

Teaching Math with Google Drawings

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Watch the video training for this content here - Teaching Math with Google Drawings - <https://www.youtube.com/watch?v=AqQgSxwoVYs>

Using Google Drawings for Math

Google Drawings is an online tool for creating diagrams, flowcharts, headers, and other images. Drawings allows you to create and edit pictures by using shapes, text boxes, lines, arrows, tables, other images, and more.

Drawings can be used by teachers and students as a good way to explain and explore math concepts including shapes, area, angles, pictographs, fractions, and more. In this document we will see many examples of Google Drawing projects and the Common Core Math Standards they address.

For details on the basics of how to use Google Drawings, see my help guide “[Using Google Drawings](#)”.

Lines of Symmetry

Example - [Google Drawing link](#)

Students can create shapes or insert images, then add lines to show the lines of symmetry for those shapes.

CC.4.G.3 Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Partitioning Shapes

Splitting Rectangles example - [Google Drawing link](#)

Students can create shapes and then add lines to partition the shapes into equal parts.

CC.1.G.3 Reason with shapes and their attributes. Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

CC.2.G.3 Reason with shapes and their attributes. Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

CC.3.G.2 Reason with shapes and their attributes. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part is $\frac{1}{4}$ of the area of the shape.

Shapes

Shape Art Project example - [Google Drawing link](#)

Students can create a picture by inserting a variety of required shapes, and can then add colors and other images to complete their picture. Students could then use Docs to explain which shapes they used in the picture and where the shapes are.

CC.K.G.5 Analyze, compare, create, and compose shapes. Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.

CC.1.G.1 Reason with shapes and their attributes. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); for a wide variety of shapes; build and draw shapes to possess defining attributes.

CC.1.G.2 Reason with shapes and their attributes. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Students do not need to learn formal names such as “right rectangular prism.”)

CC.2.G.1 Reason with shapes and their attributes. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (Sizes are compared directly or visually, not compared by measuring.)

CC.3.G.1 Reason with shapes and their attributes. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

CC.4.G.2 Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

CC.7.G.2 Draw, construct, and describe geometrical figures and describe the relationships between them. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

Fractions

Fraction Flag example - [Google Drawing link](#)

Students can create their own country flag using a variety of colored shapes, then they can use Docs to explain which fractional part of the whole each color represents.

CC.3.NF.1 Develop understanding of fractions as numbers. Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)

CC.3.NF.3b Recognize and generate simple equivalent fractions (e.g., $1/2 = 2/4$, $4/6 = 2/3$), Explain why the fractions are equivalent, e.g., by using a visual fraction model. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)

Pictographs and Line Plots

Pictograph example - [Google Drawing link](#)

Students can insert a table, text, and images into a Drawing to create a pictograph or a line plot

CC.2.MD.9 Represent and interpret data. Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.

CC.2.MD.10 Represent and interpret data. Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

CC.3.MD.3 Represent and interpret data. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

CC.3.MD.4 Represent and interpret data. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

CC.4.MD.4 Represent and interpret data. Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.

CC.5.MD.2 Represent and interpret data. Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Congruent Shapes

Congruent Shapes example - [Google Drawing link](#)

Students can use the tools in Drawings to move (translate), flip (reflection), and rotate shapes to determine congruency.

CC.8.G.1 Understand congruence and similarity using physical models, transparencies, or geometry software. Verify experimentally the properties of rotations, reflections, and translations:

- a. Lines are taken to lines, and line segments to line segments of the same length.
- b. Angles are taken to angles of the same measure.
- c. Parallel lines are taken to parallel lines.

CC.8.G.2 Understand congruence and similarity using physical models, transparencies, or geometry software. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

CC.9-12.G.CO.3 Experiment with transformations in the plane. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

CC.9-12.G.CO.5 Experiment with transformations in the plane. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

CC.9-12.G.CO.6 Understand congruence in terms of rigid motions. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

Similar Shapes

Similar Shapes example - [Google Drawing link](#)

Students can use the tools in Drawings to move (translate), flip (reflection), rotate, and dilate (resize) shapes to determine similarity.

