MyStemKits.com

Geometry

A MyStemKits Curriculum Unit

Grades: *K-5*

Subjects: *Mathematics*

Strands: *Geometry, Measurement and Data, Operations and Algebraic Thinking*

Geometry

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Introduction

The MyStemKits.com K – 5 Geometry Lessons consist of a complete set of lessons aligned to the Common Core State Standards (CCSS) for mathematics. This comprehensive set of lessons addresses the entire geometry domain from kindergarten through fifth grade. These lessons were written in response to a summary of the research on the development of mathematical thinking in children by Clements and Sarama (2009). In their book, Learning and Teaching Early Math: The Learning Trajectories Approach, Clements and Sarama (2009) describe the learning trajectories for the development of shape in children. To develop a rich and robust understanding of the defining attributes of two- and three-dimensional shapes, Clements and Sarama (2009) recommend incorporating the following four features in the geometry curriculum:

1. *Provide numerous and varied examples of shapes as well as nonexamples to develop a finer understanding of the defining attributes of each shape.*
2. *Encourage students to describe shapes using language that references their defining attributes.*
3. *Expose students to a wide variety of shape classes and, to the extent possible, relationships among classes.*
4. *Challenge students with a wide variety of geometric activities.*

The MyStemKits.com K – 5 Geometry Lessons were developed to reflect these recommendations. Each of the basic shape kits includes conventional examples of shapes from various shape classes (exemplars), a number of variations within each shape class (variants), and shapes that might be mistaken for shapes within a class (distractors). For example, the Basic Shapes: Triangle Kit contains exemplars such as an equilateral and an acute isosceles triangle, variants such as an acute scalene and an obtuse isosceles triangle, and distractors such as a sector and a chevron. Throughout the lessons, students are asked to distinguish between examples and nonexamples of shapes and justify their decisions by appealing to the defining attributes of the shape class (e.g., the defining attributes of a triangle are that it is a closed shape with three straight sides). The K – 5 Geometry Lessons incorporate a variety of pedagogical approaches (e.g., whole group discussions, engaging group and partner activities, active student participation, assessment opportunities, and self-assessment exercises) and reflect the Standards for Mathematical Practice advocated by the Common Core State Standards Initiative.

Color Key

All kits and lesson plans have been color-coded so you can more-easily find those relevant to you.

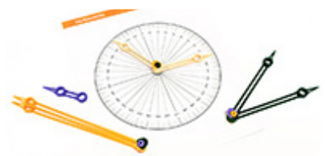
Mathematics *Interdisciplinary* *Science*

Geometry

A MyStemKits Curriculum Unit

Utilized 3D Kits

Adjustable Angle Kit



K-5
6-8
9-12

Mathematics

Perfect for exploring types of angles, drawing circles, investigating similar shapes, or telling time, this kit is a must-have for any elementary classroom.

3 Standards-Driven Lesson Plans

Angle Tester Kit

K-5
6-8

Mathematics

Help your students develop an intuitive understanding of angle measure with this set of four benchmark angles.

12 Standards-Driven Lesson Plans

Basic Shapes: Circles Kit

K-5
6-8

Mathematics

A comprehensive kit designed to help students understand circles, semicircles, and quarter circles.

17 Standards-Driven Lesson Plans

Basic Shapes: Polygons Kit

K-5
6-8

Mathematics

Nail down what is and what is not a polygon with this set of 18 shapes!

26 Standards-Driven Lesson Plans

Basic Shapes: Quadrilaterals Kit

K-5
6-8

Mathematics

Consisting of twenty-two shapes, this set of shapes can be used to develop the concept and classification of quadrilaterals.

34 Standards-Driven Lesson Plans

Basic Shapes: RIght Solids Kit

K-5
6-8

Mathematics

Provide a comprehensive look at right solids with this kit containing 26 unique shapes.

7 Standards-Driven Lesson Plans

Basic Shapes: Triangles Kit

K-5
6-8
9-12

Mathematics

Consisting of 9 unique triangles and 7 shapes that might be mistaken for triangles, this comprehensive kit helps solidify the definition of a triangle.

26 Standards-Driven Lesson Plans

Bowling Kit

K-5
6-8
9-12

Science
Mathematics

It's all strikes with this interdisciplinary kit. Physics collides with statistics as students analyze bowling pin placement, lane length, and different sized bowling balls. Also useful for graphing and fractions.

1 Standards-Driven Lesson Plans

City Engineering Kit

K-5
6-8
9-12

Science
Engineering
Mathematics

Build the next generation of civil engineers with this hands-on kit perfect for interdisciplinary STEM activities kindergarten through high school. Challenge students with requirements as they build cities, and utilize multiplication, graphing, and ecology.

