G.G.12, **10.G.1, 10.G.4**)
- 2.4 Midsegment Theorem (G.G.1, G.G.2, **10.G.1, 10.G.4**)
- 2.5 Inequalities in One Triangle (G.G.1, **10.G.1**)
- 2.6 Indirect Proof and Inequalities in Two Triangles (G.G.2, G.G.10)

Topic 3: Quadrilaterals

- 3.1 Polygons (G.G.1, **10.G.1**)
- 3.2 Properties of Parallelograms (G.G.1, **10.G.1**)
- 3.3 Proving Quadrilaterals are Parallelograms (G.G.1, **10.G.1**)
- 3.4 Rhombuses, Rectangles and Squares (G.G.1, **10.G.1**)
- 3.5 Trapezoids and Kites (G.G.1, **10.G.1**)
- 3.6 Special Quadrilaterals (G.G.1, **10.G.1**)
- 3.7 Areas of Triangles and Quadrilaterals (G.G.1, G.G.17, G.M.1, **10.G.1, 10.M.1**)

Topic 4: Transformations

- 4.1 Rigid Motion in a Plane (G.G.15, **10.G.9**)
- 4.2 Reflections (G.G.15, **10.G.9**)
- 4.3 Rotations (G.G.15, **10.G.9**)
- 4.4 Translations and Vectors (G.G.15, **10.G.9**)
- 4.5 Slide Reflections and Compositions (G.G.15, **10.G.9**)

TERM 3

Topic 1: Similarity

- 1.1 Ratio and Proportion (G.G.5)
- 1.2 Problem Solving in Geometry with Proportions (G.G.5)
- 1.3 Similar Polygons (G.G.2, G.G.4, **10.G.2, 10.G.4**)
- 1.4 Similar Triangles (G.G.2, G.G.4, **10.G.2, 10.G.4**)
- 1.5 Proving Triangles Similar (G.G.2, **10.G.4**)
- 1.6 Proportions and Similar Triangles (G.G.5, **10.G.4**)
- 1.7 Dilations (G.G.2, G.G.4, G.G.5, **10.G.2, 10.G.4**)

Topic 2: Right Triangles and Trigonometry

- 2.1 Similar Right Triangles (G.G.2, **10.G.4**)
- 2.2 Pythagorean Theorem (G.G.7, **10.G.5**)
- 2.3 Converse of the Pythagorean Theorem (G.G.7, **10.G.5**)
- 2.4 Special Right Triangles (G.G.8, **10.G.5, 10.G.6**)
- 2.5 Trigonometric Ratios (G.G.9)
- 2.6 Solving Right Triangles (G.G.9)
- 2.7 Vectors (G.G.18)

Topic 3: Surface Area and Volume

- 3.1 Exploring solids (G.G.16)
- 3.2 Surface Area of Prisms and Cylinders (G.M.2, G.M.3, G.M.4, G.M.5, **10.M.2, 10.M.3, 10.M.4**)
- 3.3 Surface Area of Pyramids and Cones (G.G.16, G.M.2, G.M.3, G.M.4, G.M.5, **10.G.10, 10.M.2, 10.M.3, 10.M.4**)
- 3.4 Volume of Prisms and Cylinders (G.M.2, G.M.3, G.M.4, G.M.5, **10.M.2, 10.M.3, 10.M.4**)
- 3.5 Volumes of Pyramids and Cones (G.M.2, G.M.3, H.M.4, G.M.5, **10.M.2, 10.M.3, 10.M.4**)
- 3.6 Surface Area and Volume of Spheres (G.M.2, G.M.3, G.M.4, G.M.5, **10.M.2, 10.M.3, 10.M.4**)
- 3.7 Similar Solids (G.M.2, G.M.3, G.M.5, **10.M.2, 10.M.3**)

TERM 4

Topic 1: Circles

- 1.1 Tangents to Circles (G.G.1, G.G.6, **10.G.6**)
- 1.2 Arcs and Chords (G.G.1, G.G.6, **10.G.6**)
- 1.3 Inscribed Angles (G.G.6, **10.G.6**)

Topic 2: Circles and Other Angle Relationships

- 2.1 Angle and arc measures (G.G.6, **10.G.6**)
- 2.2 Segment Lengths in Circles (G.G.6, **10.G.6**)
- 2.3 Equations of Circles (G.G.14, **10.G.7**)
- 2.4 Locus of Points (G.G.1, **10.G.1**)

Topic 3: Area of Polygons and Circles

- 3.1 Angle Measures in Polygons (G.G.6)
- 3.2 Areas of Regular Polygons (G.M. 3, G.M.4)
- 3.3 Perimeters and Areas of Similar Figures (G.G.5, **10.G.4**)
- 3.4 Circumference and Arc Length (G.M.1, G.M.4)
- 3.5 Areas of Circles and Sectors (G.M.1, G.M.4)
- 3.6 Geometric Probability (G.M.1)

