

Geometry Standards and Lesson Menu

Math Standard	Learning Goal	Activity overview	Source
Development Stage: Level 0 – Visualization – The objects of thought at level 0 are shapes and what they “look like.” Students in pre-kindergarten through grade 2 generally fall at Level 0.			<i>Van Hiele as cited in Van De Walle</i>
K.3.A	Identify, name, and describe circles, triangles, rectangles, squares (as special rectangles), cubes, and spheres.		Mathematics Standards
K.3.A	Puzzle Pieces	Children match different geometric shapes to their outlines.	<i>Beginning Processes: Mathematics for Young Minds;</i> ORIGO, pg 19.
K.3.A	Clowning Around	Children match geometric felt shapes to shape pictures.	<i>Beginning Processes: Mathematics for Young Minds;</i> ORIGO,pg 20.
K.3.A & 1.3.A	Investigation 1: Focus Time Looking At 2-D Shapes	<ul style="list-style-type: none"> ▪ Observing and describing shapes ▪ Developing vocabulary to describe shapes ▪ Becoming familiar with the names of shapes ▪ Relating 2-D shapes to real world objects ▪ Using shapes to make a picture 	<i>Investigations: Making Shapes and Building Blocks; K; pg 5-11.</i>
K.3.A	Teacher Note: How Young Children Learn About Shapes		<i>Investigations: Making Shapes and Building Blocks; K; pg 22-25.</i>
K.3.A & 1.3.A	Investigation 1: Choice Time Book of Shapes	<ul style="list-style-type: none"> ▪ Observing and describing shapes ▪ Developing vocabulary to describe shapes ▪ Becoming familiar with the names of shapes ▪ Relating 2-D shapes to real world objects ▪ Using shapes to make a picture 	<i>Investigations: Making Shapes and Building Blocks; K; pg 12-13.</i>
K.3.A	Investigation 1: Choice Time Pattern Block Pictures	<ul style="list-style-type: none"> ▪ Exploring pattern blocks and their attributes ▪ Using informal language to describe geometric shapes ▪ Making a 2-D representation 	<i>Investigations: Making Shapes and Building Blocks; K; pg 14-16.</i>
K.3.A & K.3.B 1.3.A, 1.3.B, & 1.3.C	Investigation 1: Choice Time Shape Mural	<ul style="list-style-type: none"> ▪ Using shapes to design a picture ▪ Relating 2-D shapes to real-world objects ▪ Putting shapes together to make other shapes ▪ Developing vocabulary to describe and name shapes 	<i>Investigations: Making Shapes and Building Blocks; K; pg 17-20.</i>
K.3.A 1.3.A & 1.3.C	Investigation 2: Choice Time Pattern Block Puzzles	<ul style="list-style-type: none"> ▪ Finding combinations of shapes that fill an area ▪ Building knowledge about the relationships among pattern block shapes ▪ Developing vocabulary to describe 2-D shapes 	<i>Investigations: Making Shapes and Building Blocks; K; pg 34-37.</i>
K.3.A	Investigation 4: Making Shapes and Building Blocks – Clay Shapes	<ul style="list-style-type: none"> ▪ Describing and becoming familiar with the attributes of 2-D shapes ▪ Constructing 2-D shapes ▪ 	<i>Investigations: Making Shapes and Building Blocks; K; pg 60-69.</i>

Geometry Standards and Lesson Menu

K.3.A 1.3.A	Investigation 5: Choice Time Matching Faces	<ul style="list-style-type: none"> ▪ Observing similarities and differences between the faces of different 3-D shapes ▪ Observing similarities and differences between the different faces of a single 3-D shape ▪ Developing vocabulary to describe the different faces of 3-D shapes 	<i>Investigations: Making Shapes and Building Blocks; K; pg 88-89.</i>
K.3.A 1.3.B	Investigation 1: Session 1 What Shapes Do You See?	<ul style="list-style-type: none"> ▪ Noticing shapes in their environment ▪ Using informal language to describe geometric shapes ▪ Becoming familiar with the names of 2-D and 3-D shapes 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 5-12.</i>
K.3.A	Investigation 2: Sessions 1 & 2; Describing and Comparing Shapes	<ul style="list-style-type: none"> ▪ Constructing and describing 3-D shapes ▪ Comparing size, shape, and orientation of objects ▪ Developing vocabulary to describe 3-D shapes ▪ Looking at 3-D objects as wholes and as having parts 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 65-72.</i>
K.3.A (Teacher Note)	Investigation 1: Teacher Note Identifying Pattern Blocks and Terminology		<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 22.</i>
K.3.A (Dialogue Box)	Investigation 2: Triangles and Quadrilaterals	Are All Three-Sided Polygons Triangles? Are All Squares Rectangles?	<i>Investigations: Picturing Polygons; grade 5; pgs 44-45.</i>
K.3.A	Assessment: What is a Triangle? And Assessment: What is a Triangle? Revisited	Assesses what children know about triangles	<i>Math By All Means: Geometry Grades 1-2; pg. 19-23 & 148-151.</i>
K.3.A	Triangles on the Geoboard	Students create eight different triangles so that none are congruent	<i>Math By All Means: Geometry Grades 1-2; pg. 49-58.</i>
K.3.A	All shapes – describing	The activities are designed to help the students recognize a range of two-dimensional shapes and identify their defining properties.	<i>Geo all about angles: Exploring Line and Angle, pg 1-2.</i>
K.3.A	Shapes from Shapes	Students explore and draw different designs that can be created from the same shapes and look at how smaller shapes can be use to cover larger ones.	<i>Navigating through Geometry in Prekindergarten – Grade 2, pg.14-16.</i>

Geometry Standards and Lesson Menu

Development Stage: Level 1 – Analysis– The objects of thought at level 1 are classes of shapes rather than individual shapes.			<i>Van Hiele as cited in Van De Walle</i>
K.3.B Sort shapes using a sorting rule and explain the sorting rule.			Mathematics Standards
K.3.B	17.1 Shape Sort	Students sort shapes and describe how their shapes are alike or different.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg312.</i>
K.3.B	17.2 Feel-It Match	Students match a shape in view with one hidden that can only be felt.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 313.</i>
K.3.B	Sense of Shape	Children sort fabric by the two attributes of texture and shape.	<i>Beginning Processes: Mathematics for Young Minds, Rosemary Irons; ORIGO Education: pg 36.</i>
K.3.B	Pretty Presents	Children order boxes by size. This activity highlights the following language: big, bigger, biggest, middle, small, smaller, and smallest.	<i>Beginning Processes: Mathematics for Young Minds, Rosemary Irons; ORIGO Education: pg 69.</i>
K.3.B (Objects can be geometric shapes)	Big and Little	Children sort objects by size.	?
K.3.B (Describing Geoblocks)	Investigation 2: Session 1 & 2 Describing and Comparing Shapes	<ul style="list-style-type: none"> ▪ Comparing size, shape, and orientation of objects ▪ Developing vocabulary to describe 3-D objects 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 65-66. Also 71-72.</i>
K.3.B & 1.3.A	All shapes – sorting	The activities in this unit are designed to help students consider the similarities and differences between shapes.	<i>Geo all about angles: Exploring Line and Angle, pg. 8-11.</i>