1 Standards-Driven Lesson Plans

Composing Polygons Kit

K-5
6-8

Mathematics

Explore the variety of polygons with this build-it-yourself kit. Containing specialized "vertex" pieces, combine with straws to create polygons. Features at least five of every angle 10-180 by tens, as well as specialized angles to make all the regular polygons.

12 Standards-Driven Lesson Plans

Composing Polyhedrons Kit

K-5
6-8

Engineering
Mathematics

Explore the variety of 3-dimensional polyhedrons with this build-it-yourself kit. Containing specialized "vertex" pieces, combine with straws to create assorted polyhedrons.

2 Standards-Driven Lesson Plans

Decomposing Shapes Kit

K-5
6-8

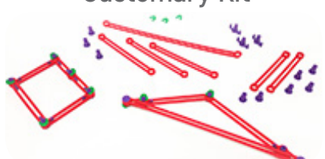
Mathematics

Art meets math with this open-ended kit as students use a variety of pieces to compose complex shapes, investigate partitioning, and explore symmetry.

6 Standards-Driven Lesson Plans

Utilized 3D Kits (Continued)

Geometry Sticks: Customary Kit

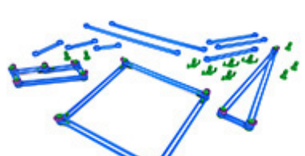


K-5 6-8 9-12 | Mathematics

Build and define shapes, examine perimeter and addition of length units. Also great for exploring the sum of interior angles, parallelograms, diagonals, triangle congruence theorem, and more!

4 Standards-Driven Lesson Plans

Geometry Sticks: Metric Kit



K-5 6-8 9-12 | Mathematics

Build and define shapes, examine perimeter and addition of length units. Also great for exploring the sum of interior angles, parallelograms, diagonals, triangle congruence theorem, and more!

4 Standards-Driven Lesson Plans

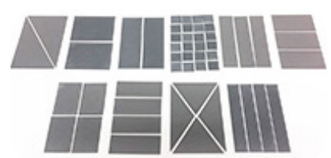
Graphing Kit

K-5 6-8 9-12 | Science Engineering Mathematics

Create interactive graphs with this hands-on kit, including dot plots, line graphs, bar graphs, and scatter plots!

1 Standards-Driven Lesson Plans

Partitioning Rectangles Kit

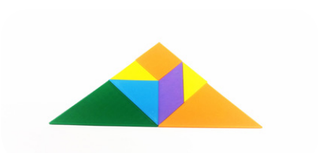


K-5 | Mathematics

Develop the foundation for both fractions and area and enable students to recognize that equal partitions of the same whole need not have the same shape.

5 Standards-Driven Lesson Plans

Tangram Kit



K-5 6-8 9-12 | Mathematics

Your classic tangram kit, simply 3D print your own tans and task your students with interactive STEAM challenges as they solve puzzles to create and dissect certain silhouettes.

3 Standards-Driven Lesson Plans

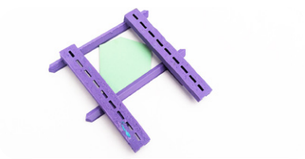
Loaded Dice Kit

K-5 6-8 9-12 | Mathematics

Don't gamble with teaching statistics! Use these fun dice to get your students rolling!

2 Standards-Driven Lesson Plans

Parallel Line Tester Kit



K-5 | Mathematics

An intuitive kit, simply place around an object and slide the bars together to check for parallel sides.

10 Standards-Driven Lesson Plans

Partitioning Circles Kit

K-5 6-8 9-12 | Mathematics

Introduce your students to fraction and area concepts with this simple kit which includes partitions of circles.

5 Standards-Driven Lesson Plans

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Lesson Plans: Kindergarten

Circles and Position

Grades: K

Strands: Geometry

Students identify circles both in the environment and on paper. They distinguish between circles and shapes that are similar to circles (i.e., distractors). They begin the development of vocabulary related to relative position (i.e., terms such as above, below, beside, in front of, behind, and next to).

Standards Addressed

CCSS.MATH.CONTENT.K.G.A.1
CCSS.MATH.CONTENT.K.G.A.2
CCSS.MATH.PRACTICES: 4

3D Kits Utilized

Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit

Introducing Triangles

Grades: K

Strands: Geometry

Students develop a working definition of a triangle that can be used to discriminate between two-dimensional shapes that are triangles and those that are not triangles. They are introduced to vocabulary related to polygons (e.g., sides and vertices). Emphasis is placed on the defining attributes of triangles and using the defining attributes to justify decisions about whether a shape is a triangle or not.

