

**Grade 4
Mathematics
Unit 7: Geometry**

Time Frame: Approximately four weeks



Unit Description

This unit extends students' understanding of geometry by using lines, line segments, rays, and angles to draw and classify two-dimensional polygons.

Student Understandings

Students identify, describe, and draw points, lines, line segments, and rays. Students develop an understanding of types of angles, parallel and perpendicular lines, and line symmetry. They learn how angles are formed and how angles can be added and subtracted. They use these understandings to differentiate types of triangles and quadrilaterals. Students learn the difference between regular and irregular polygons and classify two-dimensional polygons based on angles, line segments, parallel and perpendicular lines, and symmetry.

Guiding Questions

1. Can students identify and draw points, lines, line segments, and rays?
2. Can students form, measure, add, and subtract angles?
3. Can students classify types of angles?
4. Can students draw and identify parallel, perpendicular, and intersecting lines, segments, or rays?
5. Can students classify two-dimensional polygons and identify their parts?
6. Can students draw lines of symmetry and identify the number of lines of symmetry in a figure?

Unit 7 Grade-Level Expectations (GLEs) and Common Core State Standards (CCSS)

CCSS for Mathematical Content	
CCSS #	CCSS Text
Measurement and Data	
4.MD.5	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a “one-degree angle,” and can be used to measure angles.

	b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.
4.MD.7	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
Geometry	
4.G.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
4.G.2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
4.G.3	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.
ELA CCSS	
CCSS #	CCSS Text
Writing Standards	
W.4.2d	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. Use precise language and domain-specific vocabulary to inform about or explain the topic.
Speaking and Listening Standards	
SL.4.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. b. Follow agreed-upon rules for discussions and carry out assigned roles. c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others. d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.

Sample Activities

Activity 1: Geometry Vocabulary Self-Awareness Chart (CCSS: 4.W.4.2d)

Materials List: Geometry Vocabulary Self-awareness Chart BLM, pencils

Have students maintain a modified *vocabulary self-awareness* chart ([view literacy strategy descriptions](#)) for geometry. Provide this list of words to the students and have them complete a self-assessment of their knowledge of the words using the Geometry Vocabulary Self-awareness Chart BLM. Do not give students definitions or examples at this stage. (Students

will work on the definitions and examples in other activities.) Ask students to rate their understanding of each word with either a “+” (understands well), a “√” (limited understanding) or a “-” (don’t know). Over the course of this unit, students should be told to return to the chart and add new information to it. The goal for students using the chart is to replace all the check marks and minus signs with a plus sign. Since students continually revisit their vocabulary charts to revise their entries, they have multiple opportunities to practice and extend their understanding of key geometry terms.

Activity 2: Exploring Points, Lines, Line Segments, and Rays (CCSS: 4.G.1)

Materials List: Geometry Vocabulary Self-awareness Chart BLM from Activity 1; Points, Lines, Line Segments, and Rays BLM; scissors; paper; pencils

Using words from the Geometry Vocabulary Self-awareness Chart BLM, students will create a *lesson impression* ([view literacy strategy descriptions](#)). *Lesson impressions* help create situational interest in the content by stimulating students’ curiosity. Have students write an impression of the lesson based on a list of words that they will study that day. The impression helps motivate students by increasing their anticipation of the content and gives them a purpose for learning. Provide students these impression words: point, line, line segment, and ray. Tell students to predict what the lesson will be about. Have them write a short descriptive paragraph explaining their prediction. Have students read their impressions aloud to the class to increase anticipation about the lesson. For example, students might write: “Today’s lesson will be about geometry. We will look at points, lines, line segments, and rays. We will look at what these terms are and will possibly look at how they are related. We will use these terms to help us understand shapes later on.”

Provide the students with the Points, Lines, Line Segments, and Rays BLM. Have the students cut out the figures in boxes A – F. Have the students sort the figures into groups based on their similarities. Without telling students the names of the figures, have them discuss what makes these figures similar. (Figures A and F both have an arrow on one end and a point on the other end, figures B and D have arrows on both ends, and figures C and E have points on both ends.) Have students discuss what they think the arrow means and what the endpoints mean. (The arrows mean that the figure goes on indefinitely in that direction. The endpoints mean that the figure ends at that point and does not go on indefinitely.) Have students write descriptions of each of the figures in their own words. Ask students to share their descriptions with the class.

