



# Geometry

## Foundations of Geometry

### Competencies

HS 2.1, HS 2.2, HS 4.1, HS 4.2

### Resources

HMH, Quizizz, Desmos, EdPuzzle

### Standards

A.SSE.A: Interpret the structure of expressions.

A.CED.A: Create equations that describe numbers or relationships.

A.REI.1 - Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a variable argument to justify a solution method.

A.REI.2 - Apply and extend previous understanding to solve equations in one variable.

G.CO.11: Make geometric constructions.

G.GPE.8 Use coordinates to compute perimeters of polygons and area of triangles and rectangles, including the use of the distance and midpoint formulas. (Just learning distance formula in this unit, will get to perimeter and area later.)

G.GPE.6. Use coordinates to prove simple geometric theorems algebraically, including the use of slope, distance, and midpoint formulas.

### Vocab

**Content:** point, line, plane, line segment, endpoints, ray, opposite ray, coplanar, parallel, collinear, postulate, midpoint, segment bisector, segment addition postulate, midpoint formula, distance formula, pythagorean theorem, congruent, angle, vertex, sides, degrees, angle bisector, acute angle, right angle, obtuse angle, straight angle, supplementary, complementary, angle addition postulate, conjecture, inductive reasoning, deductive reasoning, theorem, counterexample, conditional statement, hypothesis, conclusion, linear pair theorem, properties of equality: addition, subtraction, multiplication, division, reflexive, symmetric, transitive, substitution, postulates about points, lines, and planes

**Academic:** identify draw apply justify construct solve evaluate



# Geometry

## Foundations of Geometry

### I can

- \* I can identify and name basic geometric terms.
- \* I can use the Segment and Angle Addition Postulates to set up equations to find unknown measurements.
- \* I can use the distance formula or Pythagorean Theorem to find segment lengths.
- \* I can use the midpoint formula to find the midpoint of a segment or an endpoint of a segment.
- \* I can use definitions of geometric concepts to set up equations to find unknown measurements. (Such the definition of midpoint, bisectors, etc. to set up equations.)
- \* I can use definitions, postulates, theorems, and properties to justify steps in a basic algebraic or geometric proof.
- \* I can identify the hypothesis and conclusion of a conditional statement.
- \* I can use a compass and straightedge to construct a copy of a segment, copy of an angle, bisect an angle, and bisect a segment.



# Geometry Transformations

## Competencies

HS 2.1, HS 4.1

## Resources

HMH, Quizizz, Desmos, EdPuzzle

## Standards

A.SSE.A: Interpret the structure of expressions.

G.CO.1 Verify the properties of rotations, reflections, translations, and symmetry.

G.CO.2 Recognize transformations as functions that take points in the plane as inputs and give other points as outputs and describe the effect of translations, rotations, and reflections on two-dimensional figures.

G.CO.3 Given two congruent figures, describe a sequence of rigid motions that exhibits the congruence (isometry) between them using coordinates and the non-coordinate plane.

G.CO.5 Given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

## Vocab

**Content:** preimage image rigid motion isometry transformation translation vector reflection line of reflection perpendicular lines perpendicular bisector rotation center of rotation angle of rotation symmetry line of symmetry point symmetry rotational symmetry degrees of rotational symmetry

**Academic:** Describe Construct Identify Apply



# Geometry Transformations

## I can

- \* I can identify and describe translations, reflections, and rotations.
- \* I understand that translations, reflections, and rotations are rigid motions and map angles to angles and lines to lines to prove two figures are congruent.
- \* I can use a transformation rule and its preimage points to find its image points.
- \* I can write a transformation rule given its preimage and image.
- \* I can describe & write a sequence of translations, reflections, and rotations that maps one figure onto another.
- \* I can identify symmetry in a figure (point, line, and rotational).



# Geometry

## Lines & Angles

### Competencies

HS 2.2, HS 4.1, HS 4.2

### Resources

HMH, Quizizz, Desmos, EdPuzzle

### Standards

G.CO.7 Construct arguments about lines and angles using theorems. Theorems include: vertical angles are congruent, when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent

G.GPE.7 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometry problems. (e.g. Find the equation of a line parallel or perpendicular to a given line that passes through a given point.)

A.CED.1 Apply and extend previous understanding to create equations and inequalities in one variable and use them to solve problems.

A.CED.2 Apply and extend previous understanding to graph equations on coordinate axes.

A.REI.2 - Apply and extend previous understanding to solve equations in one variable.

