

# Geometry

## Domain Overview

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### GRADE 3

The study of geometry in third grade builds upon previous experiences from Grade 2. Students have been exposed to numerous shapes as they play, draw, color, build, and explore with toys and technology. These experiences help to develop spatial reasoning, which is important in daily life for interpreting and making drawings, forming mental images, visualizing changes, and generalizing about perceptions in the environment. At this level students will identify and draw triangles, pentagons, and hexagons and specifically concentrate on quadrilaterals. Third graders will also focus on fractions by partitioning a whole shape such as a circle or rectangle into equal parts.

### GRADE 4

At the fourth grade level, the study of geometry features descriptions, analysis, comparisons, and classification of two-dimensional shapes. Students will learn three important concepts and skills. First, students will draw points, lines, line segments, rays, angles, and perpendicular and parallel lines. Second, 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 will be classified. Third, students will recognize and draw a line of symmetry for a two-dimensional shape. By building, drawing, and analyzing two-dimensional shapes, students expand their knowledge of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

### GRADE 5

In fifth grade, students will be thinking about the underlying structure of the coordinate system and learning how axes make it possible to locate points anywhere on a coordinate plane. At this grade level, students will also represent real-world and mathematical problems by graphing and interpreting points in the first quadrant of the coordinate plane. Students will also make a connection that attributes belonging to a category of two-dimensional shapes that belong to all subcategories of that category. As a result of this learning, students will develop a foundational understanding for future concepts with the coordinate system and also be able to classify and better understand geometric shapes.



## SUGGESTED MATERIALS FOR THIS DOMAIN

| 3 | 4 | 5 |  |
|---|---|---|--|
| ✓ | ✓ | ✓ | Geoboards and geobands (rubber bands)  |
| ✓ |   |   | Straws, toothpicks, pipe cleaners, Popsicle sticks to create quadrilaterals          |
| ✓ | ✓ | ✓ | Paper and pencil for drawing shapes (or individual whiteboards and markers)          |
|   | ✓ |   | Construction paper die-cut alphabet letters (used to find symmetry)                  |
|   | ✓ |   | Miras or mirrors to show reflections of symmetry                                     |
| ✓ | ✓ |   | A variety of cut-out paper shapes, including circles, triangles, pentagons, hexagons |
| ✓ | ✓ |   | Pattern blocks (Reproducible 11)   |
| ✓ |   |   | Scissors   |
|   | ✓ |   | Tangrams (Reproducible 12)   |
|   | ✓ |   | <i>The Greedy Triangle</i> by Marilyn Burns  |

## KEY VOCABULARY

| 3 | 4 | 5 |   |
|---|---|---|---|
|   | ✓ |   | <b>acute angle</b> an angle smaller than a right angle (less than 90 degrees)   |
| ✓ | ✓ |   | <b>angles</b> two rays (<) that share an endpoint   |
| ✓ | ✓ | ✓ | <b>attributes</b> sides, angles, color, shape, size, girth  |
|   |   | ✓ | <b>axis (axes = plural)</b> the horizontal number line (x-axis) and the vertical number line (y-axis) on the coordinate plane. Axes are also the lines at the side and bottom of a graph. |
|   | ✓ | ✓ | <b>classify</b> put things into groups (classes) based on a property  |
|   |   | ✓ | <b>congruent</b> equal in size and shape  |
|   |   | ✓ | <b>coordinate plane</b> a number in an ordered pair that names the location of a point on the coordinate plane  |
| ✓ | ✓ | ✓ | <b>closed figure</b> a shape that begins and ends at the same point; for example, a triangle  |
| ✓ | ✓ | ✓ | <b>edge</b> sides   |
|   | ✓ |   | <b>eighth</b> one eighth, one of eight equal parts  |
| ✓ |   |   | <b>equal shares</b> equal sizes, the same amount  |
| ✓ | ✓ | ✓ | <b>figure</b> a closed shape in two or three dimensions   |

(Continued)