Tell the students the name of each of the figures and provide a brief description. Tell students that a point is a place in space. Points cannot be seen or measured. When points are discussed, they are usually shown as a dot and labeled with a capital letter. The figures on the BLM are all composed of points. Two of the points have been shown with dots and labeled with letters. But there are many other points on the figures. The arrows mean that the figure goes on indefinitely in both directions.

Tell students that the figures with arrows at both ends are called lines. A line is a straight path of points that has no endpoints. Explain to students that lines are shown by points placed

near the arrows and labeled with letters. Have students name the lines on the BLM (lines CD, GH).

Tell students that rays have arrows at only one end. This shows that a ray goes on infinitely in only one direction. The other end of the ray is a specific point. Rays are labeled with the end point's being listed first. Have students name the rays on the BLM. (rays AB, KL)

Line segments have no arrows at all. Tell students that line segments have endpoints and do not continue on infinitely. Have students name the line segments on the BLM. (FE, IJ)

See that students practice labeling points, lines, line segments, and rays using figures G – L on the BLM. Have students update their *vocabulary self-awareness chart* from Activity 1 with definitions and examples for the terms point, line, line segment, and ray.

Tell the students to draw a line segment. Ask them what they would have to do in order to change the segment into a ray and explain why they would have to do this. (Draw an arrow on one side of the line segment. Rays go on indefinitely in one direction and that is shown by using an arrow.) Have students tell what they would have to do to turn the ray into a line. (Draw an arrow on the other side of the ray. Lines go on indefinitely in both direction and that is shown by using an arrow at each end.)

Have students return to their *lesson impression* paragraphs. Have a few students read their paragraphs aloud and discuss how their impression was similar and different to the actual lesson. Consider having students write a new paragraph using the impression words and compare this paragraph with their impression text. Discuss overall impressions of the lesson.

Activity 3: What is an Angle? (CCSS: 4.MD.5a, 4.MD.5b, 4.G.1)

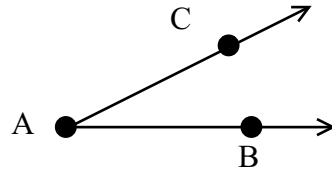
Materials List: Geometry Vocabulary Self-awareness Chart BLM from Activity 1, bendable or flex straws, colored pencils, paper, scissors

Have students draw a ray. Have them draw another ray so that both rays share a common endpoint. The students should have a variety of figures with different size angles if they did not copy each other's figures. Tell students that the place where the two rays meet is called a vertex. Tell them when 2 rays or segments share a common endpoint, they form an angle. Have students share their angles with their group and discuss the similarities and differences among the different angles that they drew. Students should realize that all angles have two rays that join at a point, but that the opening between the two rays differs. Tell them that they are going to explore how mathematicians measure the differences among angles.

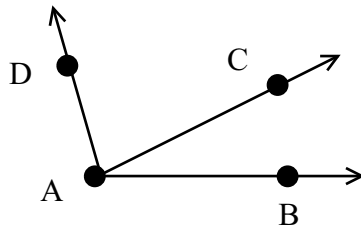
Provide each student with two straws and have them place one straw inside the other by pinching the end of one of the straws and sticking it into the second straw. Explain that they will let the straws represent rays even though rays have arrows on them and the straws do not. The place where the straws join will represent the vertex. Have students create an angle using the straws in which the rays are not too far apart from each other. Have the students draw that angle on a piece of paper. Have students use one colored pencil for one of the rays

and another colored pencil for the second ray. Have them label their angle as CAB. Tell students that when naming an angle, the letters are listed with the vertex letter in the middle.