Standards Addressed

CCSS.MATH.CONTENT.K.G.A.1
CCSS.MATH.CONTENT.K.G.A.2
CCSS.MATH.CONTENT.K.G.B.5
CCSS.MATH.PRACTICES: 3, 4

3D Kits Utilized

Basic Shapes: Triangles Kit

Identifying Right Angles

Grades: K

Strands: Geometry

Students are introduced to the concept of a right angle. They identify examples of right angles in the real world and in geometric shapes and are introduced to vocabulary related to angles (i.e., sides and vertices). This lesson prepares students for understanding and identifying rectangles.

Standards Addressed

CCSS.MATH.CONTENT.K.G.A.1
CCSS.MATH.CONTENT.K.G.A.2
CCSS.MATH.PRACTICES: 3, 4

3D Kits Utilized

Angle Tester Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit

Introducing Rectangles

Grades: K

Strands: Geometry

Students develop a working definition of a rectangle that can be used to discriminate between two-dimensional shapes that are rectangles and those that are not rectangles. They continue to use vocabulary related to polygons (e.g., sides and vertices). Emphasis is placed on the defining attributes of rectangles and using the defining attributes to justify decisions about whether a shape is a rectangle or not.

Standards Addressed

CCSS.MATH.CONTENT.K.G.A.1
CCSS.MATH.CONTENT.K.G.A.2
CCSS.MATH.CONTENT.K.G.B.5
CCSS.MATH.PRACTICES: 3, 4

3D Kits Utilized

Basic Shapes: Quadrilaterals Kit
Composing Polygons Kit

Introducing Hexagons

Grades: K

Strands: Geometry

Students develop a working definition of a hexagon that can be used to discriminate between two-dimensional shapes that are hexagons and those that are not hexagons. They continue to use vocabulary related to polygons (e.g., sides and vertices). Emphasis is placed on the defining attributes of hexagons and using the defining attributes to justify decisions about whether a shape is a hexagon or not.

Standards Addressed

CCSS.MATH.CONTENT.K.G.A.1
CCSS.MATH.CONTENT.K.G.A.2
CCSS.MATH.CONTENT.K.G.B.5
CCSS.MATH.PRACTICES: 3, 4

3D Kits Utilized

Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit
Composing Polygons Kit (optional)

Comparing Flat Shapes

Grades: K

Strands: Geometry

Students analyze and compare properties of two-dimensional (flat) shapes to which they have been introduced. They develop and deepen their understanding of defining attributes of two-dimensional shapes by analyzing and comparing them. Students analyze circles, triangles, rectangles, and hexagons. They compare shapes based on the numbers of sides, vertices, presence of right angles, and congruence of sides.

Standards Addressed

CCSS.MATH.CONTENT.K.G.B.4
CCSS.MATH.PRACTICES: 2

3D Kits Utilized

Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit
Composing Polygons Kit (optional)

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An Introduction to Composing Shapes

Grades: K

Strands: Geometry

Students recognize that shapes can be joined along sides of equal length to compose new shapes. They compose rectangles, squares, and hexagons using other two-dimensional shapes.

Standards Addressed

CCSS.MATH.CONTENT.K.G.B.6 CCSS.MATH.PRACTICES: 4, 7

3D Kits Utilized

Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit
Decomposing Shapes Kit (optional)

Composing Shapes with Templates

Grades: K

Strands: Geometry

Students further explore shape composition by selecting shapes that complete template puzzles.

Standards Addressed

CCSS.MATH.CONTENT.K.G.B.6 CCSS.MATH.PRACTICES: 4, 7

3D Kits Utilized

Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit
Tangram Kit

Decomposing Shapes

Grades: K

Strands: Geometry

Students will work to decompose known shapes into their component parts. They will explore and discuss the shapes and their attributes that compose hexagons, pentagons, and other complex shapes.

Standards Addressed

CCSS.MATH.CONTENT.K.G.B.6 CCSS.MATH.PRACTICES: 4, 7

3D Kits Utilized

Decomposing Shapes Kit

Flat and Solid Shapes

Grades: K

Strands: Geometry

Students learn to distinguish between two- and three-dimensional shapes. Terms describing attributes of three-dimensional shapes are also introduced.

Standards Addressed

CCSS.MATH.CONTENT.K.G.B.6 CCSS.MATH.PRACTICES: 2

3D Kits Utilized

Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Right Solids Kit
Basic Shapes: Triangles Kit

Naming Solid Shapes

Grades: K

Strands: Geometry

Students are introduced to cubes, cylinders, cones, and spheres. Emphasis is placed on identifying and naming these solids using manipulatives and finding examples in the environment.

Standards Addressed

CCSS.MATH.CONTENT.K.G.B.4 CCSS.MATH.PRACTICES: 2, 4

3D Kits Utilized

Basic Shapes: Right Solids Kit

Modeling Shapes in the Real World

Grades: K

Strands: Geometry

Students model shapes in the real world by composing solid shapes.