Geometry Standards and Lesson Menu

K.3.C Describe the location of one object relative to another object using words, such as <i>in, out, over, under, above, below, between, next to, behind, and in front of.</i>			Mathematics Standards
K.3.C (Focus on prepositional words that describe position of objects in relation to other objects)	Investigation 4: Choice Time Quick Images on the Computer	<ul style="list-style-type: none"> ▪ analyzing visual images ▪ describing position of a spatial relationships among objects 	<i>Investigations: Making Shapes and Building Blocks; K; pg 75-81.</i>
K.3.C	Opposite Antics	Children perform actions to show positional language relating to opposites, such as; up, down; under, over; high low; in front, behind; top, bottom; front, back; and above, below.	<i>Beginning Processes: Mathematics for Young Minds, Rosemary Irons; ORIGO Education: pg 50.</i>
K.3.C	Beside- Between- Behind	Students describe relationship (location) between two or more items	<i>Geometry Kindergarten through Grade Nine; Hands-On; pg 3.</i>
K.3.C	Crossed and Separate	Using drinking straws, students identify the position of straws dropped in the center of a circle of students.	<i>Geo all about angles: Exploring Line and Angle, pg. 1</i>
K.3.C	Ins and Outs	Students learn positional vocabulary by following and giving directions using positional terms.	<i>Navigating through Geometry in prekindergarten – grade 2, pg 33-35.</i>
K.3.C	Match My Grid	Students work in pairs; one student arranges three to five shapes on a piece of paper that has been separated into four sections. Using positional and geometric vocabulary, the student describes the arrangement of the shapes to the partner.	<i>Navigating through Geometry in prekindergarten – grade 2, pg 36-38.</i>
K.3.C	From Here to There	The students determine a variety of paths to get from one point to another on a grid, describing the moves using the words <i>up, down, right, and left.</i>	<i>Navigating through Geometry in prekindergarten – grade 2, pg 39-41.</i>
K.3.C	Map Maker	Students create and interpret maps of familiar areas.	<i>Navigating through Geometry in prekindergarten – grade 2, pg 42-44.</i>

Geometry Standards and Lesson Menu

1.3.A Compare and sort a variety of two and three dimensional figures according to their geometric attributes.			Mathematics Standards
1.3.A	17.3 What's Like This?	Students match a collection shapes to a "target" shape that has something in common with one or more of the shapes in the collection.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 313.</i>
1.3.A	17.4 Face Match	Two different matching activities can be done with face cards. 1. Given a face card, find the solid; 2. Given a solid, find the face card.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 314.</i>
K.3.A 1.3.A	Investigation 1: Focus Time	<ul style="list-style-type: none"> ▪ Observing and describing shapes ▪ Developing vocabulary to describe shapes ▪ Becoming familiar with the names of shapes ▪ Relating 2-D shapes to real world objects ▪ Using shapes to make a picture 	<i>Investigations: Making Shapes and Building Blocks; K; pg 5-11.</i>
1.3.A & 1.3.B	Investigation 3: Focus Time 3-D Shapes in the Classroom & Shape Hunt	<ul style="list-style-type: none"> ▪ Recognizing shapes in the environment ▪ Observing and describing 3-D shapes ▪ Relating 3-D shapes to real-world objects ▪ Relating a 3-D object to a 2-D picture of its geometric shape 	<i>Investigations: Making Shapes and Building Blocks; K; pg 40-45.</i>
1.3.A & 1.3.B	Investigation 3: Choice Time Shape Hunt	<ul style="list-style-type: none"> ▪ Recognizing shapes in the environment ▪ Observing and describing 3-D shapes ▪ Relating 3-D shapes to real-world objects ▪ Relating a 3-D object to a 2-D picture of its geometric shape 	<i>Investigations: Making Shapes and Building Blocks; K; pg 46-47..</i>
1.3.A	Investigation 3: Choice Time Exploring Geoblocks	<ul style="list-style-type: none"> ▪ Exploring Geoblocks and their attributes ▪ Using informal language to describe geometric shapes 	<i>Investigations: Making Shapes and Building Blocks; K; pg 48-49.</i>
1.3.A	Investigation 5: Focus Time A Close Look at Geoblocks	<ul style="list-style-type: none"> ▪ Observing and describing attributes of 3-D shapes ▪ Matching faces of 3-D shapes 	<i>Investigations: Making Shapes and Building Blocks; K; pg 84-87.</i>
K.3.A 1.3.A	Investigation 5: Choice Time Matching Faces	<ul style="list-style-type: none"> ▪ Observing similarities and differences between the faces of different 3-D shapes ▪ Observing similarities and differences between the different faces of a single 3-D shape ▪ Developing vocabulary to describe the different faces of 3-D shapes 	<i>Investigations: Making Shapes and Building Blocks; K; pg 88-89.</i>

Geometry Standards and Lesson Menu

1.3.A	Investigation 2: Sessions 11 & 12; Sorting 2-D Shapes	<ul style="list-style-type: none"> Describing and comparing 2-D shapes Sorting and classifying 2-D shapes Developing vocabulary to name and describe 2-D shapes Describing characteristics of triangles 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 43-55.</i>
1.3.A	Investigation 2: Session 3 Block Pictures	<ul style="list-style-type: none"> Describing characteristics of 3-D shapes Matching a 3-D object to a 2-D picture of the object Comparing 3-D shapes 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 73-79.</i>
1.3.A	Investigation 1: Session 1 Sorting Polyhedra Minimum 1 hour	<ul style="list-style-type: none"> Exploring, sorting, and talking about common geometric solids. Analyzing how solids are the same and different. Investigating and analyzing the parts of solids. Developing the ability to describe solids. 	<i>Investigations: Exploring Solids and Boxes; grade 3; pg.3-13.</i>
1.3.A	Investigation 1: Session 2 What's My Shape? Minimum 1 hour	<ul style="list-style-type: none"> Learning the game: What's My Shape? 	<i>Investigations: Exploring Solids and Boxes; grade 3; pg.3-13.</i>
1.3.A (Picking Out Polygons) 1.3.B (Defining a Polygon)	Investigation 1: Session 1 Is It a Polygon? Minimum 1 hour	<ul style="list-style-type: none"> Working with two-dimensional shapes Distinguishing between polygons and shapes that are not polygons Drawing polygons. 	<i>Investigations: Picturing Polygons; grade 5; pgs. 5-8.</i>
1.3.A 1.3.C (Putting Together Power Polygons)	Investigation 1: Session 2 Making Polygons Minimum 1 hour	<ul style="list-style-type: none"> Working with two-dimensional shapes Recognizing polygons by number of sides Creating and drawing polygons 	<i>Investigations: Picturing Polygons; grade 5; pg. 9-13.</i>
1.3.A & 1.3.C	The Tangram Pieces	Focus on types of polygons – triangles and quadrilaterals.	<i>Geometry and Fractions with Tangrams: Grades 3-6. Pg 9-10.</i>
1.3.A	Three Facts	Students start thinking and talking about the properties of shapes.	<i>Geo all about angles: Exploring Line and Angle, pg 4.</i>
1.3.A	Regular and Irregular Polygons	Students sort shapes by properties.	<i>Geo all about angles: Exploring Line and Angle, pg 5.</i>
K.3.B & 1.3.A	All shapes – sorting	The activities in this unit are designed to help students consider the similarities and differences between shapes.	<i>Geo all about angles: Exploring Line and Angle, pg. 8-11.</i>
1.3.A	Alike and Different	Students identify attributes of objects, such as shape, size, and number of edges, and play games in which they compare and sort objects by their attributes. This activity emphasized language development.	<i>Navigating through Geometry in prekindergarten – grade 2, pg 17-18.</i>