G.CO.11 Make formal geometric constructions such: constructing perpendicular lines, perpendicular bisector, constructing a parallel line to a given line through a point not on the line.

### Vocab

**Content:** vertical angles linear pair adjacent angles supplementary angles complementary angles congruent angles parallel lines transversal corresponding angles same-side interior angles same-side exterior angles alternate interior angles alternate exterior angles postulate theorem converse slope parallel slope perpendicular slope reciprocal opposite reciprocal slope-intercept form point-slope form

**Academic:** Construct Identify Apply Solve Evaluate Prove



# Geometry

## Lines & Angles

### I can

- \* I can use the theorems about lines and angles (such as Vertical Angles Theorem, Linear Pair Postulate) to find and justify angle measures.
- \* I can use the theorems about lines and angles (such as Vertical Angles Theorem, Linear Pair Postulate) to write and solve equations.
- \* I can use theorems involving parallel lines and a transversal to find and justify angle measures.
- \* I can use theorems involving parallel lines and a transversal to write and solve equations.
- \* I can construct arguments and complete proofs involving parallel lines.
- \* I can identify the slope of parallel and perpendicular lines.
- \* I can determine whether a set of lines are parallel, perpendicular, or neither.
- \* I can write equations of parallel and perpendicular lines.
- \* I can use a compass and straightedge to construct parallel and perpendicular lines.



# Geometry

## Congruent Triangles

### Competencies

HS 4.1, HS 2.1

### Resources

HMH, Quizizz, Desmos, EdPuzzle

### Standards

G.CO.9 Construct arguments about the relationships between two triangles using the following theorems: SSS, SAS, ASA, AAS, and HL.

G.CO.4 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

A.CED.1 Apply and extend previous understanding to create equations in one variable and use them to solve problems.

### I can

A\* I can identify corresponding parts of congruent triangles and find their measures.

\* I can write and interpret triangle congruence statements.

\* I can use corresponding parts of congruent triangles to write and solve equations.

\* I can construct arguments for congruent triangles using SSS, SAS, AAS, ASA, HL, and CPCTC.

\* I can complete proofs for congruent triangles using SSS, SAS, AAS, ASA, HL, and CPCTC.

### Vocab

**Content:** CPCTC congruent sides congruent angles congruent triangles ASA AAS SAS SSS HL right triangle hypotenuse leg biconditional contrapositive

**Academic:** identify draw apply justify solve prove



# Geometry

## Properties of Triangles

### Competencies

HS 2.2, HS 4.1, HS 4.2

### Resources

HMH, Quizizz, Desmos, EdPuzzle

### Standards

G.CO.7 - Construct arguments about lines and angles using theorems. Theorems include: points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

G.CO.8 - Construct arguments about the relationships within one triangle using theorems. Theorems include: measures of interior angles of a triangle sum to 180; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point; angle sum and exterior angle of triangles.

G.GPE.6 - Use coordinates to prove simple geometric theorems algebraically, including the use of slope, distance, and midpoint formulas.

A.CED.1 Apply and extend previous understanding to create equations in one variable and use them to solve problems.

### Vocab

**Content:** perpendicular bisector equidistant angle bisector concurrent point of concurrency midsegment interior angle auxiliary line triangle sum theorem exterior angle remote interior angle isosceles triangles legs vertex angle base base angles equilateral triangle equiangular triangle triangle inequalities medians centroid altitude

**Academic:** identify apply solve reason interpret





# Geometry

## Properties of Triangles

### I can

- \* I can use theorems about perpendicular bisectors, angle bisectors, and midsegments of a triangle to find and justify angle and segment measures.
- \* I can use theorems about perpendicular bisectors, angle bisectors, and midsegments of a triangle to write and solve equations.
- \* I can use the distance and midpoint formulas to verify properties of the midsegment of a triangle.
- \* I can identify the median, altitude, perpendicular bisector, angle bisector, centroid, midsegment of a triangle.
- \* I can use properties of a centroid to find and justify statements about segments.
- \* I can use properties of a centroid to write and solve equations.
- \* I can use triangle theorems to find interior and exterior angle measures.
- \* I can use triangle theorems to write and solve equations involving angles and sides.
- \* I can use the Triangle Inequality Theorem to order sides and angles of a triangle.



# Geometry

## Similar Figures

### Competencies

HS 2.2, HS 4.3

### Resources

HMH, Quizizz, Desmos, EdPuzzle

### Standards

A.CED.1 Apply and extend previous understanding to create equations and inequalities in one variable and use them to solve problems.