Standards Addressed

CCSS.MATH.CONTENT.K.G.B.5 CCSS.MATH.PRACTICES: 4, 7

3D Kits Utilized

Basic Shapes: Right Solids Kit
Composing Polyhedrons Kit (optional)

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Lesson Plans: First Grade

What's a Polygon with Three Sides?

Grades: 1

Strands: Geometry

Students will learn the term polygon as it relates to all closed, flat shapes with three or more straight sides. Next, students identify the defining attributes of triangles. They reason about the defining attributes of triangles as well as non-defining attributes such as color, size, and orientation.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.1
CCSS.MATH.PRACTICES: 3, 4

3D Kits Utilized

Basic Shapes: Triangles Kit
Basic Shapes: Polygons Kit

What's a Four-Sided Polygon? A Square is a Rectangle, Too?

Grades: 1

Strands: Geometry

Students deepen their understanding that a square is a special kind of rectangle. They compare and contrast the defining attributes of squares and rectangles to uncover the similarities and differences.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.1
CCSS.MATH.PRACTICES: 3, 7

3D Kits Utilized

Angle Tester Kit
Basic Shapes: Quadrilaterals Kit
Composing Polygons Kit
Parallel Line Tester Kit

Hexagons: A Shape with Six Straight Sides

Grades: 1

Strands: Geometry

Students identify the defining attributes of hexagons. They apply their understanding by sorting hexagons and non-hexagons, as well as creating and drawing hexagons of various sizes, orientations, and side lengths.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.1
CCSS.MATH.PRACTICES: 3, 7

3D Kits Utilized

Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit
Composing Polygons Kit

Introducing Parallel Lines & Trapezoids

Grades: 1

Strands: Geometry

Students are formally introduced to parallel lines. They identify parallel lines in two-dimensional shapes using parallel lines testers. Students are then introduced to the defining attributes of trapezoids. They have the opportunity to reason about the defining attributes of trapezoids and non-defining attributes such as color, size, and orientation.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.1
CCSS.MATH.PRACTICES: 3, 7

3D Kits Utilized

Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Parallel Line Tester Kit

Introducing Parallelograms

Grades: 1

Strands: Geometry

Students are introduced to the defining attributes of a parallelogram. They apply their understanding by distinguishing between parallelograms and non-parallelograms.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.1
CCSS.MATH.PRACTICES: 3, 4

3D Kits Utilized

Basic Shapes: Quadrilaterals Kit
Composing Polygons Kit (optional)
Geometry Sticks: Metric Kit (optional)
Geometry Sticks: Customary Kit (optional)
Parallel Line Tester Kit

Shapes with Right Angles

Grades: 1

Strands: Geometry

Students review the definition of a right angle and then identify right angles in two-dimensional shapes using the right angle tester. Students recognize that some shapes always have right angles, sometimes have right angles, and never have right angles.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.1
CCSS.MATH.PRACTICES: 3, 7

3D Kits Utilized

Angle Tester Kit
Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit
Composing Polygons Kit

Circles, Half Circles, & Quarter Circles

Grades: 1

Strands: Geometry

Students are introduced to half-circles and quarter-circles using a foundational understanding of the defining attributes of circles. Students identify and sort half-circles, quarter-circles, and circles.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.2
CCSS.MATH.CONTENT.1.G.A.3
CCSS.MATH.PRACTICES: 3, 4

3D Kits Utilized

Adjustable Angle Kit (optional)
Basic Shapes: Circles Kit
Partitioning Circles Kit

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Sorting Two-Dimensional Shapes

Grades: 1

Strands: Geometry

Students sort two-dimensional shapes based on their defining attributes.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.1 CCSS.MATH.PRACTICES: 3, 4

3D Kits Utilized

Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit

Composing Two-Dimensional Shapes

Grades: 1

Strands: Geometry

Students combine two-dimensional shapes to compose new shapes. Students are challenged to create composite shapes from smaller shapes.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.2 CCSS.MATH.PRACTICES: 3, 4

3D Kits Utilized

Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit

Decomposing Shapes

Grades: 1

Strands: Geometry

Students will work to decompose known shapes into their component parts. Students will explore and discuss the shapes and their attributes that compose, hexagons, pentagons, and other complex shapes.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.2 CCSS.MATH.PRACTICES: 3, 4

3D Kits Utilized

Decomposing Shapes Kit
Tangram Kit

Sorting Three-Dimensional Shapes

Grades: 1

Strands: Geometry

Students engage in sorting activities to uncover similarities and differences of three-dimensional shapes. They use the terms faces, bases, and vertices to identify defining attributes.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.1 CCSS.MATH.PRACTICES: 3, 7