Geometry Standards and Lesson Menu

1.3.A	Sorting (Direct Measure-KU 2)	Students sort objects (e.g. shells, leaves, rocks) into groups and then order them by size. Ask: Which part of the shell did you look at to judge the size?	<i>First Steps in Mathematics: Measurement – Volume 1, pg. 22.</i>
1.3.B Identify and name two-dimensional figures, including those in real-world contexts, regardless of size or orientation. <i>Figures should include circles, triangles, rectangles, squares (as special rectangles), rhombi, hexagons, and trapezoids.</i>			Mathematics Standards
1.3.B	Teacher Note: Learning to See Shapes in the Environment		<i>Investigations: Making Shapes and Building Blocks; K; pg 21.</i>
1.3.B & 1.3.C	Investigation 5: Choice Time Geoblock Match-Up	<ul style="list-style-type: none"> ▪ Developing vocabulary to describe 3-D shapes ▪ Looking at 3-D objects both as wholes and as having parts ▪ Matching a 3-D block to a 2-D outline of one of the block faces ▪ Describing and comparing faces of 3-D shapes 	<i>Investigations: Making Shapes and Building Blocks; K; pg 90-91.</i>
K.3.A 1.3.B (Focus on the real-world contexts)	Investigation 1: Session 1 What Shapes Do You See?	<ul style="list-style-type: none"> ▪ Noticing shapes in their environment ▪ Using informal language to describe geometric shapes ▪ Becoming familiar with the names of 2-D and 3-D shapes 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 5-12.</i>
1.3.B (Quick Images: A New Routine) (Shapes in the Classroom) 1.3.A (Sorting Shape Cards- do not use “diamond” use “rhombus” as the correct term) 1.3.A (Making Shape Card Posters)	Investigation 1: Session 1 Shapes Around Us	<ul style="list-style-type: none"> ▪ Identifying shapes in the environment ▪ Describing two-dimensional shapes ▪ Identifying categories for two-dimensional shapes ▪ Sorting two-dimensional shapes in different ways 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 5-13.</i>
1.3.A & 1.3.B (Types of Polygons)	Investigation 1: Session 4 Types of Polygons (Teacher Note)	This is a Teacher Note that helps develop the language for numerical prefixes. Students look for examples of polygon shape in familiar objects	<i>Investigations: Picturing Polygons; grade 5; pg 27 only</i>
1.3.A (May have to modify the writing portion to oral language)	Investigation 2: Session 1 Investigating Quadrilaterals	<ul style="list-style-type: none"> ▪ Sorting shapes according to the number of sides ▪ Sorting quadrilaterals in different ways ▪ Identifying rectangles 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 46-51.</i>
1.3.A (Just the ordering by description part of this lesson)	Investigation 2: Session 2 Which Rectangle is Biggest?	<ul style="list-style-type: none"> ▪ Ordering rectangles ▪ Defining “biggest” in different ways 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 52-53.</i>
1.3.B	The Greedy Triangle	<ul style="list-style-type: none"> ▪ Geometry concepts and vocabulary, geometry shapes in the world. 	<i>Math By All Means: Geometry 3-4; pg. 26-33.</i>
1.3.B	Assessment: What is a Triangle?	Assesses what children know about triangles	<i>Math By All Means: Geometry Grades 1-2; pg. 19-23.</i>

Geometry Standards and Lesson Menu

1.3.B & 1.3.C	Hold and Fold	Students explore different shapes that emerge from folding squares	<i>Math By All Means: Geometry Grades 1-2; pg. 34-41.</i>
1.3.B & 1.3.C	A Cloak for the Dreamer	Students explore different shapes to make a design for a new cloak	<i>Math By All Means: Geometry Grades 1-2; pg. 42-48.</i>
1.3.B	Triangles on the Geoboard	Students create eight different triangles so that none are congruent	<i>Math By All Means: Geometry Grades 1-2; pg. 49-58.</i>
1.3.A & 1.3.B	More Shapes on the Geoboard	Students work individually to create shapes on the geoboard and copy them onto geoboard dot paper.	<i>Math By All Means: Geometry Grades 1-2; pg. 102-109.</i>
1.3.B	Describing Shapes	Students will talk in pairs to describe shapes	<i>Math By All Means: Geometry Grades 1-2; pg. 110-115.</i>
1.3.B	Assessment: Shapes Inside Shapes	The assessment provides the opportunity to gain insights into how students perceive shapes within a design and the language they use to describe those shapes.	<i>Math By All Means: Geometry Grades 1-2; pg. 131-135.</i>
1.3.B	Assessment: Shape Walk	Taking the class on a walk to assess children's awareness of shapes in the world, the characteristics they notice to identify shapes, and the language they feel comfortable using.	<i>Math By All Means: Geometry Grades 1-2; pg. 141-147.</i>
1.3.B	Build What I've Created	<ul style="list-style-type: none"> ▪ Construct a geometric design from oral directions ▪ Use precise geometric vocabulary in giving directions ▪ Recognize geometric shapes and patterns in quilts. 	<i>Navigating Through Geometry in Grades 3-5; pg.11-14.</i>
1.3.B	All shapes – describing	The activities are designed to help the students recognize a range of two-dimensional shapes and identify their defining properties.	<i>Geo all about angles: Exploring Line and Angle, pg 1-2.</i>
1.3.B	Shape Up	Students use their bodies to make shapes.	<i>Geo all about angles: Exploring Line and Angle, pg 12.</i>
1.3.B	Name That Block	The teacher describes one three-dimensional block in a set of displayed blocks, focusing on the distinguishing features (2D faces) of that block.	<i>Navigating through Geometry in prekindergarten – grade 2, pg 19-21.</i>
1.3.B	Projector Math	Students view shapes shown on an overhead projector and must recall what they have seen. Recognize geometric shapes in the environment and identify three-dimensional shapes from their images.	<i>Navigating through Geometry in prekindergarten – grade 2, pg 71-72.</i>

Geometry Standards and Lesson Menu

1.3.C Combine known shapes to create shapes and divide known shapes into other shapes.			Mathematics Standards
1.3.C	17.7 Geoboard Tiles	Students make shapes on the geoboard using combinations of only one smaller shape as if the smaller shape were a tile.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 316.</i>
1.3.C 4.3.A (focus on congruent shapes)	17.8 Congruent Parts	Students subdivide a copied shape into smaller shapes. Specify whether they are all to be congruent or simply the same type.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 316.</i>
1.3.C	Investigation 5: Choice Time Planning Pictures on the Computer	<ul style="list-style-type: none"> ▪ Using pattern blocks to make a design or picture ▪ Using <i>Shapes</i> to replicate a pattern block design or picture 	<i>Investigations: Making Shapes and Building Blocks; K; pg 92-101.</i>
K.3.A 1.3.A & 1.3.C	Investigation 2: Choice Time Pattern Block Puzzles	<ul style="list-style-type: none"> ▪ Finding combinations of shapes that fill an area ▪ Building knowledge about the relationships among pattern block shapes ▪ Developing vocabulary to describe 2-D shapes 	<i>Investigations: Making Shapes and Building Blocks; K; pg 34-37.</i>
K.3.A & K.3.B 1.3.A, 1.3.B, & 1.3.C	Investigation 1: Choice Time Shape Mural	<ul style="list-style-type: none"> ▪ Using shapes to design a picture ▪ Relating 2-D shapes to real-world objects ▪ Putting shapes together to make other shapes ▪ Developing vocabulary to describe and name shapes 	<i>Investigations: Making Shapes and Building Blocks; K; pg 17-20.</i>
1.3.C	Investigation 2: Exploring Shapes with the Computer	<ul style="list-style-type: none"> ▪ Exploring the <i>Shapes</i> software on the computer with a partner ▪ Visualizing how to move a shape so that it is oriented correctly to fit into a design 	<i>Investigations: Making Shapes and Building Blocks; K; pg 28-33.</i>
1.3.C	Investigation 3: Choice Time The Shape of Things on the Computer	<ul style="list-style-type: none"> ▪ Finding combinations of shapes that fill an area ▪ Visualizing what shape to select to fill in a design ▪ Visualizing how to move a shape so that it is oriented correctly to fit into a design ▪ Putting parts together to form a whole ▪ Learning to use the <i>Shapes</i> software 	<i>Investigations: Making Shapes and Building Blocks; K; pg 50-59.</i>
1.3.C	Investigation 4: Choice Time Fill the Hexagon	<ul style="list-style-type: none"> ▪ Finding combinations of shapes that fill an area ▪ Building knowledge about the relationships among pattern block shapes 	<i>Investigations: Making Shapes and Building Blocks; K; pg 70-72.</i>
1.3.C	Investigation 4: Choice Time Build a Block	<ul style="list-style-type: none"> ▪ Combining smaller 3-D shapes to make a larger 3-D shape 	<i>Investigations: Making Shapes and Building Blocks; K; pg 73-74.</i>

