

Just in Time Quick Check

Standard of Learning 3.MG.4

Strand: Measurement and Geometry

Standard of Learning 3.MG.4

The student will identify, describe, classify, compare, combine, and subdivide polygons.

Students will demonstrate the following Knowledge and Skills:

- a) Describe a polygon as a closed plane figure composed of at least three line segments that do not cross.
- b) Classify figures as polygons or not polygons and justify reasoning.
- c) Identify and describe triangles, quadrilaterals, pentagons, hexagons, and octagons in various orientations, with and without contexts.
- d) Identify and name examples of polygons (triangles, quadrilaterals, pentagons, hexagons, octagons) in the environment.
- e) Classify and compare polygons (triangles, quadrilaterals, pentagons, hexagons, octagons).
- f) Combine no more than three polygons, where each has three or four sides, and name the resulting polygon (triangles, quadrilaterals, pentagons, hexagons, octagons).
- g) Subdivide a three-sided or four-sided polygon into no more than three parts and name the resulting polygons.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting and Prerequisite SOL: 2.MG.3, 3.PFA.1

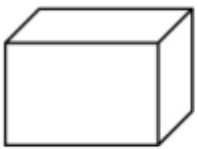

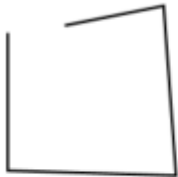
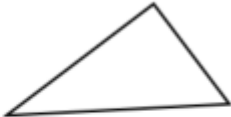
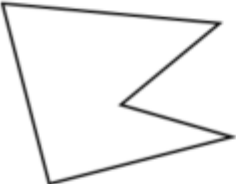
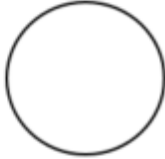


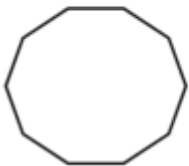
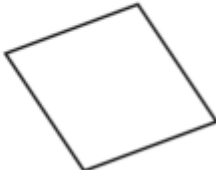
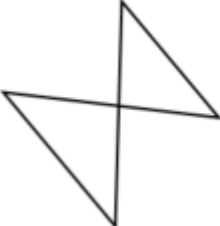
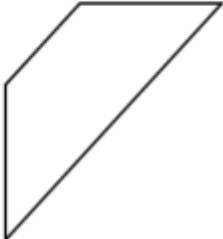
Just in Time Quick Check 3.MG.4

***Note: Problem #5 should be copied single-sided so that students are able to cut out the polygons.**

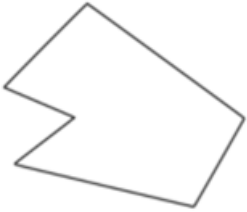
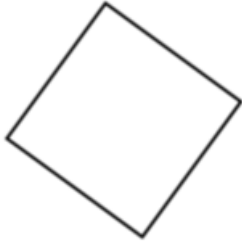
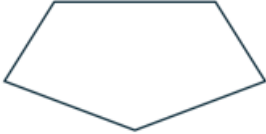

1. Look at the table of shapes below.

a) Circle the shapes from this table that are polygons. Write a sentence that explains why these shapes are polygons.

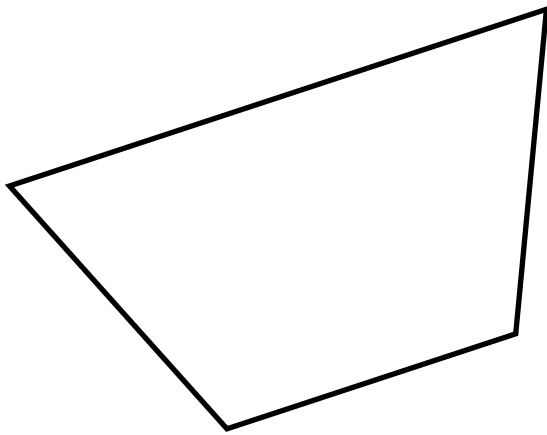
b) Put an X on the shapes from this table that are not polygons. Write a sentence that explains why these shapes are not polygons.

2. Complete the chart. Use the word bank to help you. Words may be used more than once.

Word Bank:		
Triangle	Quadrilateral	Pentagon
Hexagon	Octagon	
Polygon	Number of Sides	Name
		
		
		
		

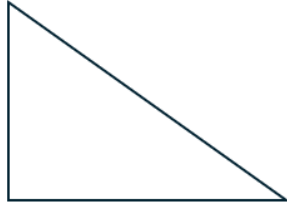
3. Use a straight edge to subdivide the given shape into three polygons. Label each of the three resulting polygons.