A.REI.2 - Apply and extend previous understanding to solve equations in one variable.

G.SRT.1 - Use geometric constructions to verify the properties of dilations given by a center and scale factor: A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

G.SRT.2 - Recognize transformations as functions that take points in the plane as inputs and give other points as outputs and describe the effect of dilations on two-dimensional figures.

G.SRT.3 - Given two similar figures, describe a sequence of transformations that exhibits the similarity between them using coordinates and the non-coordinate plane.

G. SRT.4 - Understand the meaning of similarity for two-dimensional figures as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

G. SRT.5 - Construct arguments about triangles using theorems. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity, and AA

G. SRT.6 - Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

### Vocab

**Content:** scale factor enlargement reduction dilation pre-image image similar AA Similarity Theorem SSS Similarity Theorem SAS Similarity Theorem Side-Splitter Theorem & Converse indirect measurement geometric mean

**Academic:** identify apply justify solve evaluate reason



# Geometry

## Similar Figures

### I can

- \*I can identify a transformation as a dilation and describe the effects of a dilation on two-dimensional figures.
- \*I can determine whether or not two figures are similar.
- \*I can determine the scale factor of a dilation.
- \*I can identify a dilation of two-dimensional figures as functions that take points in the plane as inputs and give other points as outputs to find dilation coordinates.
- \*I can use the perpendicular bisector theorem to find segment measures.
- \* I can construct arguments and proofs related to theorems about the similarity of triangles.
- \* I can use properties of similarity to write and solve equations.



# Geometry

## Right Triangles & Trig

### Competencies

HS 2.1, HS 2.2, HS 4.3

### Resources

HMH, Quizizz, Desmos, EdPuzzle

### Standards

A.SSE.A: Interpret the structure of expressions.

A.CED.1 Apply and extend previous understanding to create equations and inequalities in one variable and use them to solve problems.

A.REI.2 - Apply and extend previous understanding to solve equations in one variable.

G.SRT. 6 - Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

G.SRT.7. - Show that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

G.SRT.8 - Explain and use the relationship between the sine and cosine of complementary angles.

G.SRT.9\* - Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

### Vocab

**Content:** sHypotenuse Leg Right Triangle Sine Cosine Tangent Compeletary Angles Inverse Inverse Sine Inverse Cosine Inverse Tangent Angle of Elevation Angle of Depression

**Academic:**Identify Apply Find Solve Simplify



# Geometry

## Right Triangles & Trig

### I can

- \* I can find the side lengths of 30-60-90 and 45-45-90 triangles.
- \* I can find the sine, cosine, and tangent ratios for a right triangle.
- \* I can use the sine, cosine, and tangent ratios to find side lengths of a right triangle.
- \* I can use the inverse sine, cosine, and tangent to find angles measures in a right triangle.
- \* I can use the Pythagorean Theorem, trigonometric ratios and inverses to solve application problems involving right triangles.



# Geometry

## Quadrilaterals & Coordinate Geometry

### Competencies

HS 4.1, HS 4.2, HS 2.2

### Resources

HMH, Quizizz, Desmos, EdPuzzle

### Standards

A.CED.1 Apply and extend previous understanding to create equations and inequalities in one variable and use them to solve problems.

A.REI.2 - Apply and extend previous understanding to solve equations in one variable.

G.GPE.6 - Use coordinates to prove simple geometric theorems algebraically, including slope, distance, & midpoint formulas

G.GPE.7 - Prove slope criteria for parallel & perpendicular lines and use them to solve geometric problems

G.GPE.8 - Use coordinates to compute perimeters of polygons and areas of triangles & rectangles, including the use of distance & midpoint formulas

G.CO.10 - Construct arguments about parallelograms using theorems. Theorems include: opposite sides are congruent, opposite angles are congruent, diagonals of parallelograms bisect each other, and conversely, rectangles are parallelograms with congruent diagonals. (Building upon prior knowledge in elementary & middle school).

### Vocab

**Content:** diagonal equilateral equiangular regular polygon interior angle exterior angle bisect supplementary congruent parallelogram quadrilateral rectangle rhombus square kite trapezoid isosceles trapezoid parallel perpendicular midsegment

**Academic:** Identify Classify Compare Prove Use Graph



# Geometry

## Quadrilaterals & Coordinate Geometry

### I can

- \* I can use theorems about parallelograms to find and justify angle, side, and diagonal measures.
- \* I can use theorems about parallelograms to write and solve equations
- \* I can determine the most precise name for a quadrilateral based on properties given.
- \* I can provide justifications for steps in a quadrilateral proof.
- \* I can use the slope, distance, and midpoint formulas to justify properties about quadrilaterals.
- \* I can use the slope, distance, and midpoint formulas to compute perimeters and area polygons.
- \* I can write the equation for sides of a quadrilateral using previous knowledge from parallel and perpendicular lines.