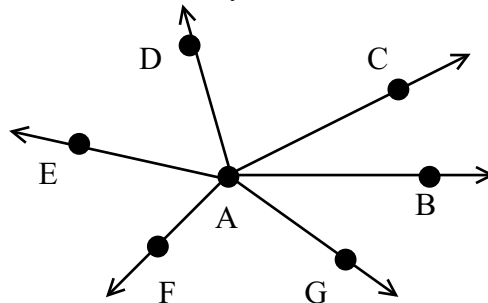
For example:



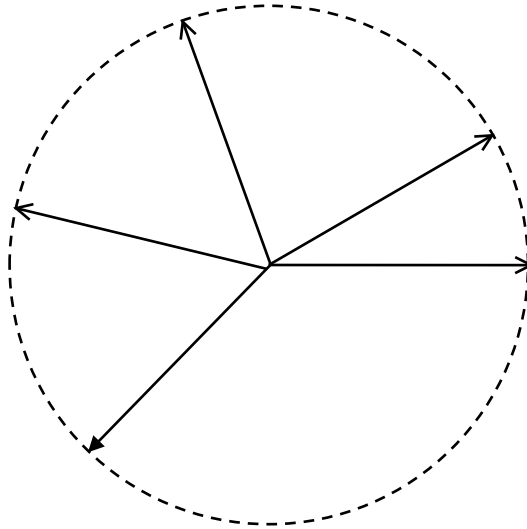
Have the students rotate one of the rays to form a new angle. Ask them to draw the new angle on their original drawing using the same color that they used for the second ray in their original drawing. Have them label the new ray as AD and the new angle as DAB. For example:



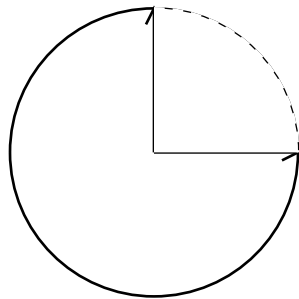
Have students continue rotating one of the straws until they have rays rotating all the way around the figure. Make sure they continue using the same colored pencil. By the end of the rotations, students should have two colors of rays: one for the first ray and several of the same color for the rotated rays. Have them label each new ray and angle. For example:



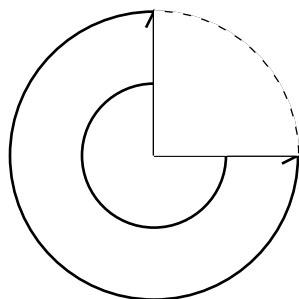
what conclusions they can draw from this process. Students may say that rotating rays from the center forms angles or that rays can go all the way around in a circle. Lead students to realize that the rays of an angle rotate around the center in a circular arc. For example:



Tell students that angles are measured by considering the fraction of the circular arc between the points where the two rays intersect the circle as compared to the entire circle. (A circle is considered to have 360 units because historically it was thought that it took 360 days for the earth to rotate in a circle around the sun. Each day became one unit, so one rotation in a circle is $1/360$). Since a circle is broken into 360 parts, an angle is measured by the fraction of the circular arc over 360. Each unit is called a degree. Have students look at the following circular fraction to determine the number of degrees of the angle. Have students determine that the dashed arc is $1/4$ of the total circle. Since $1/4$ of 360 is 90, the angle is 90 degrees. Provide the students with other examples ($1/3$ or 120° , $1/2$ or 180° , $3/4$ or 270° , etc.).



To prevent some students from thinking that degrees measure the length of the circular arc, give them the following circle.



Discuss with students how the dashed circular arcs are the same fractional amount of each circle. Help students realize that since the fraction of the rays' circular arc to the whole circle is the same, then the measurement of the angle is the same. Despite the size of the circles, the angle remains 90 degrees. Provide students with multiple examples of this if necessary. Have students update their *vocabulary self-awareness chart* from Activity 1 with definitions and examples for the terms angle, vertex, and degree.

Activity 4: Types of Angles (CCSS: 4.G.1)

Materials List: Geometry Vocabulary Self-awareness Chart BLM from Activity 1, Types of Angles BLM, scissors

Provide students with the Types of Angles BLM. Have students cut out the figures in boxes A – F. Have them sort the figures into groups based on their similarities. Without telling students the names of the angles, have them discuss what makes the angles in their groups similar. (Angles A and C have rays that are close together, angles B and E have rays that farther apart, angle D makes an L, and angle F is a straight line.) Students should be able to group angles based on their size ($< 90^\circ$, 90° , between 90° and 180° , and 180°). Discuss how angle groups are similar despite their orientation. Students may have trouble with a straight angle. Use problem F on the BLM to illustrate that an angle is formed when 2 rays share a common endpoint. Tell students the names of the different types of angles (acute, right, obtuse, straight).