4. Read each description and circle all the correct answers in each row.

Description	Polygons
I have more sides than a pentagon. I could be a...	quadrilateral hexagon octagon
I have fewer angles than a hexagon. I could be a...	quadrilateral triangle octagon
I have exactly four vertices. I could be a...	triangle pentagon quadrilateral

5. Cut out the given shapes. Use glue or tape to combine two or three of the shapes to create a new polygon. Name the resulting polygon.



3.MG.4 Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

***Note:** Problem #5 should be copied single-sided so that students are able to cut out the polygons.

1. Look at the table of shapes below.

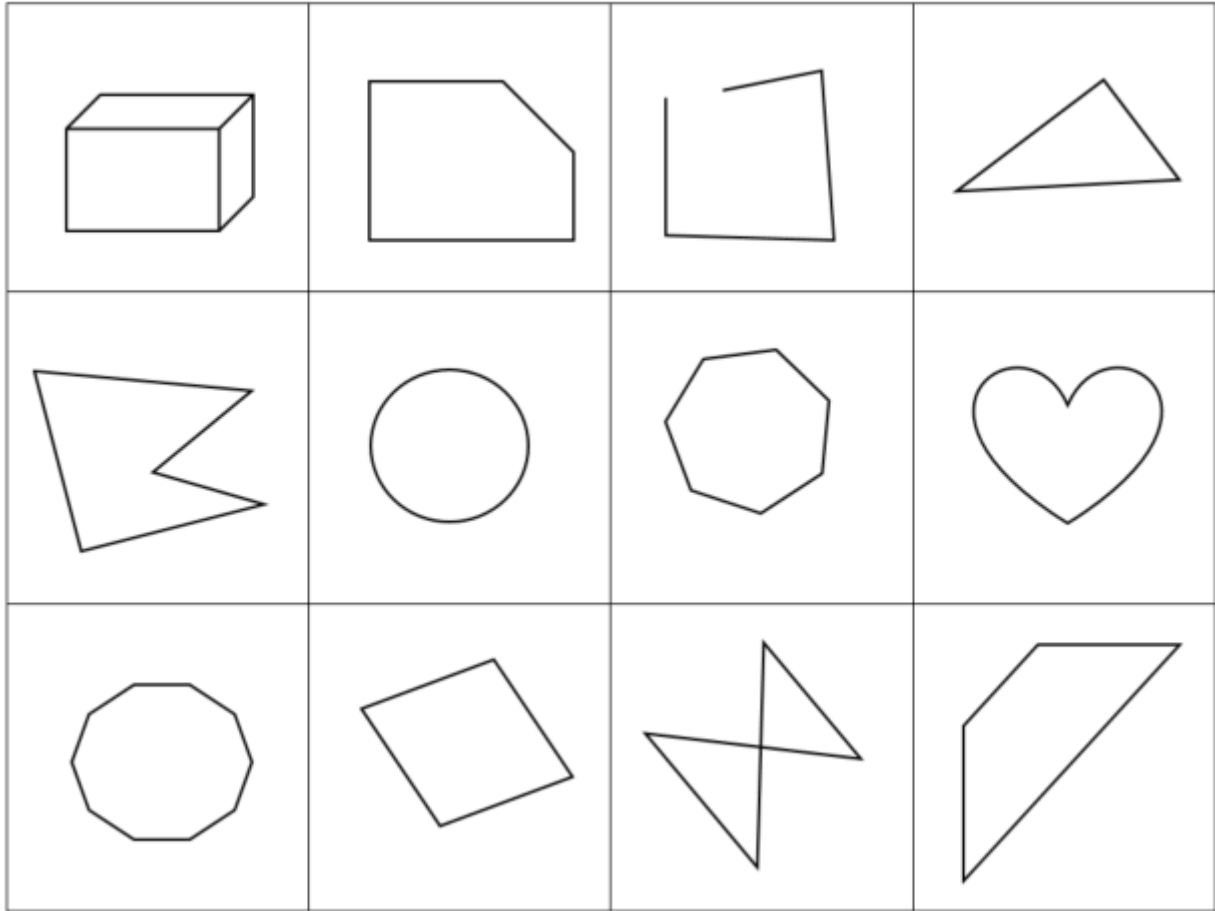
- a) Circle the shapes from this table that are polygons. Write a sentence that explains why these shapes are polygons.