Learning Standards for Geometry

Analyze characteristics and properties of two- and three-dimensional geometric shapes, and develop mathematical arguments about geometric relationships

Specify locations and describe spatial relationships using coordinate geometry and other representational systems

Apply transformations and use symmetry to analyze mathematical situations

Use visualization, spatial reasoning, and geometric modeling to solve problems

Students engage in problem solving, communicating, reasoning, connecting, and representing as they:

- G.G.1 Recognize special types of polygons (e.g., isosceles triangles, parallelograms, and rhombuses). Apply properties of sides, diagonals, and angles in special polygons; identify their parts and special segments (e.g., altitudes, midsegments); determine interior angles for regular polygons. Draw and label sets of points such as line segments, rays, and circles. Detect symmetries of geometric figures. **(10.G.1)**
- G.G.2 Write simple proofs of theorems in geometric situations, such as theorems about congruent and similar figures, parallel or perpendicular lines. Distinguish between postulates and theorems. Use inductive and deductive reasoning, as well as proof by contradiction. Given a conditional statement, write its inverse, converse, and contrapositive. **(10.G.4)**
- G.G.3 Apply formulas for a rectangular coordinate system to prove theorems.
- G.G.4 Draw congruent and similar figures using a compass, straightedge, protractor, or computer software. Make conjectures about methods of construction. Justify the conjectures by logical arguments. **(10.G.2)**
- G.G.5 Apply congruence and similarity correspondences (e.g., $\triangle ABC \cong \triangle XYZ$) and properties of the figures to find missing parts of geometric figures, and provide logical justification. **(10.G.4)**
- G.G.6 Apply properties of angles, parallel lines, arcs, radii, chords, tangents, and secants to solve problems. **(10.G.3)**
- G.G.7 Solve simple triangle problems using the triangle angle sum property, and/or the Pythagorean Theorem. **(10.G.5)**
- G.G.8 Use the properties of special triangles (e.g., isosceles, equilateral, 30° - 60° - 90° , 45° - 45° - 90°) to solve problems. **(10.G.6)**

- G.G.9 Define the sine, cosine, and tangent of an acute angle. Apply to the solution of problems.
- G.G.10 Apply the triangle inequality and other inequalities associated with triangles (e.g., the longest side is opposite the greatest angle) to prove theorems and solve problems.
- G.G.11 Demonstrate an understanding of the relationship between various representations of a line. Determine a line's slope and x- and y-intercepts from its graph or from a linear equation that represents the line. Find a linear equation describing a line from a graph or a geometric description of the line, e.g., by using the "point-slope" or "slope y-intercept" formulas. Explain the significance of a positive, negative, zero, or undefined slope.
- G.G.12 Using rectangular coordinates, calculate midpoints of segments, slopes of lines and segments, and distances between two points, and apply the results to the solutions of problems. **(10.G.7)**
- G.G.13 Find linear equations that represent lines either perpendicular or parallel to a given line and through a point, e.g., by using the "point-slope" form of the equation. **(10.G.8)**
- G.G.14 Demonstrate an understanding of the relationship between geometric and algebraic representations of circles.
- G.G.15 Draw the results, and interpret transformations on figures in the coordinate plane, e.g., translations, reflections, rotations, scale factors, and the results of successive transformations. Apply transformations to the solution of problems. **(10.G.9)**
- G.G.16 Demonstrate the ability to visualize solid objects and recognize their projections and cross sections. **(10.G.10)**
- G.G.17 Use vertex-edge graphs to model and solve problems. **(10.G.11)**
- G.G.18 Use the notion of vectors to solve problems. Describe addition of vectors and multiplication of a vector by a scalar, both symbolically and pictorially. Use vector methods to obtain geometric results.

Measurement

Understand measurable attributes of objects and the units, systems, and processes of measurement.

Apply appropriate techniques, tools, and formulas to determine measurements

Students engage in problem solving, communicating, reasoning, connecting, and representing as they:

- G.M.1 Calculate perimeter, circumference, and area of common geometric figures such as parallelograms, trapezoids, circles, and triangles. **(10.M.1)**
- G.M.2 Given the formula, find the lateral area, surface area, and volume of prisms, pyramids, spheres, cylinders, and cones, e.g., find the volume of a sphere with a specified surface area. **(10.M.2)**
- G.M.3 Relate changes in the measurement of one attribute of an object to changes in other attributes, e.g., how changing the radius or height of a cylinder affects its surface area or volume. **(10.M.3)**
- G.M.4 Describe the effects of approximate error in measurement and rounding on measurements and on computed values from measurements. **(10.M.4)**
- G.M.5 Use dimensional analysis for unit conversion and to confirm that expressions and equations make sense.