## KEY VOCABULARY

3 4 5

- ✓ ✓ ✓ **fraction** a part of a whole number
- ✓ ✓ ✓ **geometry** the study of properties, measurement, and relationships of points, lines, angles, surfaces, and solids
- ✓ **grid** a coordinate grid that locates a point by its distance from the intersection of two straight lines
- ✓ ✓ ✓ **half** one of two parts
- ✓ ✓ ✓ **line** the shortest distance between any two points on a plane
- ✓ **line plot** a graph that shows frequency of data along a number line, usually plotted with an x
- ✓ **horizontal** a straight line on a coordinate plane where all points on the line have the same y coordinate
- ✓ ✓ ✓ **line segment** a part of a line that connects two points
- ✓ **obtuse** an angle measuring more than 90 degrees but less than 180 degrees
- ✓ ✓ ✓ **open figure** a shape made up of line segments with at least one line segment that isn't connected to anything at one of its endpoints
- ✓ **ordered pairs** pair of numbers used to locate a point on a coordinate plane; the first number tells how far to move horizontally and the second number tells how far to move vertically
- ✓ **origin** the starting point on a coordinate grid
- ✓ ✓ **parallel** two lines in a plane that do not intersect
- ✓ ✓ ✓ **partition** equal dividing
- ✓ ✓ **perpendicular** lines that are at right angles (90 degrees) to each other
- ✓ ✓ **plane** a flat two-dimensional surface
- ✓ ✓ **plot** used to pinpoint where places on a line are located to show data
- ✓ ✓ **point** an exact position or location on a plane surface
- ✓ **prism** three-dimensional figure with two congruent and parallel faces that are polygons; the rest of the faces are parallelograms
- ✓ ✓ ✓ **properties** a quality that something has, such as color, size, height, and so on
- ✓ **quadrant** a graph divided into four sections
- ✓ ✓ ✓ **quarter** one of four parts
- ✓ **ray** a line that starts at a point and goes off in a particular direction to infinity
- ✓ **reflection** a mirror image of a geometric figure

## KEY VOCABULARY

3 4 5

|   |   |   |  |   |
|---|---|---|--|---|
| ✓ | ✓ |   | <b>regular hexagon</b>   | a polygon with six equal sides and six equal angles                                 |
| ✓ | ✓ | ✓ | <b>regular polygon</b>   | a closed plane figure having three or more sides                                    |
|   | ✓ | ✓ | <b>right angle</b>   | an angle that measures exactly 90 degrees   |
| ✓ | ✓ | ✓ | <b>side</b>  | a line segment of a many-sided figure   |
|   | ✓ |   | <b>straight angle</b>  | an angle that measures exactly 180 degrees  |
| ✓ | ✓ | ✓ | <b>surface</b>   | area of faces and curved surfaces of a three-dimensional figure                     |
|   | ✓ |   | <b>symmetry</b>  | an object is symmetrical when one half is a mirror image of the other half.         |
| ✓ | ✓ | ✓ | <b>triangle</b>  | a three-sided polygon   |
|   |   |   | <b>scalene</b>   | triangle with none of the sides the same length                                     |
|   |   |   | <b>isosceles</b>   | a triangle with two equal sides; the angles opposite the equal sides are also equal |
|   |   |   | <b>equilateral</b>   | triangle with three equal sides and three equal angles                              |
| ✓ | ✓ | ✓ | <b>two-dimensional shapes</b>  | shapes with two dimensions: length and width  |
|   |   |   | <ul style="list-style-type: none"> <li>• circle</li> <li>• square</li> <li>• triangle</li> <li>• rectangle</li> <li>• hexagon</li> <li>• trapezoid</li> <li>• quadrilateral</li> <li>• rhombus</li> <li>• parallelogram</li> </ul> |   |
| ✓ |   |   | <b>Venn diagram</b>  | a graphic organizer for comparison and contrast                                     |
| ✓ | ✓ | ✓ | <b>vertex/corner</b>   | point at which two line segments meet to form an angle                              |
|   | ✓ | ✓ | <b>vertical</b>  | an up/down position   |