# Geometry Fundamental Statistics

## Competencies

## Resources

HMH, Quizizz, Desmos, EdPuzzle

## Standards

S.ID.1 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

S.ID.2 Interpret differences in shape, center, and spread in context of the data sets using dot plots, histograms, and box plots, accounting for possible effects of extreme data points(outliers).

S.ID.4 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

## Vocab

**Content:** mean median range innerquartile range outlier dot plot histogram bar chart box plot frequency table relative frequency categorical data quantitative data standard deviation spread

**Academic:** Calculate Compare Summarize Construct Describe





# Geometry

# Fundamental Statistics

## I can

- \* I can describe one data set in terms of center and spread represented by dot plots, histograms, and box plots. (ie using mean, median, range, IQR, standard deviation)
- \* I can interpret the differences in shape, center, and spread in the context of data sets represented by dot plots, histograms and box plots. (ie using mean, median, range, IQR, standard deviation)
- \* I can identify interpret the effects of outliers on the shape, center, and spread of a data set.
- \* I can summarize categorical data for two categories in a two-way frequency table.
- \* I can construct a two-way table frequency table from given categorical data.
- \* I can use a two-way frequency table to calculate and interpret relative frequencies in the context of the data and identify possible associations and trends in the data.



# Geometry

## Surface Area & Volume

### Competencies

HS 2.2, HS 4.1

### Resources

HMH, Quizizz, Desmos, EdPuzzle

### Standards

A.CED.1 Apply and extend previous understanding to create equations and inequalities in one variable and use them to solve problems.

A.REI.2 - Apply and extend previous understanding to solve equations in one variable.

G.GMD.2 - Give an informal argument using Cavalieri's principle for the volume of a solid figure.

G.MG.1 - Use geometric shapes, their measures, and their properties to describe objects

G.MG.2 - Apply concepts of density and displacement based on area and volume in modeling situations

G.MG.3 - Apply geometric methods to solve design problems

### Vocab

**Content:** polyhedron face edge vertex net prism prism base lateral face altitude/height slant height right prism cross-section surface area lateral area volume cylinder pyramid cones sphere regular polygon apothem Cavalieri's Principle composite figure

**Academic:** Identify Recall Calculate Compare Design Construct



# Geometry

## Surface Area & Volume

### I can

- \* I can use geometric shapes, measurement, and properties to describe objects
- \* I can apply geometric methods to solve design problems.
- \* I can find missing parts of a 3D solids based on given measurements.
- \* I can calculate surface area and volume of basic 3D solids.
- \* I can explain volume formulas of basic 3D solids and use them to solve problems.
- \* I can apply concepts of density and displacement based on area and volume in modeling situations.
- \* I can apply geometric methods to solve design problems.



# Geometry

## Circles

### Competencies

HS 4.2

### Resources

HMH, Quizizz, Desmos, EdPuzzle

### Standards

G.GPE.1 - Write the equation of a circle given the center & radius or a graph of the circle

G.GPE.2 - Derive the equation of a circle of given center & radius using the Pythagorean Theorem; graph the circle in the coordinate plane

G.C.2 - Identify & describe relationships among inscribed angles, radii, & chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

### Vocab

**Content:** circle center radius diameter chord circumference central angle inscribed angle circumscribed angle arc minor arc major arc intercepted arc semi-circle adjacent arcs arc length arc measure concentric circles sector of a circle tangent point of tangency

**Academic:** calculate identify classify solve evaluate



# Geometry

## Circles

### I can

- \* I can identify the center, radius, and diameter of a circle, given the graph of the circle.
- \* I can write the equation of a circle given the center and radius.
- \* I can write the equation of a circle given a graph of the circle.
- \* I can use the center and radius to graph a circle in the coordinate plane.
- \* I can use the Arc Addition Postulate to find arc measure.
- \* I can identify minor arcs, major arcs, semicircles, chords, inscribed angles, circumscribed angles, and tangent lines.
- \* I can find the arc length and area of a sector of a circle.
- \* I can find the measure of inscribed angles and intercepted arcs.
- \* I can find angle, arc, and segment measures using lines tangent to a circle.
- \* I can find angle and side measures for a polygon either inscribed or circumscribed about a circle.