3D Kits Utilized

Basic Shapes: Circles Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Right Solids Kit

Composing Three-Dimensional Shapes

Grades: 1

Strands: Geometry

Students combine three-dimensional shapes to compose new shapes. Students are challenged to create composite shapes from smaller shapes.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.2 CCSS.MATH.PRACTICES: 3, 4

3D Kits Utilized

Basic Shapes: Polygons Kit
Basic Shapes: Right Solids Kit
Composing Polyhedrons Kit (optional)

Partitioning Circles into Halves & Quarters

Grades: 1

Strands: Geometry

Students engage in partitioning circles into equal shares called halves and fourths (quarters). They create and identify circles correctly partitioned into equal shares and use the terms half, fourth, and quarter to name each share.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.3 CCSS.MATH.PRACTICES: 2

3D Kits Utilized

Partitioning Circles Kit

Partitioning Rectangles into Halves and Quarters

Grades: 1

Strands: Geometry

Students partition rectangles into equal shares called halves and fourths (quarters). They create and identify rectangles correctly partitioned into equal shares and use the terms half, fourth, and quarter to name each share.

Standards Addressed

CCSS.MATH.CONTENT.1.G.A.3 CCSS.MATH.PRACTICES: 2

3D Kits Utilized

Partitioning Rectangles Kit

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Geometry
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Lesson Plans: Second Grade

Introducing Pentagons

Grades: 2

Strands: Geometry

This lesson begins with a review of polygons introduced in Kindergarten (triangle, rectangle, square, and hexagon) and first grade (trapezoid) in light of their defining attributes. Students then develop a working definition of a pentagon that can be used to discriminate between two-dimensional shapes that are pentagons and those that are not pentagons. Emphasis is placed on the defining attributes of pentagons.

Standards Addressed

CCSS.MATH.CONTENT.2.G.A.1
CCSS.MATH.PRACTICES: 3

3D Kits Utilized

Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit

Solid Shapes

Grades: 2

Strands: Geometry

This lesson begins with a review of the names and attributes of solid shapes introduced in Kindergarten (cube, cone, cylinder, and sphere) and first grade (prism). Then students analyze attributes of solid shapes by describing the number and type of the faces and the number of vertices and edges.

Standards Addressed

CCSS.MATH.CONTENT.2.G.A.1
CCSS.MATH.PRACTICES: 2

3D Kits Utilized

Basic Shapes: Right Solids Kit

Quadrilaterals

Grades: 2

Strands: Geometry

Students develop a working definition of a quadrilateral that can be used to discriminate between two-dimensional shapes that are quadrilaterals and those that are not. Emphasis is placed on the defining attributes of quadrilaterals. Students reexamine parallelograms, trapezoids, rectangles, and squares as special cases of quadrilaterals.

Standards Addressed

CCSS.MATH.CONTENT.2.G.A.1
CCSS.MATH.PRACTICES: 2, 5, 6

3D Kits Utilized

Angle Tester Kit
Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit
Parallel Line Tester Kit

Partitions & Equal Shares - Circles

Grades: 2

Strands: Geometry

Students partition circles into two, three, or four equal shares and use the words halves, thirds, and fourths to describe the parts. They understand that two halves, three thirds, and four fourths comprise a whole and recognize that equal shares of two circles are the same only when they come from identical circles.

Standards Addressed

CCSS.MATH.CONTENT.2.G.A.3
CCSS.MATH.PRACTICES: 2

3D Kits Utilized

Partitioning Circles Kit

Partitions & Equal Shares - Rectangles

Grades: 2

Strands: Geometry

Students partition rectangles into two, three, or four equal shares and use the words halves, thirds, and fourths to describe the parts. They understand that two halves, three thirds, and four fourths comprise a whole and recognize that equal shares of identical wholes need not have the same shape.

Standards Addressed

CCSS.MATH.CONTENT.2.G.A.3
CCSS.MATH.PRACTICES: 2

3D Kits Utilized

Partitioning Circles Kit
Partitioning Rectangles Kit

Partitioning Rectangles and Arrays

Grades: 2

Strands: Geometry, Operations and Algebraic Thinking

Students partition rectangles into rows and columns of same-size squares. They begin the development of the concept of area by counting the number of squares into which a rectangle has been partitioned. They discover that the size of the rectangle affects the number of squares in the partition as they write repeated addition sentences to describe the arrays they created.

Standards Addressed

CCSS.MATH.CONTENT.2.G.A.2
CCSS.MATH.CONTENT.2.OA.C.4
CCSS.MATH.PRACTICES: 2, 5

3D Kits Utilized

Partitioning Rectangles Kit

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Geometry

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Lesson Plans: Third Grade

Review of 2D Shapes

Grades: 3

Strands: Geometry

Students review circles, half circles, and quarter circles as well as the defining attributes of triangles, quadrilaterals, pentagons, and hexagons. They also review the concepts of right angles and parallel sides using manipulatives and sort shapes based on these attributes.