Teacher Note: An angle between 180° and 360° is called a reflex angle. This is not a term that students need to know, but they need to understand that there are angles greater than 180° .

Have students update their *vocabulary self-awareness chart* from Activity 1 with definitions and examples for the terms acute angle, right angle, obtuse angle, and straight angle. On the Types of Angles BLM, have students label and name the angles shown in boxes G – L.

Have students practice drawing the different types of angles on a sheet of paper. Provide students with examples of each type and have students label the points on each angle and sort the angle into groups of acute, right, and obtuse angles. Ask them throughout this process how and why the angles within each category are alike and how and why the angle categories are different. Have students form the different types of angles using their arms.

Activity 5: Parallel and Perpendicular Lines (CCSS: 4.G.1)

Materials List: Geometry Vocabulary Self-awareness Chart BLM from Activity 1, Parallel and Perpendicular Lines BLM, pencils

Provide students with the Parallel and Perpendicular Lines BLM. Have the students cut out the figures in boxes A – F. Ask the students to sort the figures into groups based on their similarities.

Teacher Note: Some students may form 2 groups, putting the intersecting and perpendicular lines in one group and the parallel lines in another. Some students may form 3 groups, separating the perpendicular and intersecting lines in to different groups.

Without telling students the names of the figures, have them discuss what makes these figures similar. (Figures A and D do not cross, figures B and F cross and figures C and E cross and make four 90 degree angles.)

For the purposes of teaching the terms intersecting, perpendicular, and parallel, focus mainly on using lines. Line segments and rays can also be parallel, perpendicular, and intersecting. Provide examples of them once the students have mastered the terms intersecting, perpendicular, and parallel lines. Make sure that students understand that perpendicular lines are also intersecting lines. Discuss with students how the intersecting lines (including perpendicular) form angles. Review how to label and read the names for angles. Have students understand that all perpendicular lines form right angles. Intersecting lines that are not perpendicular form opposite acute and obtuse angles. Parallel lines never intersect and are always the same distance apart. Have students create definitions for each of these types of figures. Have students update their *vocabulary self-awareness chart* from Activity 1 with definitions and examples for the terms parallel, intersecting, and perpendicular lines.

Have the students name the lines in boxes G – L from the Parallel and Perpendicular Lines BLM and label the lines as intersecting, parallel, or perpendicular and intersecting. Provide students with practice identifying parallel, perpendicular, and intersecting lines. Have students name the angles formed by the intersecting lines and classify them as acute, obtuse, and right. Once students feel comfortable identifying these characteristics, have the students play *professor know-it-all* ([view literacy strategy descriptions](#)). Choose one student to be the “professor.” Provide the “professor” with a figure of parallel, perpendicular, or intersecting lines. Have the students question the “professor” about the figure. Encourage the students to ask about angles and provide explanations about whether the pair of lines is parallel, perpendicular, or intersecting. Repeat the game again with other students and other figures. Use this strategy later in the unit to review for quizzes or other assignments.

Activity 6: Adding and Subtracting Angles (CCSS: 4.MD.7)

Materials List: Adding and Subtracting Angles BLM, paper plates with 36 crimps, rulers, pencils

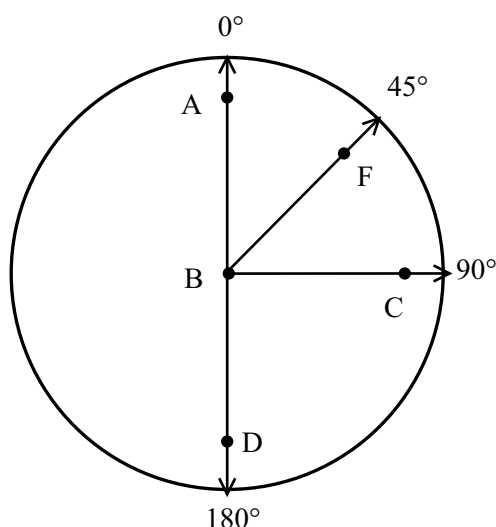
Provide the students with the following word problem: Tori looked at the clock in the beginning of class. The next time she looked at the clock, the minute hand had rotated 90° . The next time she looked, it had rotated an additional 90° . How many degrees had the minute hand rotated since the first time she looked at the clock?