Geometry Standards and Lesson Menu

1.3.C 2.4.A	Investigation 1: Session 2 Same Shape Different Pieces	<ul style="list-style-type: none"> Filling an outline with shapes Finding combinations of shapes that fill a region Counting and adding 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 13-15.</i>
1.3.C 2.4.A (Choice 2: Pattern Block Counts & Pattern Block Fill-in)	Investigation 1: Sessions 3, 4, 5 & 6; Describing 2-D Shapes	<ul style="list-style-type: none"> Visualizing and representing 2-D shapes Filling an outline with shapes and finding combinations of shapes that fill an area Fitting shapes together or breaking them apart to make other shapes 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 17-30.</i>
1.3.C	Investigation 2: Sessions 13, 14, & 15; Quilts with Squares and Triangles	<ul style="list-style-type: none"> Combining squares and triangles to create larger squares 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 56-61.</i>
1.3.C (Teacher Note: Seeing Relationships Between Shapes)	Investigation 1: Composing and Decomposing Shapes	<ul style="list-style-type: none"> Seeing relationships between shapes 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 27-28.</i>
1.3.C (Choice 2: Build the Geoblock) (Homework)	Investigation 1: Session 2 & 3 Seeing Shapes Within Shapes	<ul style="list-style-type: none"> Fitting shapes together to cover a region Putting parts together to form a whole Combining three-dimensional shapes to make a three-dimensional whole 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 18-21.</i>
1.3.C Homework	Investigation 1: Session 4 & 5 Composing New Shapes with 2 Triangles	<ul style="list-style-type: none"> Homework activity 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 35.</i>
1.3.C (Cube Buildings) 1.3.C (Homework)	Investigation 1: Session 6,7,8 Building Buildings	<ul style="list-style-type: none"> Composing New Shapes with 3 or 4 Triangles Guess My Building 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 39-42.</i>
1.3.C & 1.3.A (with revision)	Investigation 2: Session 3 Building Polyhedra Minimum 1 hour	<ul style="list-style-type: none"> Determining the spatial relationships among faces, edges, and corners that are necessary for the polyhedra to be built. Organizing their conceptions of polyhedra so that can count the faces, edges, and corners. 	<i>Investigations: Exploring Solids and Boxes; grade 3; pg.22-23.</i>
1.3.A & 1.3.B (Sorting the Four-Triangle Shapes) 1.3.C (Searching for Four-Triangle Shapes)	The Four Triangle Problem	<ul style="list-style-type: none"> Students try to find all the possible arrangements using four triangles Create a sorting rule for the shapes according to the number of sides and angles 	<i>Math By All Means: Geometry 3-4 pg 16-25.</i>
1.3.A, 1.3.B, 1.3.C	Same and Different	<ul style="list-style-type: none"> Compare and Contrast figures from Four-Triangle Shapes 	<i>Math By All Means: Geometry 3-4; pg 62-67</i>

Geometry Standards and Lesson Menu

1.3.A, 1.3.B, 1.3.C 2.4.A 3.4.C	Four-Triangle Color Arrangements	<ul style="list-style-type: none"> Students develop spatial problem-solving ability 	<i>Math By All Means: Geometry 3-4; pg 77-82.</i>
1.3.C	Rocket Discovery	<ul style="list-style-type: none"> Students figure out how to cut a square into smaller pieces and reproduce a rocket shape. 	<i>Math By All Means: Geometry Grades 1-2; pg. 27-33.</i>
1.3.C	Rocket Shapes	<ul style="list-style-type: none"> Students arrange a rectangle and three triangles to construct a square, a triangle, a rectangle, and a hexagon. 	<i>Math By All Means: Geometry Grades 1-2; pg. 80-87.</i>
1.3.B & 1.3.C	Shapes with Pattern Block Triangles	Students investigate ways to combine two, three, four, and five Pattern Block triangles	<i>Math By All Means: Geometry Grades 1-2; pg. 59-68.</i>
1.3.B & 1.3.C	Square Designs	Students develop and hone spatial skills by visualizing, cutting, and rearranging shapes.	<i>Math By All Means: Geometry Grades 1-2; pg. 88-95.</i>
1.3.C	Cloak Patterns	Students use two different shapes (square, rectangle, or triangle) to create the pattern.	<i>Math By All Means: Geometry Grades 1-2; pg. 96-101.</i>
1.3.B & 1.3.C	Shapes with Six Green Triangles	Students investigate ways to combine two, three, four, and five Pattern Block triangles	<i>Math By All Means: Geometry Grades 1-2; pg. 116-123.</i>
1.3.B & 1.3.C	Shapes with Six Squares	The students create shapes by arranging six squares	<i>Math By All Means: Geometry Grades 1-2; pg. 136-140.</i>
1.3.C	More Tangram Pieces	Students manipulate tangram shapes to cover other shapes.	<i>Geometry and Fractions with Tangrams: Grades 3-6. Pg. 9-11.</i>
1.3.C	Shaping Up A Three Piece Tan	Students use isosceles triangles to make a kite, a parallelogram, a rhombus, and a trapezoid.	<i>Geo paperpolygons: Exploring 2D Shapes Through Paper Folding, pg. 15-16.</i>
1.3.C	Triangle in Square	Students fold a square and fold into triangles. Discussion develops vocabulary and concepts of attributes of 2D shapes.	<i>Geo paperpolygons: Exploring 2D Shapes Through Paper Folding, Pg. 7.</i>
1.3.C	Split That Shape	Students explore dividing shapes into other shapes.	<i>Geo all about angles: Exploring Line and Angle, pg 20.</i>

Geometry Standards and Lesson Menu

1.3.C	Triangles in Shapes	Students use patterns to discover the number of triangles that can be drawn inside quadrilaterals, pentagons, hexagon, heptagon, and octagon.	<i>Geo all about angles: Exploring Line and Angle, pg 23</i>
1.3.C	Cutting Corners	Students explore ways to cut rectangles to make other shapes, including smaller rectangles, triangles, and shapes of the same size.	<i>Navigating through Geometry in prekindergarten – grade 2, pg 22-26.</i>
Development Stage: Level 2 – Informal Deduction – The objects of thought at level 2 are the properties of shapes.			<i>Van Hiele as cited in Van De Walle</i>
2.4.A Solve problems involving properties of two and three dimensional figures.			Mathematics Standards
2.4.A	17.9 Geoboard Challenges	Challenge students to see how many different shapes they can make of a specific type.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 317.</i>
2.4.A	Tangram Puzzles		<i>A variety of sources; see Dale Seymour catalog.</i>
1.3.C 2.4.A (Focus on problem solving – What is the least number of blocks needed or what is the largest number of blocks.)	Investigation 1: Session 2 Same Shape Different Pieces	<ul style="list-style-type: none"> ▪ Filling an outline with shapes ▪ Finding combinations of shapes that fill a region ▪ Counting and adding 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 13-16.</i>
2.4.A	Investigation 1: Session 7 Three Ways to Fill an Outline	<ul style="list-style-type: none"> ▪ Composing and decomposing shapes ▪ Using different combinations of shapes to make the same larger shape ▪ Altering designs to use more or fewer pieces to cover the same space 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 31-33.</i>
2.4.A	Investigation 1: Sessions 8, 9, & 10; Filling Shapes	<ul style="list-style-type: none"> ▪ Composing and decomposing shapes ▪ Using different combinations of shapes to make the same larger shape ▪ Altering designs to use more or fewer pieces to cover the same space 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 34-42.</i>
2.4.A	Investigation 2: Sessions 4, 5, and 6; Blocks in a Sock	<ul style="list-style-type: none"> ▪ Identifying 3-D objects by matching them to outlines of their faces ▪ Matching a 3-D object to a 2-D picture of the object 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 80-84.</i>