Standards Addressed

CCSS.MATH.CONTENT.3.G.A.1
CCSS.MATH.PRACTICES: 2, 7

3D Kits Utilized

Angle Tester Kit
Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit
Composing Polygons (optional) Kit
Parallel Line Tester Kit
Partitioning Circles Kit

Properties of the Special Quadrilaterals

Grades: 3

Strands: Geometry

Students review the defining attributes of the special quadrilaterals studied at previous grade levels (trapezoids, parallelograms, rectangles, and squares). They also explore other important mathematical properties of each shape.

Standards Addressed

CCSS.MATH.CONTENT.3.G.A.1
CCSS.MATH.PRACTICES: 2, 7

3D Kits Utilized

Angle Tester Kit
Basic Shapes: Quadrilaterals Kit
Parallel Line Tester Kit

Introducing Rhombuses

Grades: 3

Strands: Geometry

Students are introduced to rhombuses. They engage in sorting activities that focus attention on the defining attributes of rhombuses and then explore other important properties of rhombuses.

Standards Addressed

CCSS.MATH.CONTENT.3.G.A.1
CCSS.MATH.PRACTICES: 2, 7

3D Kits Utilized

Basic Shapes: Quadrilaterals Kit
Parallel Line Tester Kit

Introducing Kites

Grades: 3

Strands: Geometry

Students are introduced to the defining attributes of kites. They engage in sorting activities that focus attention on important attributes of quadrilaterals and the differences among them.

Standards Addressed

CCSS.MATH.CONTENT.3.G.A.1
CCSS.MATH.PRACTICES: 2, 7

3D Kits Utilized

Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit

Categorizing Special Quadrilaterals

Grades: 3

Strands: Geometry

Students explore shared attributes of sets of quadrilaterals that place them in the same larger category and identify larger categories into which the quadrilaterals can be placed. They draw examples of quadrilaterals which do not belong to a given set of categories.

Standards Addressed

CCSS.MATH.CONTENT.3.G.A.1
CCSS.MATH.PRACTICES: 2, 7

3D Kits Utilized

Basic Shapes: Quadrilaterals Kit

Partitioning Rectangles into Equal-Area Parts

Grades: 3

Strands: Geometry, Measurement and Data

Students are introduced to partitioning rectangles into equal-area parts. Over the course of this two-day lesson, they partition rectangles presented on square grids into two, three, four, six, and eight equal-area parts using a variety of methods. They describe each part as a unit fraction of the whole.

Standards Addressed

CCSS.MATH.CONTENT.3.G.A.2
CCSS.MATH.CONTENT.3.MD.C.5.A
CCSS.MATH.CONTENT.3.MD.C.5.B
CCSS.MATH.CONTENT.3.MD.C.6
CCSS.MATH.PRACTICES: 2, 8

3D Kits Utilized

Partitioning Rectangles Kit

Partitioning Shapes into Equal-Area Parts

Grades: 3

Strands: Geometry

Students partition a variety of shapes into equal-area parts without the benefit of a square grid. They reason about equal area using both an intuitive understanding of congruence and the recognition that equal-area parts of the same whole can vary in shape. They continue to describe each part as a unit fraction of the whole.

Standards Addressed

CCSS.MATH.CONTENT.3.G.A.2
CCSS.MATH.PRACTICES: 2, 7

3D Kits Utilized

Decomposing Shapes Kit
Basic Shapes: Polygons Kit (optional)
Basic Shapes: Quadrilaterals Kit (optional)
Basic Shapes: Triangles Kit (optional)
Partitioning Rectangles Kit (optional)

Lesson Plans: Fourth Grade

Polygons and Shape Review

Grades: 4

Strands: Geometry

This lesson begins with a review of the defining attributes of the two-dimensional shapes addressed in kindergarten through grade 3. Then students develop a working definition of the term polygon that can be used to discriminate between two-dimensional shapes that are polygons and those that are not. Students engage in sorting exercises as they explore the relationships among categories of two-dimensional shapes.

Standards Addressed

CCSS.MATH.CONTENT.4.G.A.1
CCSS.MATH.PRACTICES: 2, 7

3D Kits Utilized

Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit
Parallel Line Tester Kit

Points, Lines, Rays, and Segments

Grades: 4

Strands: Geometry, Operations and Algebraic Thinking

In this two-day lesson, students begin a formal introduction to points, lines, rays, and segments. They learn to model these entities with drawings. They learn how to name points and describe lines, rays, and segments using named points. They identify points, lines, rays, and segments in two-dimensional figures.