Students may circle open figures, figures with curves or crossed segments, or three-dimensional figures and state that they are polygons. This error may indicate a need for more experience classifying figures with differing attributes. Opportunities to play “What’s My Rule” using a collection of shapes (including polygons and non-polygons) focuses attention on the similarities and differences between polygons and non-polygons. To play, the teacher selects a few shapes that fit a specific, chosen rule. Without knowing the rule, students select a different shape that they believe fits the rule and place it in the group. Shapes that fit the rule remain in the group, but the teacher moves shapes that do not fit the rule outside the group. Students then describe the rule after sorting all the shapes.

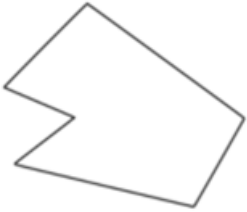
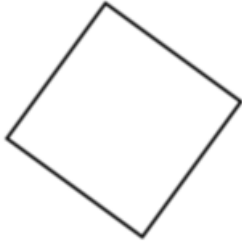
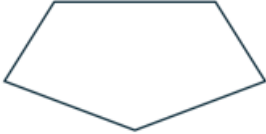

- b) Put an X on the shapes from this table that are not polygons. Write a sentence that explains why these shapes are not polygons.

Students may put X’s on polygons instead of figures that are not polygons, which may indicate a need for more experience classifying figures with differing attributes. Opportunities to play “What’s My Rule” using a collection of shapes (including polygons and non-polygons) focuses attention on the similarities and differences between polygons and non-polygons. See the teacher notes for #1a for how to play this game.

Students may fail to classify concave or irregular figures as polygons. To build understanding, provide students with opportunities to work with figures having a variety of characteristics and include concave figures and irregular figures. Using pictures of figures allows students to consider the same figures in different spatial orientations to deepen conceptual understanding. Geoboards are another useful tool that can be used to create figures that are polygons and figures that are not polygons.



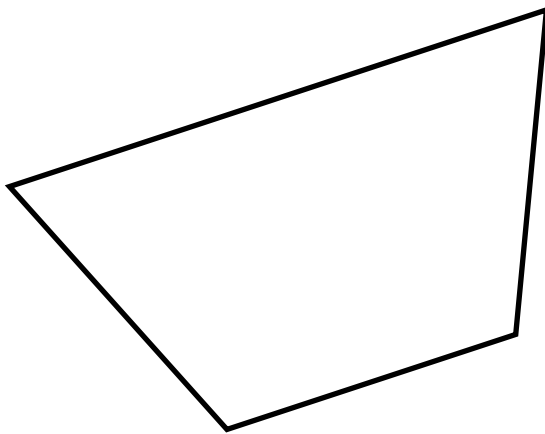
2. Complete the chart. Use the word bank to help you. Words may be used more than once.

Word Bank:		
Triangle	Quadrilateral	Pentagon
Hexagon	Octagon	
Polygon	Number of Sides	Name
		
		
		
		

Students may be unsure of how to count the sides, especially if the shape is concave or irregular. Having students label their starting place with a dot, then tracing around each side of the figure may be helpful. Students may also confuse prefixes when naming polygons. These students will benefit from more opportunities to determine the number of sides of regular and irregular polygons. It is important that these experiences also include concave polygons. Using a variety of materials (power polygons, pattern blocks, geoboards, etc.) may be helpful. Students may also benefit from drawing polygons on dot paper and labeling the number of sides on their figures.

Students will benefit from hearing and using the vocabulary used to name polygons during regular classroom instruction. Incorporating and encouraging the use of this vocabulary during class discussions is a meaningful way to provide practice with the prefixes used to name polygons. Teachers are encouraged to include real-life figures that represent the prefixes and meanings when possible (e.g., a piece of honeycomb is shaped like a hexagon; a playing card has four sides and is a quadrilateral; home base for softball or baseball has five sides and is a pentagon). Making connections between the prefixes used in naming polygons and their environment helps students build understanding. It is important, however, to use real-life figures that do not have rounded corners as these violate the definition of polygon.

3. Use a straight edge to subdivide the given shape into three polygons. Label each of the three resulting polygons.



Students may not realize that, after subdividing, different polygons may now be sharing a side. It may be helpful to have students trace around each individual figure in a different color or cut out the resulting shapes to determine the names of these polygons. The use of tangrams and pattern blocks for practice may help to build understanding for combining and subdividing polygons.