Geometry Standards and Lesson Menu

2.4.A	Investigation 3: Session 1 & 2 Drawing Geoblocks	<ul style="list-style-type: none"> Observing and describing characteristics of 3-D shapes Making a 2-D representation of a 3-D object Building a 3-D construction from a 2-D representation 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 100-108.</i>
2.4.A	Investigation 3: Session 3, 4, 5, 6, 7; Planning a Town; Building a Town; Giving Directions	<ul style="list-style-type: none"> Observing and describing characteristics of 3-D shapes Creating and using 2-D representations of 3-D shapes Building 3-D constructions from 2-D representations Visualizing, describing, and comparing paths between two locations in space and on a grid. 	<i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 98-126.</i>
2.4.A (Predict and Cover)	Investigation 1: Session 2 & 3 Seeing Shapes Within Shapes	<ul style="list-style-type: none"> Fitting shapes together to cover a region Putting parts together to form a whole Combining three-dimensional shapes to make a three-dimensional whole 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 18-21 & 29.</i>
2.4.B (On-Computer Activity: Introducing Solve Puzzles)	Investigation 1: Session 4 & 5	<ul style="list-style-type: none"> Identifying and describing numerical relationships found among the pattern block shapes 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 30-31.</i>
2.4.A (The Last Block Game)	Investigation 1: Session 6,7,8 Building Buildings	<ul style="list-style-type: none"> Using logical reasoning and spatial relationships Using multiples of a number to describe the structure of rectangular prism 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 38-39.</i>
2.4.A (Homework – Only One Rectangle)	Investigation 2: Session 3 Homework Only One Rectangle	<ul style="list-style-type: none"> Using 1 inch tiles, students figure out which numbers between 1 and 12 make only one rectangle. 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 59.</i>
2.4.A (Rectangle Riddles Only)	Investigation 2: Session 4 & 5 Describing Rectangles	<ul style="list-style-type: none"> Choice 4 Rectangle Riddles 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg.64.</i>
2.4.A	Investigation 1: Session 2 & 3 Slides, Flips, and Turns	<ul style="list-style-type: none"> Covering a rectangular region with tetrominoes of a single shape Forming conjectures as to why certain tetrominoes will cover the region completely Visualizing how one shape can be moved to best fit into a spatial arrangement of shapes 	<i>Investigations: Flips, Turns and Area; grade 3; pg. 11-22.</i>
2.4.A	Investigation 1: Session 5 Final Challenges	<ul style="list-style-type: none"> Reasoning about why certain shapes cover some areas, but not others Visualizing whether two shapes are congruent 	<i>Investigations: Flips, Turns and Area; grade 3; pg. 27-31.</i>

Geometry Standards and Lesson Menu

<p>2.4.A & 1.3.B (homework component)</p>	<p>Investigation 2: Session 1 & 2; Building Polygons</p> <p>Minimum 2 hours</p>	<p>Building the polygons. Discussing the polygons. Homework finding polygons at home, 1.3.B pg. 19.</p> <ul style="list-style-type: none"> ▪ Recognizing components of polygons – sides and vertices. ▪ Recognizing how the components of polygons are put together to form whole shapes ▪ Recognizing the components of polyhedra- faces, vertices and edges. ▪ Recognizing how the components of polyhedra are put together to form whole shapes. 	<p><i>Investigations: Exploring Solids and Boxes; grade 3; pg.16-21.</i></p>
<p>2.4.A</p>	<p>Investigation 3: Session 1 - Making Boxes; Making Boxes for a Cube Min. 1 hour</p>	<p>Finding and using patterns to design open boxes for a cube. Explaining thinking.</p>	<p><i>Investigations: Exploring Solids and Boxes; grade 3 pg.28-31.</i></p>
<p>2.4.A</p>	<p>Investigation 3: Session 2 – Patterns for Other Solids Min. 1 hour</p>	<p>Determining the shape, number, and spatial relationships between faces of solids; Finding multiple solutions to problems.</p>	<p><i>Investigations: Exploring Solids and Boxes; grade 3; pg.33-37.</i></p>
<p>2.4.A (Sorting the Four-Triangle Shapes)</p>	<p>The Four Triangle Problem</p>	<ul style="list-style-type: none"> ▪ Students try to find all the possible arrangements using four triangles ▪ Create a sorting rule for the shapes according to the number of sides and angles ▪ Use properties of shapes (parallel, opposite sides, angles, equal sides, etc) to sort 	<p><i>Math By All Means: Geometry 3-4 pg 16-25.</i></p>
<p>2.4.A</p>	<p>Same and Different</p>	<ul style="list-style-type: none"> ▪ Compare and Contrast figures from Four-Triangle Shapes 	<p><i>Math By All Means: Geometry 3-4; pg 62-67.</i></p>
<p>1.3.A, 1.3.B, 1.3.C 2.4.A 3.4.C</p>	<p>Four-Triangle Color Arrangements</p>	<ul style="list-style-type: none"> ▪ Students develop spatial problem-solving ability 	<p><i>Math By All Means: Geometry 3-4; pg 77-82.</i></p>
<p>3.4.A Identify and sketch parallel, intersecting, and perpendicular lines and line segments.</p>			<p>Mathematics Standards</p>
<p>3.4.A, 3.4.B, 3.4.C 5.3.B, 5.3.G, 5.3.H</p>	<p>17.22 Property Challenges</p>	<p>This activity can be done with almost any materials that allow students to draw or construct shapes easily. List properties or relationships, and have students construct as many shapes as possible that have those properties.</p>	<p><i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 329.</i></p>

Geometry Standards and Lesson Menu

<p>2.4.A, (3.4.A, 3.4.B, & 3.4.D – only with lesson revisions)</p>	<p>Investigation 3: Session 1, 2, 3, 4, 5 – Building a Town</p> <p>Minimum 4 hours</p>	<ul style="list-style-type: none"> ▪ Problem solving involving planning, trial-and-error processing, analysis, and visualization (2.4.A) ▪ This lesson could teach about parallel, intersecting, and perpendicular lines (3.4.A), if teacher focused instruction on the road layout. ▪ This lesson could teach about sketching right angles (3.4.B), if teacher inserted this into the lesson. <p>Lesson should be a 2-D map so buildings are quadrilaterals. If students measured perimeter or were restricted to a perimeter measurement this lesson could address standard 3.4.D.</p>	<p><i>Investigations: Quilt Squares and Block Towns; grade 1; pg. 98-118.</i></p>
<p>3.4.A & 3.4.B</p>	<p>Toothpick Patterns</p>	<p>Students use toothpicks to form lines and angles</p>	<p><i>Math By All Means: Geometry 3-4; pg 34-45.</i></p>
<p>3.4.A & 3.4.B</p>	<p>The Put-in-Order Problem</p>	<p>This is an extension of Toothpick Patterns and gives students an opportunity to explore properties of polygons made with toothpicks.</p>	<p><i>Math By All Means: Geometry 3-4; pg 89-95.</i></p>
<p>3.4.A & 3.4.B</p>	<p>Activity 17.5 Shape Hunt</p>	<p>Students search not just for triangles, circles but also for properties of shapes: parallel lines, right angles, etc.</p>	<p><i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 314.</i></p>
<p>3.4.A</p>	<p>Diagonal Lines, Exploring Parallel Lines and Diagonals in Quadrilaterals</p>	<p>Students explore lines as they fold paper</p>	<p><i>Geo all about angles: Exploring Line and Angle, pg 4-5.</i></p>
<p>3.4.B Identify and sketch right angles.</p>			<p>Mathematics Standards</p>
<p>3.4.B, 3.4.C, (3.4.D perimeter) 4.3.E 5.3.B, 5.3.G</p>	<p>17.23 Measure Investigation</p>	<p>Ask students to make shapes according to special measurement requirements.</p>	<p><i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 329-330.</i></p>
<p>3.4.A & 3.4.B (Can You Make These?)</p>	<p>Investigation 2; Session 4 & 5 Making Shapes That Follow Rules</p>	<p>Generating geometric figures from descriptions of their properties Describing geometric figures orally and in writing.</p>	<p><i>Investigations: Picturing Polygons; grade 5; pg.46-49..</i></p>
<p>3.4.B</p>	<p>Investigation 2; Session 1 & 2 Turns</p>	<ul style="list-style-type: none"> ▪ Exploring what happens when turns are repeated ▪ Becoming familiar with a common measurement for turns – degrees. 	<p><i>Investigations: Turtle Paths; grade3; pg. 31-40.</i></p>