Standards Addressed

CCSS.MATH.CONTENT.4.G.A.1
CCSS.MATH.CONTENT.4.OA.C.5
CCSS.MATH.PRACTICES: 2, 4

3D Kits Utilized

N/A

Angles and Angle Types

Grades: 4

Strands: Geometry, Measurement and Data

This lesson will introduce the definition of angle and angle measure. Students then learn to categorize angles as either right, acute, or obtuse. Students will begin using a protractor to measure and draw angles.

Standards Addressed

CCSS.MATH.CONTENT.4.G.A.1
CCSS.MATH.CONTENT.4.MD.C.5.A
CCSS.MATH.CONTENT.4.MD.C.5.B
CCSS.MATH.CONTENT.4.MD.C.6
CCSS.MATH.PRACTICES: 5, 7

3D Kits Utilized

Adjustable Angle Kit
Angle Tester Kit

Shapes and Angles

Grades: 4

Strands: Geometry, Measurement and Data

This lesson begins with reviewing how to categorize angles as either right, acute, or obtuse and reinforces how to use a protractor. Students then analyze shapes by measuring and categorizing their angles.

Standards Addressed

CCSS.MATH.CONTENT.4.G.A.1
CCSS.MATH.CONTENT.4.MD.C.6
CCSS.MATH.PRACTICES: 5, 7

3D Kits Utilized

Angle Tester Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit

Shapes and Symmetry

Grades: 4

Strands: Geometry, Measurement and Data

Students are introduced to the concept of a line of symmetry of a two-dimensional figure. They identify line-symmetric figures and draw lines of symmetry. They also draw figures with specified numbers of lines of symmetry. The lesson includes a bridge into bisecting angles using symmetry to then introduce the additive property of angles.

Standards Addressed

CCSS.MATH.CONTENT.4.G.A.3
CCSS.MATH.CONTENT.4.MD.C.6
CCSS.MATH.CONTENT.4.MD.C.7
CCSS.MATH.PRACTICES: 7

3D Kits Utilized

Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit

Adding Angles

Grades: 4

Strands: Geometry

Students will further their understanding of how angle measure is additive by decomposing and composing angles. Students will use the angle kits to build angles to add together and transition to writing equations using variables to represent an unknown angle in a diagram.

Standards Addressed

CCSS.MATH.CONTENT.4.G.A.3
CCSS.MATH.CONTENT.4.MD.C.6
CCSS.MATH.CONTENT.4.MD.C.7
CCSS.MATH.PRACTICES: 7

3D Kits Utilized

Adjustable Angle Kit
Angle Tester Kit

Symmetry and Design

Grades: 4

Strands: Geometry

Students use lines of symmetry to create designs while reinforcing identification of polygons and the variety of ways to decompose and compose polygons.

Standards Addressed

CCSS.MATH.CONTENT.4.G.A.3
CCSS.MATH.PRACTICES: 7

3D Kits Utilized

Decomposing Shapes Kit

Perpendicular Lines, Segments, & Rays

Grades: 4

Strands: Geometry

Students are introduced to the term perpendicular and draw examples of perpendicular lines, segments, and rays. They identify and label perpendicular sides in two-dimensional shapes.

Standards Addressed

CCSS.MATH.CONTENT.4.G.A.1 CCSS.MATH.PRACTICES: 7

3D Kits Utilized

Angle Tester Kit
Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit
Composing Polygons Kit

Parallel Lines, Segments, and Rays

Grades: 4

Strands: Geometry

Students are introduced to the term parallel and draw examples of parallel lines, segments, and rays. They identify and label parallel sides in two-dimensional shapes.

Standards Addressed

CCSS.MATH.CONTENT.4.G.A.1 CCSS.MATH.PRACTICES: 7

3D Kits Utilized

Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Parallel Line Tester Kit

Classifying Shapes: Triangles

Grades: 4

Strands: Geometry

Students are introduced to terminology used to classify triangles based on the lengths of their sides and on the measures of their angles. Students analyze, classify, and cross-classify a variety of triangle types.

Standards Addressed

CCSS.MATH.CONTENT.4.G.A.2 CCSS.MATH.PRACTICES: 7

3D Kits Utilized

Basic Shapes: Triangles Kit
Composing Polygons Kit (optional)
Geometry Sticks: Customary Kit (optional)
Geometry Sticks: Metric Kit (optional)

Classifying Shapes: Quadrilaterals

Grades: 4

Strands: Geometry

Students further explore perpendicular and parallel lines by classifying quadrilaterals based on the presence or absence of parallel or perpendicular lines and on the lengths of sides. They analyze quadrilaterals through a variety of sorting activities.

