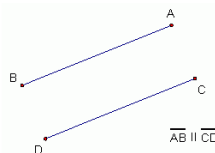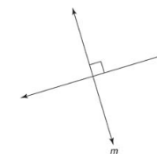| *"I Can"* Help My Student!	Important Understandings and Concepts
• draw an example of a point, line, line segment, ray, right angle, acute angle, obtuse angle, perpendicular lines and parallel lines. (G.1) • look for and identify the following in a given two-dimensional figure: point, line, line segment, ray, right angle, acute angle, obtuse angle, perpendicular lines and parallel lines. (G.1) • classify two-dimensional shapes into the following categories: those with parallel lines, those with perpendicular lines, those with both and/or neither parallel not perpendicular lines. (G.2) • classify two-dimensional shapes into categories based on the presence or absence of acute, obtuse or right angles. (G.2) • identify and draw right angles. (G.2) • identify line symmetric. (G.3)	**What should my student already know before I begin…..** • Distinguish between defining and non defining attributes of a shape (Grade 1) • Identify triangles, quadrilaterals, pentagons, hexagons, and cubes and their specific attributes (Grade 2)

Learning at a Glance

Students should become familiar with the concept of *parallel and perpendicular lines*. Two lines are parallel if they never intersect and are always equidistant. Two lines are perpendicular if they intersect in right angles (90º). Students may use transparencies with lines to arrange two lines in different ways to determine that the 2 lines might intersect in one point or may never intersect.

Parallel Lines   Perpendicular Lines

There are many different *kinds of quadrilaterals*, but all have several things in common; all of them have four sides, are coplanar, have two diagonals, and the sum of their four interior angles equals 360 degrees (two triangles; one triangle = 180 degrees; 180 + 180 = 360). Remember, if you see the word quadrilateral, it does not necessarily mean a figure like a square or rectangle.
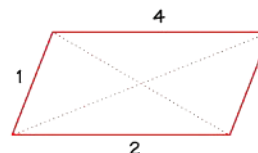
If a shape can be folded on a line so that the two halves match, then it is said to have *line symmetry* of mirror symmetry. One way to introduce line symmetry to children is to show examples and nonexamples (symmetry and nonsymmetry). Another option is to have a student fold a sheet of paper in half and cut out a shape of their choosing (cut opposite the fold line). When they open the paper, the line of symmetry will be the fold line (van de Walle, 2007)

van de Walle, J. (2007). *Elementary and middle school mathematics: Teaching developmentally*. (6th ed., p. 432). Pearson Education.

Words to Know

parallelogram: a quadrilateral with opposite sides that are parallel and of equal length and opposite angles that are equal.

Parallel lines: lines that are the same distance apart.

*perpendicular lines:* lines that intersect at right angles to each other.

polygon: a plane shape having three or more sides.

quadrilateral: polygons with (4) sides.

rectangle: a quadrilateral with four right angles and two pairs opposite equal parallel sides.

How Can You Help Your Student?	Sample Problems and other Resources

Interactive Learning Games

Composing Shapes – [Trapezoid activity](#)

Learn Zillion – [Points, Lines and Segments](#)learning

Learn Zillion – [Classify and Draw Angles](#)learning

Learn Zillion – [Classify Parallelograms](#)learning

Learn Zillion – [Line of Symmetry with Shapes](#)learning

Draw Real-life Quadrilaterals
Give student some index cards. On the blank side have them illustrate a quadrilateral in real life (examples: checkerboard game-square, skyscraper-rectangle, desk top-rectangle, trapezoid-table trapezoid, side view of a roof of a house-parallelogram, etc.) On the lined portion of the index card, have students write their own clues to describe the quadrilaterals they have drawn on the other side. Place the cards in a Ziploc bag and use as a learning resource.

For more information on helping your child learn mathematics (with activities from pre-school to grade five), go to http://www2.ed.gov/parents/academic/help/math/index.html

Sample Problem: For each figure, draw *all* of the lines of symmetry. What pattern do you notice? How many lines of symmetry do you think there would be for regular polygons with 9 and 11 sides. Sketch each figure and check your predictions.

Solution: Polygons with an odd number of sides have lines of symmetry that go from a midpoint of a side through a vertex (corner)
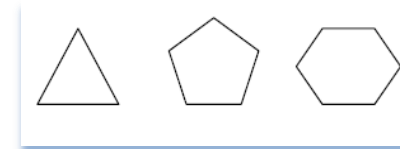
Special Quadrilaterals

	A **parallelogram** has two parallel pairs of opposite sides.
	A **rectangle** has two pairs of opposite sides parallel, and four right angles. It is also a parallelogram, since it has two pairs of parallel sides.
	A **square** has two pairs of parallel sides, four right angles, and all four sides are equal. It is also a rectangle and a parallelogram.
	A **rhombus** is defined as a parallelogram with four equal sides. Is a rhombus always a rectangle? No, because a rhombus does not have to have 4 right angles.
	Trapezoids only have one pair of parallel sides. It's a type of quadrilateral that is not a parallelogram. (British name: **Trapezium**)
	Kites have two pairs of adjacent sides that are equal.

Recommended Children's Literature

The use of children's literature is equally important as problems and deserves some attention. Use these books to enhance both language literacy and mathematical literacy for an interdisciplinary connection during story time. *These books can be checked out at your local Atlanta-Fulton Public Library System www.afplweb.com*

The Greedy Triangle by Marilyn Burns   *The Patchword Quilt* by Valerie Flourney
What Is Symmetry? By Edward Emberley   *Grandfather Tang's Stories* by Ann Tompert