Geometry Standards and Lesson Menu

3.4.C Identify and describe special types of quadrilaterals.			<i>Mathematics Standards</i>
3.4.C (focus on quadrilaterals) 2.4.A	17.9 Geoboard Challenges	Challenge students to see how many different shapes they can make of a specific type (quadrilaterals)	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 317.</i>
3.4.C (focus on quadrilaterals) 5.3.C (focus on triangles)	17.19 Shape Sort II	Sort shapes by naming properties and not by names of the shapes.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 325-326.</i>
3.4.C	17.20 Mystery Definition	Using an “all of these, none of these” rule students identify quadrilaterals.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 327.</i>
3.4.C	Roping in Quadrilaterals	<ul style="list-style-type: none"> ▪ Sort quadrilaterals on the basis of specific attributes ▪ Determine the common attributes of a set of quadrilaterals 	<i>Navigating Through Geometry in Grades 3-5; pg.22-25.</i>
3.4.A (Identifying quadrilaterals) 3.4.C (Identifying quadrilaterals) 5.3.A (Sorting quadrilaterals)	Investigation 2: Session 1 , 2, 3 Sorting Polygons	<ul style="list-style-type: none"> ▪ Exploring attributes of triangles and quadrilaterals ▪ Sorting and classifying triangles and quadrilaterals ▪ Developing vocabulary to describe special triangles and quadrilaterals 	<i>Investigations: Picturing Polygons; grade 5; pg.36-37.</i>
3.4.C (Describing Rectangles)	Investigation 2: Session 6 Picturing Rectangles	<ul style="list-style-type: none"> ▪ Following descriptions written by other students to build rectangles ▪ Evaluating the effectiveness of written descriptions ▪ Drawing a rectangle from memory and describing it in writing 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 66-71.</i>
3.4.B 3.4.C	Investigation 2: Session 1 Making Rectangles	<ul style="list-style-type: none"> ▪ Discussing students’ definitions of rectangles. ▪ Identifying properties of rectangles ▪ Using <i>Geo-Logo</i> commands to write procedures for drawing rectangles 	<i>Investigations: Sunken Ships and Grid Patterns; grade4; pg 45-50.</i>
3.4.C	Same and Different	<ul style="list-style-type: none"> ▪ Compare and Contrast figures from Four-Triangle Shapes 	<i>Math By All Means: Geometry 3-4; pg 62-67.</i>

Geometry Standards and Lesson Menu

1.3.A, 1.3.B, 1.3.C 2.4.A 3.4.C	Four-Triangle Color Arrangements	<ul style="list-style-type: none"> Students develop spatial problem-solving ability 	<i>Math By All Means: Geometry 3-4; pg 77-82.</i>
3.4.C	Assessment: Polygon Cards	<ul style="list-style-type: none"> Properties of polygons 	<i>Math By All Means: Geometry 3-4; pg 83-88.</i>
3.4.C	Square Up	<ul style="list-style-type: none"> Students use geoboards to define a square 	<i>Math By All Means: Geometry 3-4; pg 96-103.</i>
3.4.C	Analyzing the Square	Geometrical language is drawn from a discussion about the square and its features.	<i>Geo paper polygons: Exploring 2D Shapes, pg.5.</i>
4.3.A Determine congruence of 2-D figures.			Mathematics Standards
1.3.C 4.3.A (focus on congruent shapes)	17.8 Congruent Parts	Students subdivide a copied shape into smaller shapes. Specify whether they are all to be congruent or simply the same type.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 316.</i>
4.3.A (Is It the Same Rectangle?)	Investigation 2: Dialogue Box Is It the Same Rectangle?	<ul style="list-style-type: none"> The property of congruence is explored 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 60.</i>
4.3.A (Focus on the congruent language and exploration)	Investigation 3: Sessions 3,4,5 Cutting Congruent Halves	<ul style="list-style-type: none"> Folding and cutting shapes into congruent halves Constructing a shape that can be folded and cut into congruent halves 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 82-85</i>
4.3.A (Focus on the congruent language and exploration)	Investigation 1: Session 5 Final Challenges	<ul style="list-style-type: none"> Reasoning about why certain shapes cover some areas, but not others Visualizing whether two shapes are congruent 	<i>Investigations: Flips, Turns and Area; grade 3; pg. 27-31.</i>
4.3.A & 4.3.D (area – measurement standard)	Investigation 2: Session 2 & 3 A Poster of Four-Unit Shapes	<ul style="list-style-type: none"> Making shapes with a given area Deciding if two shapes are congruent Gaining experience with the relationships among squares and triangles 	<i>Investigations: Flips, Turns and Area; grade 3; pg. 39-45.</i>
4.3.A	Exploring Packages	<ul style="list-style-type: none"> Explore congruent faces of three-dimensional shapes 	<i>Navigating Through Geometry in Grades 3-5; pg. 80-82.</i>

Geometry Standards and Lesson Menu

4.3.A	Congruent and Similar Shapes	Students determine the congruence of 2D figures.	<i>Geometry and Fractions with Tangrams: Grades 3-6. Pg. 20-23.</i>
4.3.E Demonstrate that rectangles with the same area can have different perimeters, and that rectangles with the same perimeter can have different areas.			Mathematics Standards
3.4.B, 3.4.C, (3.4.D perimeter) 4.3.E 5.3.B, 5.3.G	17.23 Measure Investigation	Ask students to make shapes according to special measurement requirements.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 329-330.</i>
4.3.E Ordering Rectangles and Covering Rectangles	Investigation 2: Session 2 Which Rectangle is Biggest?	<ul style="list-style-type: none"> Ordering rectangles Finding the number of tiles that cover rectangles 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 52-53.</i>
4.3.A (Building Tile Rectangles)	Investigation 2: Session 3 Building Rectangles	<ul style="list-style-type: none"> Ordering rectangles Finding different rectangular arrays using the same number of tiles Describing ways of arranging square tiles in rectangular arrays Representing arrays by drawing on squared paper 	<i>Investigations: Shapes, Halves, and Symmetry; grade 2; pg. 55-57</i>
4.3.E	Investigation 3: Sessions 1 & 2 Activity: Discussing 200 Steps and Four 90° Turns	<ul style="list-style-type: none"> Constructing rectangles, each having a perimeter of 200 turtle steps, using analysis of a geometric figure, arithmetic and problem solving strategies. Finding many different rectangles that have perimeters of 200 turtle steps 	<i>Investigations: Turtle Paths; grade3; pg. 69</i>
4.3.E	The Area Stays the Same	Students encounter the idea that shapes with perimeters of different lengths can have the same area.	<i>Math By All Means: Area and Perimeter; Grades 5-6; pg 24-35.</i>
4.4.D Graph and identify points in the first quadrant of the coordinate plane using ordered pairs.			Mathematics Standards
4.4.D (Finding the Coordinates – If the lesson adapts to staying in the 1 st quadrant)	Investigation 1: Session 3 Polygon Pictures with Coordinate Geometry Minimum 1 hour	<ul style="list-style-type: none"> Locating points on a coordinate grid Creating and drawing polygons 	<i>Investigations: Picturing Polygons; grade 5; pg 15-18.</i>
4.4.D	Investigation 1: Session 1 Coordinates and Distances on a Grid Whole class 40 min.; Pairs 20 min.	<ul style="list-style-type: none"> Determining locations on a map of Grid City Using coordinates as mathematicians do 	<i>Investigations: Sunken Ships and Grid Patterns; grade4; pg 5-9.</i>

Geometry Standards and Lesson Menu

4.4.D (Keep in 1st Quadrant)	Investigation 1: Sessions 3 & 4 Playing Sunken Ships	<ul style="list-style-type: none"> Combining coordinates and distances on a grid. 	<i>Investigations: Sunken Ships and Grid Patterns; grade4; pg 17-29.</i>
4.4.D (Stay in the 1st quadrant)	Xs and Os	<ul style="list-style-type: none"> Locate points on a rectangular coordinate plane using ordered pairs Use the point of origin (0, 0) as a point of reference 	<i>Navigating Through Geometry in Grades 3-5; pg.40-43.</i>
4.4.D (Focus on making the shapes, not similarity)	Can They Be the Same?	Use the coordinate grid to plot points to make shapes	<i>Navigating Through Geometry in Grades 3-5; pg.44-46.</i>
4.4.D	Don't Fall Over!	Students play a game similar to Twister on a coordinate-grid floor mat. They follow left-right and up-down directions to decide where to place their hands and feet and learn how to name points on a graph.	<i>Navigating through Geometry in prekindergarten – grade 2, pg 45-48.</i>
4.4.D	Coordinate Grid Pictures	Use the coordinate grid to plot points to make pictures. Various holiday and seasonal pictures make this an easy way to reinforce plotting points throughout the year.	<i>Graphiti Book 1</i>
5.3.A Classify quadrilaterals <i>Sort quadrilaterals into their various types: parallelograms, kites, squares, rhombi, trapezoids, and rectangles noting which shapes fit into more than one category or multiple categories and why.</i>			Mathematics Standards
3.4.A (Identifying quadrilaterals) 3.4.C (Identifying quadrilaterals) 5.3.A (Sorting quadrilaterals) 5.3.A (Attributes of quadrilaterals) 5.3.A (Classification of Triangles and Quadrilaterals) Teacher Note	Investigation 2: Session 1, 2, 3 Sorting Polygons Minimum 3 hours	<ul style="list-style-type: none"> Exploring attributes of triangles and quadrilaterals Sorting and classifying triangles and quadrilaterals Developing vocabulary to describe special triangles and quadrilaterals 	<i>Investigations: Picturing Polygons; grade 5; pg.36-43.</i>
5.3.A & 5.3.B	Sorting Angles	Students find the angles that make up quadrilaterals and then classify angles in different ways. They draw a variety of quadrilaterals and cut apart the angles. They learn the terms <i>right</i> , <i>acute</i> , and <i>obtuse</i> and use the corner of an index card to sort the angles according to those attributes.	<i>Sizing Up Measurement: Activities for Grades 3-5 Classrooms, pg. 156-159.</i>
5.3.A & 5.3.B	More about Angles and Sides	Students explore the properties of quadrilaterals and triangles.	<i>Geometry and Fractions with Tangrams: Grades 3-6. Pg. 13-14.</i>
5.3.A	Folding the Six-Turn Parallelogram	Students develop vocabulary and concepts about the properties of a parallelogram.	<i>Geo paperpolygons: Exploring 2D Shapes Through Paper Folding, pg 34.</i>