Have the students make predictions using the *directed learning-thinking activity* ([view literacy strategy descriptions](#)) about how they can solve this problem. Activate their prior knowledge by having students realize that angles represent a fractional amount of the circular arc of a circle. Provide students with a paper plate. (Consider marking the center of each circle for the students.) Have students label the crimps around the paper plate starting with

0° . When the students finish labeling, discuss that 0° needs to also be labeled 360° . This is both the starting and ending point of the circle.

On the plates, students will draw rays and angles.

- Have students use a ruler to draw a 90° angle using rays that share an endpoint in the center of the circle with one ray going toward 0° and the other toward 90° . Have students label the center of the circle B. Have students label the ray going from the center of the circle to 0° as ray BA and the ray going from the center of the circle to 90° as ray BC.
- Have students draw another ray, ray BD, 90° clockwise from ray BC. Ask students on which degrees rays BC and BD meet the rim of the circle (90 and 180). Ask students the name of the angle that has a measure of 180° ($\angle ABD$). Ask students which angles are within $\angle ABD$ ($\angle ABC$ and $\angle CBD$). Ask students if the measure of each angle is the same (yes). Ask students how they know ($90^\circ + 90^\circ = 180^\circ$).
- Discuss how angles can be added and how angle measures are the sum of the angle measures inside them.
- Ask students to draw a new ray, ray BF, from the center of the circle to 45° . Ask students if there are any new angles formed by the new ray? ($\angle ABF$, $\angle FBC$, $\angle FBD$) Ask students what is the measure for $\angle FBC$ since they know that $m\angle ABF$ is 45° (45°). Ask how they know the measure is 45° ($90^\circ - 45^\circ = 45^\circ$).
- Ask students other questions that require them to determine the measure of an angle when they know the measure of one of the parts and the total measure. Note: If students are having trouble with this concept, use a protractor to demonstrate how angles can be added and subtracted. Even though the students do not need to know how to use a protractor, it can be a helpful tool to conceptualize adding and subtracting angles.



Provide students with the Adding and Subtracting Angles BLM. Have students add and subtract angles using the diagrams.

Use the predictions from the class as a discussion topic. Ask students what they expected to learn and what they actually learned. Have them continue this prediction process as they become exposed to new content.

Activity 7: Properties of Polygons (CCSS: 4.G.1)

Materials List: Polygons BLM, pencils

Provide the students with the Polygons BLM. Review the names for the different polygons. Have students look at the first figure. Ask the students questions such as these:

- Which of the line segments intersect? (segments BA & AD, AD & DC, DC & CB, CB & BA)
- Are any of the line segments perpendicular? (No)
- Are the opposite line segments parallel? (Yes)
- How many angles are formed in the shape? (4)
- What types of angles do the line segments form? (2 acute and 2 obtuse angles)
- What are all of the names of the polygon? (polygon, quadrilateral, parallelogram, rhombus)

Have students work in groups to look at the next five figures to identify the relationships in pairs of segments and the types of angles formed. Make sure the students use the names of the lines and angles in their discussions. Discuss the results as a class. Have each group choose 2 of the polygons and tell how the polygons are alike and how they are different. Have students to complete the rest of the BLM independently.

Activity 8: Draw that Polygon (CCSS: 4.G.1)

Materials List: Dot Paper BLM, pencils, rulers

Provide the students with the Dot Paper BLM. Have the students draw a polygon with the following criteria: a 4-sided figure with opposite sides that are parallel. Have the students check to see if their neighbors drew the same figure as they did. (Students may have drawn squares, rhombuses, rectangles, or parallelograms.) Discuss why there are so many variations.

Ask students to draw a 4-sided figure with opposite sides parallel with only two acute angles. Have the students check to see if their neighbors drew the same figure as they did. (Students could have drawn parallelograms or rhombuses.) Discuss how this question is different than the first one. Ask the students to draw other figures with different criteria providing a variety of different types of figures (intersecting lines, types of angles, types of triangles, and types of polygons).