CC.8.G.4 Understand congruence and similarity using physical models, transparencies, or geometry software. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

CC.9-12.G.SRT.2 Understand similarity in terms of similarity transformations. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

Angles of a Triangle

Angles of a Triangle example - [Google Drawing link](#)

Students can copy, paste, and rotate copies of a triangle to demonstrate that the three angles of a triangle always add up to 180 degrees.

CC.9-12.G.CO.10 Prove geometric theorems. Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180 degrees; 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.

Sorting Objects

3 Category Sorter - Shapes - [Google Drawing link](#)

3 Category Sorter - Colors - [Google Drawing link](#)

3 Category Sorter - Sizes - [Google Drawing link](#)

(more graphic organizers - [Google Drive folder link](#))

Students can drag and drop objects into three categories based on a variety of characteristics including shape, color, and size.

CC.K.MD.3 Classify objects and count the number of objects in each category. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. (Limit category counts to be less than or equal to 10.)

CC.1.MD.4 Represent and interpret data. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Properties of Quadrilaterals

Sorting Quadrilaterals template - [Google Drawing link](#)

(more graphic organizers - [Google Drive folder link](#))

Students can insert quadrilaterals into a graphic organizer to show their understanding of which categories each shapes fits in.

CC.3.G.1 Reason with shapes and their attributes. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

CC.4.G.2 Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

CC.5.G.3 Classify two-dimensional figures into categories based on their properties. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.

CC.5.G.4 Classify two-dimensional figures into categories based on their properties. Classify two-dimensional figures in a hierarchy based on properties.

Adding Integers

Adding Integers Template - [Google Drawing link](#)

Students can represent an integer addition problem by using and combining colored chips that model the positive and negative number being added.

CC.6.NS.5 Apply and extend previous understandings of numbers to the system of rational numbers. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, debits/credits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

CC.6.EE.7 Reason about and solve one-variable equations and inequalities. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.

CC.7.NS.1b Understand $p + q$ as the number located a distance $|q|$ from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.

Measuring Area

8x8 Grid Template - [Google Drawing link](#)

16x16 Grid Template - [Google Drawing link](#)

Students can measure or estimate the measure of area for shapes you have provided or shapes they have inserted, by using the grid overlay in the Drawing template.

CC.3.MD.6 Geometric measurement: understand concepts of area and relate area to multiplication and to addition. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

CC.3.MD.7a Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.

CC.3.MD.7c Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.

CC.3.MD.7d Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

CC.5.NF.4b Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

Algebraic Expressions

Algebra Tiles Template - [Google Drawing link](#)

Students can copy and paste the algebra tile shapes in the template to multiply algebraic expressions.

CC.6.EE.3 Apply and extend previous understandings of arithmetic to algebraic expressions. Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.

CC.9-12.A.APR.1 Perform arithmetic operations on polynomials. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Lines and Angles

Map Geometry project - Use Google Maps to zoom in on a neighborhood. Take a screenshot. Put the captured image into Google Drawings. Use the Drawing tools to identify angles, lines, and more. Use the protractor template or protractor extension to measure angles.

Protractor Template Drawing - [Google Drawing link](#)

Protractor Template image - [PNG image](#)

Ctrl + Shift + Switch Window keys - take a screenshot on a Chromebook

Snagit Extension (to take screenshots on a non-Chromebook) - [Chrome Web Store link](#)

Awesome Screenshot extension (to take screenshots on a non-Chromebook) - [Chrome Web Store link](#)

MB-Ruler for Chrome (protector extension) - [Chrome Web Store link](#)

Edge: The Web Ruler (ruler web app) - [Chrome Web Store link](#)

CC.4.MD.6 Geometric measurement: understand concepts of angle and measure angles. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

CC.4.G.1 Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

CC.7.G.5 Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

CC.8.G.5 Understand congruence and similarity using physical models, transparencies, or geometry software. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the three angles appear to form a line, and give an argument in terms of transversals why this is so.

Other resources

- Bring me to your organization: My training and consulting services - on-site or online - [link](#)

- All of my free training materials, help guides, presentations, videos, and more - [link](#)

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