Geometry Standards and Lesson Menu

5.3.A	Folding the Eight-Turn Parallelogram	Students develop vocabulary and concepts about the properties of a parallelograms.	<i>Geo paperpolygons: Exploring 2D Shapes Through Paper Folding, pg 36.</i>
5.3.A	Geo quadrilaterals	Students explore the variety of names given to four-sided shapes.	<i>Geo all about angles: Exploring Line and Angle pg. 45-49.</i>
5.3.B Identify, sketch, and measure acute, right, and obtuse angles			Mathematics Standards
3.4.B, 3.4.C, (3.4.D perimeter) 4.3.E 5.3.B, 5.3.G	17.23 Measure Investigation	Ask students to make shapes according to special measurement requirements.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 329-330.</i>
3.4.A, 3.4.B, 3.4.C 5.3.B, 5.3.G, 5.3.H	17.22 Property Challenges	This activity can be done with almost any materials that allow students to draw or construct shapes easily. List properties or relationships, and have students construct as many shapes as possible that have those properties.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 329.</i>
5.3.B (Making Shapes with Geo-Logo)	Investigation 2; Session 4 & 5 Making Shapes That Follow Rules Min. 2 hrs.	Generating geometric figures from descriptions of their properties Describing geometric figures orally and in writing.	<i>Investigations: Picturing Polygons; grade 5; pg.46-49.</i>
5.3.B (Learning the Move and Turn Commands) 5.3.B (How Did You Make the Equilateral Triangle? 5.3.C (Comparing Turns and Angles) 5.3.C (Teacher Note)	Investigation 2; Session 6 & 7 Using Move and Turn Commands Minimum 2 hours	Determining turn sizes for making an equilateral triangle; Distinguishing between turns and angles; Defining categories of triangles and quadrilaterals more precisely.	<i>Investigations: Picturing Polygons; grade 5; pg.56-69.</i>
5.3.B	Investigation 2: Session 8 Finding Angle Sizes Minimum 1 hour	Estimating and measuring the size of angles Using known angles to find measures of other angles.	<i>Investigations: Picturing Polygons; grade 5; pg.70-73.</i>
5.3.B	Investigation 2: Session 9 Writing About Angles Minimum 1 hour	Estimating and measuring the size of angles	<i>Investigations: Picturing Polygons; grade 5; pg.79.</i>

Geometry Standards and Lesson Menu

5.3.B & 5.3.C	Thinking about Triangles	<ul style="list-style-type: none"> ▪ Use geoboards to investigate properties of triangles ▪ Make and test conjectures about properties of triangles ▪ Draw conclusions on the basis of experimentation with a variety of examples 	<i>Navigating Through Geometry in Grades 3-5; pg. 15-21.</i>
5.3.B	What is an Angle?	Students put two straws together to create a device that makes angles of different sizes. The students learn that an angle refers to how far apart two rays are spread as they open the straws different amounts to represent angles that equal a quarter turn, a half turn, three quarters turn, and a complete turn.	<i>Sizing Up Measurement: Activities for Grades 3-5 Classrooms, pg. 150-152.</i>
5.3.B	Body Angles and Simon Says	Students explore different ways they can make acute, right, obtuse, and straight angles with their bodies.	<i>Sizing Up Measurement: Activities for Grades 3-5 Classrooms, pg. 152-155.</i>
5.3.B	Hunt for Angles	Students become aware of objects in their environments that are made of different angles as they search for different kinds of angles in the classroom – acute, right, obtuse, and straight.	<i>Sizing Up Measurement: Activities for Grades 3-5 Classrooms, pg. 155-156.</i>
5.3.B	Measuring Angles	Students understand angles by exploring how they can be measured. Students first try to measure a set of angles by using familiar measurement tools such as a ruler. They learn that the critical attribute is the spread between two rays. Students create a nonstandard unit for measuring angles – a wedge.	<i>Sizing Up Measurement: Activities for Grades 3-5 Classrooms, pg. 159-163.</i>
5.3.B	Waxed Paper Protractors	Students identify how angles are used in the outside world. They create a tool to measure angles – waxed paper protractor.	<i>Sizing Up Measurement: Activities for Grades 3-5 Classrooms, pg. 164-167.</i>
5.3.B	Pattern Block Angles	Students develop their understandings of angles by solving a problem: <i>What are the measurements of each of the angles in each of the pattern blocks?</i>	<i>Sizing Up Measurement: Activities for Grades 3-5 Classrooms, pg. 171-174.</i>
5.3.B	Measuring with Plastic Protractors	Students develop their understanding of angles by making an angle estimator, a tool that lets them make an angle that widens and narrows. Then students learn how to use a traditional protractor to measure angles.	<i>Sizing Up Measurement: Activities for Grades 3-5 Classrooms, pg. 174-176.</i>

Geometry Standards and Lesson Menu

5.3.B	The Target Angle Game	Students use their angle estimators from “Measuring with Plastic Protractors” to play a game. They make an angle they think matches a target angle, then make the actual measurement.	<i>Sizing Up Measurement: Activities for Grades 3-5 Classrooms</i> , pg. 177-179.
5.3.B	Crazy Quilts	Students draw and then color crazy quilt patches made of straight lines. The students estimate the angles they created and measure them with protractors.	<i>Sizing Up Measurement: Activities for Grades 3-5 Classrooms</i> , pg. 180-182.
5.3.B	Angles of Tangram Pieces	The measures for <i>acute</i> , <i>right</i> , and <i>obtuse</i> angles are explored	<i>Geometry and Fractions with Tangrams: Grades 3-6</i> . Pg. 9-12.
5.3.B	Working with Angles	Students make an isosceles right triangle and explore the measure of the angles and are able to prove the measure from their construction.	<i>Geo paperpolygons: Exploring 2D Shapes Through Paper Folding</i> , pg. 12.
5.3.B	Investigating Angles	Students investigate the measure of angles by folding paper.	<i>Geo paperpolygons: Exploring 2D Shapes Through Paper Folding</i> , pg 16-17.
5.3.B	Comparing Angles	Students compare the sizes and contexts of different angles through a series of lessons.	<i>Geo all about angles: Exploring Line and Angle</i> , pg. 46-52.
5.3.B	Angles in a Triangle	Students use protractors to construct triangles.	<i>Geo all about angles: Exploring Line and Angle</i> pg. 43
5.3.B	Book Corners (Direct Measure-KU 1)	Have pairs of students use the corners of a book to find corners around the classroom with the same angle. Encourage them to draw each one and label it. Invite students to compare their angles to the corners of a square and introduce the language ‘right angle’ and ‘90 degrees’ to describe the size of the angles.	<i>First Steps in Mathematics: Measurement – Volume 1</i> , pg. 101.
5.3.B	Ordering Angles (Direct Measure-KU 1)	Students use a number of different ‘angles’ made from varying lengths of straws to order the size of some angles. Ask: When you decided which one was the largest angle, what did you compare?	<i>First Steps in Mathematics: Measurement – Volume 1</i> , pg. 102.