2013-14

Activity 9: Using Geometric Properties to Classify Triangles (CCSS: 4.G.1, 4.G.2)

Materials List: Classifying Triangles BLM, paper, pencils

Provide students with the Classifying Triangles BLM. Have the students cut out the figures in boxes A – F. Tell students to focus on the lengths of the sides of each triangle. Have the students sort the figures into groups based on their similarities. Without telling students the terms to describe triangles based on length, have them discuss what makes these figures similar. (Triangles A and C each have all sides the same length, triangles B and F each have two sides that are the same length, and triangles D and E each have all sides with different lengths.) Discuss that the orientation of the triangle does not impact the length of the sides. Tell students that the triangles in boxes A and C are equilateral triangles, those in boxes B and F are isosceles triangles, and those in boxes D and E are scalene triangles. On the BLM, have students classify the triangles in boxes G – I based on the length of their sides.

Have students again look at the figures in boxes A – F. Tell them this time to focus on the size of the angles of the triangles. Have the students sort the figures into groups based on their similarities. Without telling the students the terms to describe the types of angles, have them discuss what makes these figures similar. (Triangles A, C and F have all acute angles. Triangles B and D have right angles. Triangle E has 1 obtuse angle.) Discuss that the orientation of the triangle does not impact the types of angles. Tell students that the figures in boxes A, C, and F are acute triangles, the figures in boxes B and D are right triangles, and the figure in box E is an obtuse triangle. On the BLM, have students classify the triangles in boxes G – I based on the types of their angles.

Have students look at the triangles in boxes J – L. Have the students classify the triangles by both length and angles. Have them justify their reasons for their classifications. (Triangle J is isosceles and obtuse, triangle K is scalene and right, and triangle L is equilateral and acute).

2013-14

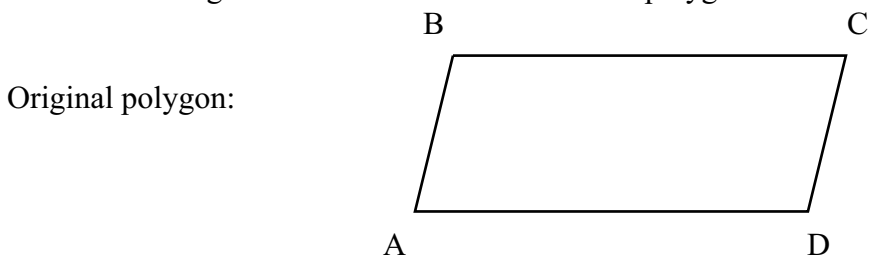
Activity 10: Using Geometric Properties to Classify Polygons (CCSS: 4.G.1, 4.G.2)

Materials List: Classifying Polygons BLM, geoboard, rubber bands, pencils, paper

Provide students with the Classifying Polygons BLM. Have students look at the quadrilaterals in the first section (figures A - F). Have students make a list of the properties of the shapes (angles, parallel line segments, perpendicular line segments, length of sides). They should discuss the similarities and differences of the quadrilaterals in groups. Have students repeat this process with the third section (figures G, H, I, J, K, L) with the polygons that have more than four sides. Ask students to compare the different polygons. Guide them to see that polygons with the same number of sides do not always have the same size angles or sides with the same lengths. Tell students that polygons that have sides and angles that are all congruent are called regular polygons. Polygons that do not have sides and angles that are all congruent are not regular polygons and are sometimes called irregular polygons.

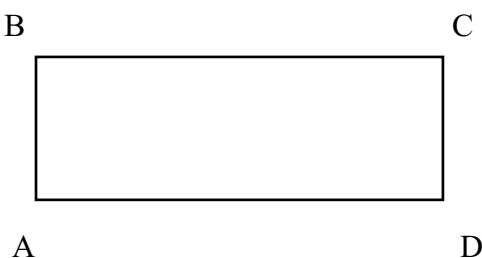
Engage students in *SPAWN* writing ([view literacy strategy descriptions](#)). *SPAWN* writing helps students improve their writing abilities in the mathematics classroom by giving them opportunities to write in meaningful ways about the mathematics content. *SPAWN* is an acronym that stands for five different writing prompts: *special powers*, *problem solving*, *alternative viewpoints*, *what if?*, and *next*. These prompts push students to write using predictive, reflective, and critical thinking skills regarding mathematics. For this *SPAWN*, students will be writing based on the *what if?* prompt.