In the problem above, students may subdivide the polygon in multiple ways. For example, the resulting polygons may be three triangles (Figure A below), or the resulting polygons may be two triangles and one quadrilateral (Figure B below). It may be beneficial for students to have opportunities to see how other students subdivided the polygon and hear their strategies for doing so.

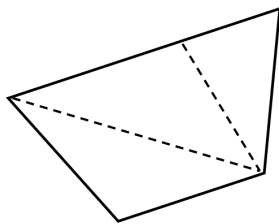


Figure A

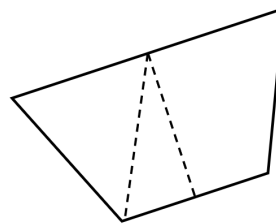


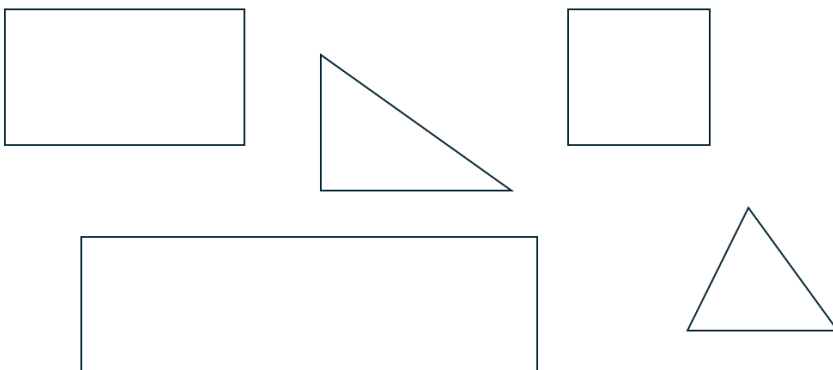
Figure B

4. Read each description and circle all the correct answers in each row.

Description	Polygons
I have more sides than a pentagon. I could be a...	quadrilateral hexagon octagon
I have fewer angles than a hexagon. I could be a...	quadrilateral triangle octagon
I have exactly four vertices. I could be a...	triangle pentagon quadrilateral

Students may have difficulty selecting more than one answer in rows 1 and 2 or they may think that all the rows must contain more than one answer. It may be helpful for students to write the number of sides, angles, or vertices for each polygon. It may also be helpful for students to draw a quick sketch of a triangle, quadrilateral, pentagon, hexagon, and octagon so they are able to physically see how many sides/angles/vertices there are for each polygon. During instruction, teachers should model accurate and appropriate mathematics vocabulary and should encourage students to use accurate vocabulary when talking or writing about polygons.

5. Cut out the given shapes. Use glue or tape to combine two or three of the shapes to create a new polygon. Name the resulting polygon.

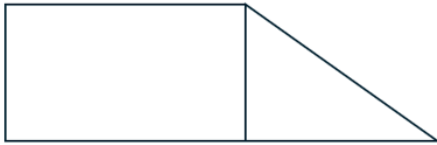


Students may have difficulty seeing the combined figure as one whole shape. Students may count all the line segments, not just the exterior sides, to determine the number of sides and the name of the polygon. It may be beneficial for students to highlight and/or label the exterior sides to assist with counting. It may also help to trace the new shape without tracing the interior segments. For students who need support with spelling, it may be beneficial to provide a word bank or vocabulary cards,

however, it is important to provide these names out of number order to ensure that students are thinking about the meaning of the prefix and not counting the order.

Combining two or three of the above figures into a new polygon can result in many possible correct answers. Some examples of polygons created from two of the shapes and examples of polygons created from three of the shapes are displayed below. Because there are many possible responses, it may be helpful for students to have opportunities to see other ways that their classmates combined the polygons and hear their strategies for doing so.

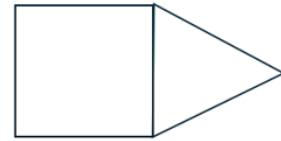
Examples with 2 Combined Shapes



Quadrilateral



Hexagon

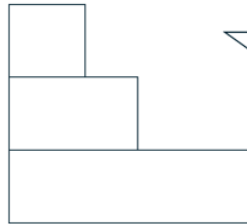


Pentagon

Examples with 3 Combined Shapes



Quadrilateral



Octagon



Pentagon