Geometry Standards and Lesson Menu

5.3.B	Comparing Polygons (Direct Measure-KU 2)	Students work in pairs. Give each pair a pattern block hexagon, square and triangle. Ask student to order them by area. When they have done this ask them to compare angles by superimposing one shape on top of another to see which angle is larger. Have them order the shapes by the size of angles.	<i>First Steps in Mathematics: Measurement – Volume 1, pg. 17.</i>
5.3.B	Treasure Hunt (Direct Measure-KU 3)	Students examine their measurement techniques in order to explain errors. Ask pairs of students to decide on the units and the appropriate instruments to design a treasure hunt around the school. Students write distance and angle measurement instructions for another pair to follow to find the treasure.	<i>First Steps in Mathematics: Measurement – Volume 1, pg. 123.</i>
5.3.B	Angles (Direct Measure-KU 4)	After comparing the size of angles directly (e.g. by placing the corner of a book on the corner of a desk, opening a compass to match how far the door is open), ask students to construct a cardboard protractor using a paper plate.	<i>First Steps in Mathematics: Measurement – Volume 1, pg. 131.</i>
5.3.C Identify, describe, and classify triangles by angle measure and number of congruent sides.			Mathematics Standards
3.4.C (focus on quadrilaterals) 5.3.C (focus on triangles)	17.19 Shape Sort II	Sort shapes by naming properties and not by names of the shapes.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 325-326.</i>
5.3.C	17.21 Toothpick Triangles	Students arrange toothpicks in straight lines to make triangles. Extends reasoning to Level 2.	<i>Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition by John Van de Walle; pg 328-329.</i>
5.3.C (Identifying Triangles by Their Angles) 5.3.C (Sorting Triangles) 3.4.A & 3.4C (Identifying quadrilaterals)	Investigation 2: Session 1 , 2, 3 Sorting Polygons	<ul style="list-style-type: none"> ▪ Exploring attributes of triangles and quadrilaterals ▪ Sorting and classifying triangles and quadrilaterals ▪ Developing vocabulary to describe special triangles and quadrilaterals 	<i>Investigations: Picturing Polygons; grade 5; pg.34.</i>
5.3.C	Combining Angles	Students draw a variety of triangles and color the angles in different colors. Then, after tearing off the angles, the students arrange them together so that each vertex is touching, to see what occurs when all the angles in a triangle are combines.	<i>Sizing Up Measurement: Activities for Grades 3-5 Classrooms, pg. 167-170.</i>

Geometry Standards and Lesson Menu

5.3.C	Folding the Isosceles Right Triangle, Dazzling Designs, Half and Half	Students explore the properties of the isosceles right triangle.	<i>Geo paperpolygons: Exploring 2D Shapes Through Paper Folding, pg 9.</i>
5.3.C	Folding the Isosceles Triangle	Students investigate an isosceles triangle that does not have a right angle.	<i>Geo paperpolygons: Exploring 2D Shapes Through Paper Folding, pg. 14.</i>
5.3.C	Geo triangles	Activities explore the properties of triangles.	<i>Geo all about angles: Exploring Line and Angle, pg 40-42.</i>
5.3.G Draw quadrilaterals and triangles from given information about sides and angles.			Mathematics Standards
5.3.G 5.3.B (estimating angle measure)	Investigation 2: Session 3 Turns, Turtles, and Triangles	<ul style="list-style-type: none"> ▪ Discussing properties of triangles ▪ Building a definition of triangles from examples and applying the definition to new figures. ▪ Estimating turn measures 	<i>Investigations: Turtle Paths; grade3; pg. 41-44.</i>
5.3.G	Investigation 2: Session 4 Equilateral Triangles	<ul style="list-style-type: none"> ▪ Discussing definitions of triangles ▪ Identifying properties of equilateral triangles ▪ 	<i>Investigations: Turtle Paths; grade3; pg. 45-51.</i>
5.3.G	Can You Do It? What Is It?	Students are challenged with a range of possible and impossible tasks. The teacher suggests a property of a shape to the students and students construct a shape with that property.	<i>Geo all about angles: Exploring Line and Angle, 2-3.</i>
5.3.H Determine the number and location of lines of symmetry in triangles and quadrilaterals.			Mathematics Standards
5.3.H	Investigation 2: Session 2 & 3	<ul style="list-style-type: none"> ▪ planning a project that involves exact measurement, description of rectangles and specification of locations 	<i>Investigations: Sunken Ships and Grid Patterns; grade4; pg 51-57.</i>
5.3.H (Focus time on triangles and quadrilaterals)	Investigation 4: Making Geometric Patterns	<ul style="list-style-type: none"> ▪ making patterns with mirror symmetry 	<i>Investigations: Mathematical Thinking at Grade 4; pg 64-90.</i>
5.3.H	Patchwork Symmetry	<ul style="list-style-type: none"> ▪ identify lines of symmetry in various pattern blocks ▪ use pattern blocks to design various patchwork-quilt squares that have line of symmetry 	<i>Navigating Through Geometry in Grades 3-5; pg. 49-51.</i>

Geometry Standards and Lesson Menu

5.3.H (Focus on triangles and quadrilaterals)	Symmetry Detectives- Learn the Secret Code!	<ul style="list-style-type: none"> ▪ Explore lines of symmetry in simple figures and geometric shapes ▪ Identify objects (triangles and quadrilaterals) in the real world that have line symmetry 	<i>Navigating Through Geometry in Grades 3-5; pg. 52-54.</i>
5.3.H	Symmetry of Tangram Shapes	Students determine which tangram pieces are symmetric and how many lines of symmetry are contained in those that are symmetric.	<i>Geometry and Fractions with Tangrams: Grades 3-6. Pg. 31-34.</i>
5.3.H	Making Symmetrical Designs	Students determine the lines of symmetry in a variety of quadrilaterals.	<i>Geo paperpolygons: Exploring 2D Shapes Through Paper Folding, pg 27.</i>
5.3.H	Folding Shapes	Students explore lines of symmetry of familiar shapes with mirrors and through paper folding.	<i>Navigating through Geometry in prekindergarten – grade 2, pg 59-61.</i>
5.3.H	Cutouts	Given a sheet of paper folded on a line of symmetry, students predict what the unfolded shape will look like. They also decide how to cut folded paper to create specific shapes.	<i>Navigating through Geometry in prekindergarten – grade 2, pg 73-75.</i>

Geometry Standards and Lesson Menu

Bibliography

Blanchard, Richard. *Graphiti: Book 1*.

Burnett, Irons and Turton. *Geo paperpolygons: Exploring 2D Shapes Through Paper Folding*. ORIGO Publications. (See 5th grade teachers)

Burns, Marilyn. *Math By All Means: Geometry Grades 1-2*

Burns, Marilyn. *Math By All Means: Geometry 3-4*

Chris Confer. *Sizing Up Measurement: Activities for Grades 3-5 Classrooms*, Math Solutions Publications, 2007.

First Steps in Mathematics: Measurement – Volume 1, Government of Western Australia, 2007.

Investigations: Making Shapes and Building Blocks; K

Investigations: Quilt Squares and Block Towns; grade 1

Investigations: Shapes, Halves, and Symmetry; grade 2

Investigations: Exploring Solids and Boxes; grade 3

Investigations: Flips, Turns and Area; grade 3

Investigations: Sunken Ships and Grid Patterns; grade 4

Investigations: Picturing Polygons; grade 5

Irons, Rosemary. *Beginning Processes: Mathematics for Young Minds*. ORIGO Education

Irvin, Barbara Bando. *Geometry and Fractions with Tangrams: Grades 3-6*.

NCTM, *Navigating Through Geometry in Grades Prekindergarten – Grade 2*.

NCTM, *Navigating Through Geometry in Grades 3-5*

Turton and Irons. *Geo all about angles: Exploring Line and Angle*. ORIGO Education.

Turton and Irons. *Geo plane puzzles: Exploring Properties of 2D Shapes*. ORIGO Education.

Van de Walle, John. *Elementary and Middle School Mathematics: Teaching Developmentally, 4th Edition*.