Standards Addressed

CCSS.MATH.CONTENT.4.G.A.2 CCSS.MATH.PRACTICES: 7

3D Kits Utilized

Angle Tester Kit
Basic Shapes: Quadrilaterals Kit
Composing Polygons Kit (optional)
Geometry Sticks: Customary Kit (optional)
Geometry Sticks: Metric Kit (optional)
Parallel Line Tester Kit

Lesson Plans: Fifth Grade

Introducing the Coordinate System

Grades: 5

Strands: Geometry

Students are introduced to the basic structure of the coordinate plane and how it can be used to describe the location of points. They apply their understanding by graphing points given their coordinates and by describing the coordinates of graphed points.

Standards Addressed

CCSS.MATH.CONTENT.5.G.A.1
CCSS.MATH.PRACTICES: 2, 6

3D Kits Utilized

Graphing Kit (optional)

Graphing Shapes on the Coordinate Plane

Grades: 5

Strands: Geometry

Students apply their understanding of graphing on the coordinate plane. They will practice graphing points given the coordinates and describe the polygons created by connecting the points.

Standards Addressed

CCSS.MATH.CONTENT.5.G.A.1
CCSS.MATH.CONTENT.5.G.B.3
CCSS.MATH.PRACTICES: 2, 6

3D Kits Utilized

Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit
Loaded Dice (optional) Kit

Graphing Data in the Coordinate Plane

Grades: 5

Strands: Geometry, Operations and Algebraic Thinking

Students are introduced to two-variable data that can be graphed in the first quadrant of the coordinate plane. They collect, graph, and interpret data in context.

Standards Addressed

CCSS.MATH.CONTENT.5.G.A.2
CCSS.MATH.CONTENT.5.OA.B.3
CCSS.MATH.PRACTICES: 2, 4

3D Kits Utilized

Bowling Kit (optional)
Loaded Dice Kit (optional)

An Introduction to Venn & Euler Diagrams

Grades: 5

Strands: Geometry

Students are introduced to Venn and Euler diagrams as a means of displaying the relationships among sets of objects. They both construct and interpret Venn diagrams to show the relationships among real-world sets, sets of numbers, and sets of shapes.

Standards Addressed

CCSS.MATH.CONTENT.5.G.B.3
CCSS.MATH.CONTENT.5.G.B.4
CCSS.MATH.PRACTICES: 2, 7

3D Kits Utilized

Basic Shapes: Circles Kit
Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Right Solids Kit
Basic Shapes: Triangles Kit

Classifying Triangles Using Venn & Euler Diagrams

Grades: 5

Strands: Geometry

Students review the angle types and triangle classifications. Then they use Venn diagrams to show the relationships among the sets of scalene, isosceles, equilateral, acute, right, obtuse, and equiangular triangles.

Standards Addressed

CCSS.MATH.CONTENT.5.G.B.3
CCSS.MATH.CONTENT.5.G.B.4
CCSS.MATH.PRACTICES: 2, 6

3D Kits Utilized

Angle Tester Kit
Basic Shapes: Triangles Kit
Composing Polygons Kit (optional)
Geometry Sticks: Customary Kit (optional)
Geometry Sticks: Metric Kit (optional)

Classifying Quadrilaterals Using Venn & Euler Diagrams

Grades: 5

Strands: Geometry

Students review the defining attributes of the special quadrilaterals (parallelograms, trapezoids, kites, rectangles, rhombuses, and squares). Then they use Venn diagrams to show the relationships among these sets.

Standards Addressed

CCSS.MATH.CONTENT.5.G.B.3
CCSS.MATH.CONTENT.5.G.B.4
CCSS.MATH.PRACTICES: 2, 6

3D Kits Utilized

Basic Shapes: Quadrilaterals Kit

Coordinate Design

Grades: 5

Strands: Geometry

Students use the coordinate plane and polygons to create designs to reinforce graphing on the coordinate plane.

Standards Addressed

CCSS.MATH.CONTENT.5.G.A.1
CCSS.MATH.CONTENT.5.G.B.3
CCSS.MATH.PRACTICES: 2, 6

3D Kits Utilized

Basic Shapes: Polygons Kit
Basic Shapes: Quadrilaterals Kit
Basic Shapes: Triangles Kit
Decomposing Shapes Kit
Tangram Kit

Engineering a City

Grades: 5

Strands: Geometry

Students use the coordinate plane and their knowledge of polygon attributes to engineer a map of a city that adheres to certain criteria.

Standards Addressed

CCSS.MATH.CONTENT.5.G.A.1
CCSS.MATH.CONTENT.5.G.B.3
CCSS.MATH.PRACTICES: 2, 6

3D Kits Utilized

City Engineering Kit