Provide students with a geoboard and rubber bands. Ask them to create a polygon. Ask the students to draw the polygon on a separate sheet of paper and name the angles, line segments, and parallel and perpendicular line segments, if any. Ask the student a *what if?* prompt that prompts the students to think about the polygon if it had different features. Have the students draw the new figure and write about how the two polygons are different. For example:



What if? prompt: What if $\angle BAD$ became a right angle (the other angles are allowed to change). Describe the polygon. What would be the difference between the original polygon and the new one? What happens to the other angles? Do they change as well? What happens to the lengths of the sides?

The figure that follows is a possible new polygon that students may have made. There are many other possibilities.



Have students make their original figure on the geoboard. Have them draw it in a different way to fit the description in the *What if?* prompt. Have them draw the new polygon on a separate sheet of paper and name the angles, line segments, and parallel and perpendicular line segments, if any. Have students answer the questions in the *What if?* prompt. Have students share their responses with their classmates. Check for logic and accuracy. Note differences in the students *SPAWN* writing to the class. Continue with other *what if?* prompts.

2013-14

Activity 11: Identifying Lines of Symmetry (CCSS: 4.G.3)

Materials List: Lines of Symmetry BLM, scissors, paper, pencils

Distribute two copies of the Lines of Symmetry BLM and scissors to each student. Have the students cut out the figures on one of the copies of the Lines of Symmetry BLM. Have students fold the figures to determine how many times the figure can be folded to have both halves match exactly. On the second copy of the Lines of Symmetry BLM, have students draw each line of symmetry and record the number of lines of symmetry each figure has. Provide students with multiple opportunities to practice identifying figures with lines of symmetry and drawing lines of symmetry on figures.

2013 – 2014

Activity 12: Predicting Lines of Symmetry in Regular Polygons (CCSS: 4.G.3)

Materials List: Regular Polygons BLM

Provide students with the Regular Polygons BLM. Have students draw all lines of symmetry for the triangle and the square on the Regular Polygons BLM. Have them label the number of sides of the figure and the number of lines of symmetry. Have students split into pairs to do *discussion* ([view literacy strategy descriptions](#)) in the form of Think Pair Square Share. In this activity, give students a question and ask them to think about it alone for a 30 seconds or 1 minute. Have students pair up to discuss what they thought. Have one pair of students share with another pair so that four students are discussing the content together. Have students discuss all the ideas of the group rather than settling on what the first person said. This activity works best when everyone shares so that the whole group hears a variety of ideas. Ask if they see any patterns with the number of lines of symmetry and the number of sides for the triangle and the square. Predict how many lines of symmetry there would be for regular polygons with five, six, seven and eight sides. Have students predict how many lines of symmetry polygons with nine, ten, or a hundred sides would have. At the conclusion of each question, have the groups share with the class their thoughts so everyone can learn from each other.

Sample Assessments

General Assessments

- Maintain portfolios containing student reports and samples of student work that included representations of lines, line segments, rays, angles, and polygons.
- Show the students a card with an angle or polygon on it. Have them draw, name, and classify the angles or polygon. Have them tell whether there are parallel and/or perpendicular line segments in the figure.
- Give prompts such as the ones that follow and have students record their thoughts in a personal math journal.
 - Explain, using examples of angles, length of line segments, parallel and

perpendicular line segments, how types of quadrilaterals are different.

- Explain, using examples of angles and line segments, how types of triangles are different.
- Explain how angles, rays, and circles are related.

Activity-Specific Assessments

- Activities 2, 4: Provide students with a figure with multiple line segments, lines, and rays in it. Have students label the line segments, lines, and rays in the figure. Have students label the angles formed by the intersecting lines. Have them label these angles as acute, right, obtuse, and straight.
- Activity 6: Provide students with addition and subtraction of angles word problems. Have students solve the problems, showing their work and explaining their answers.
- Activities 7, 10: Give students a variety of different polygons, both regular and irregular. Have them name the polygons, and describe them, discussing the types of angles, lengths of sides, and presence of parallel or perpendicular line segments.