Title: Does Poly Want a Polygon?

Brief Overview:

Our unit entitled, "Does Poly Want a Polygon?" will allow students to define, identify and classify the characteristics of polygons within a composite figure. Using literature, aesthetics and hands-on manipulatives, the students will have an understanding of the relationships that exist among the angles and sides of two dimensional figures. Prerequisites for this lesson include the knowledge of parallel and perpendicular lines, faces, edges, vertices and angles.

NCTM Content Standard/National Science Education Standard:

- Analyze characteristics and properties of plane geometric polygons and develop mathematical arguments about geometric relationships.
- Identify, compare, and analyze attributes of plane geometric polygons and develop vocabulary to describe the attributes
- Classify polygons according to their properties and develop definitions of classes of shapes such as quadrilaterals and octagons.

Grade/Level:

5^{th} Grade / Level 5.

Duration/Length:

Three sixty (60) minutes lessons – 3 days.

Student Outcomes:

Students will:

- Identify polygons by defining the prefix of the two-dimensional shape
- Classify polygons by learning the definition of each
- Classify polygons by differentiating between their sides, lines and angles.
- Identify and define the shapes that make up a composite figure.

Materials and Resources (Day 1)

Day 1

- Student math journals
- 10 Sandwich bags
- Chart paper
- Markers
- Overhead

- Polygon pattern blocks (various polygons)
- Teacher Resource 1: Pre-Assessment for “Poly Want a Polygon?”
- Teacher Resource 2: Steps to Making a Paper Airplane
- Teacher Resource 3: Pattern Blocks
- Teacher Resource 4: Prefix Chart for Board
- Teacher Resource 5: Polygon Prefix Game
- Teacher Resource 6: How Many Sides?
- Teacher Resource 7: Polly Prefix Match
- Student Resource 1: Pre-assessment for “Poly Want a Polygon?”
- Student Resource 2: Prefix Chart
- Student Resource 3: How Many Sides?
- Student Resource 4: Polly Prefix Match

Day 2

- Trade Book: The Village of Round and Square Houses by Ann Grifalconi
  ISBN # 0-316-32862-6
- Student math Journals
- Overhead
- Chart paper
- Markers
- Teacher Resource 8: Polygon Vocabulary
- Teacher Resource 9: Traffic Signs
- Teacher Resource 10: Polygon Foldable
- Teacher Resource 11: Polygon Exit Ticket
- Student Resource 5: Going on a Scavenger Hunt
- Student Resource 6: Polygon Vocabulary
- Student Resource 7: Polygon Foldable
- Student Resource 8: Polygon Exit Ticket

Day 3

- 2 – 4 Large poster boards (one color)
- Markers
- Ruler or yard stick
- Tangrams or polygon pattern blocks
- Blank paper (regular letter size copy paper)
- Construction paper or Crayons
- Scissors
- Glue
- Teacher Resource 12: Polygon Puzzle Instructions
- Teacher Resource 13: Tangram Animals
- Teacher Resource 14: Composite Figures in Polygons

- Teacher Resource 15: Final Assessment for “Poly Want a Polygon?”
- Student Resource 9: Composite Figures in Polygons
- Student Resource 10: Final Assessment for “Poly Want a Polygon?”

Development/Procedures:

Day 1 Polygons and Prefixes

- Pre-assessment – Distribute Student Resource 1A-B (pre-assessment) which will assist you in determining the prior knowledge that students have about polygons. Additionally, it will help to gain information in order to make instructional decisions about the students’ strengths and weaknesses concerning polygons. You can find the answers to the pre-assessment on Teacher Resource 1A-B.

- Engagement
  - Begin by asking the students about their day off. SAY: How was your weekend? Holiday? etc, and pause for answers…
    Begin to tell a story about their weekend. While telling the story you will also be in the process of making a paper airplane (directions to make the paper airplane are attached as: Teacher Resource 2).
  - SAY: Well for my weekend, holiday, etc… I decided to meet an old friend. Her name is Poly and Poly needed my help in finding a way home to visit her family in (choose a location. example: Georgia). So I said, “Let’s look at your choices.”
  - ASK: What modes of transportation do you think Polly could take?
  - SAY: What about a car? a train? Well what about a plane?
  - SAY: Poly thought the airplane ride sounded nice and I said, “Well what about this?” (showing the paper airplane). Does Poly Want a Polygon?
  - SAY: If you notice Poly’s airplane is made up of several polygons.
  - SAY: Some of you may ask, “What is a polygon?” Today is our first day of looking for answers to this question.

- Exploration
  - Divide students in groups of 4. Distribute a sandwich bag full of various polygon pattern blocks to each group making sure that the students get all varieties of blocks. If you do not have pattern blocks see Teacher Resource 3.

  - SAY: Each group should have a bag full of different pattern blocks. Taking turns, I would like for you to take a few minutes

and look at the pattern blocks and describe what you see. List both the differences and the similarities. Here's an example of how you may list them:

- Have the following written on chart paper or an overhead.

Color of shape	# of sides	drawing	Similar shape
green	4		red
red	4		green

- SAY: As you can see the 2 shapes have 4 sides (the similarity) but they look different and are different colors.
- SAY: Okay, now it's your turn, I will give you about 2 minutes to record what you see individually and then another 2 minutes to compare your notes as a group.
- After you have given students time to make their list of the various shapes, they will ask for one volunteer from each group to add to the list on the board.
- SAY: Now it is time to put the shapes back into the sandwich bag.

o Explanation
- As the students are putting their pattern blocks away, display Student Resource 2 on the board or as an overhead. Answers can be found on Teacher Resource 4.
- SAY: Now, we are going to discuss prefixes. But believe it or not, this has to do with math.
- ASK: Does anyone here know what the prefix, "uni and bi" mean? The students should answer uni = one and bi = two (if not guide them to the correct answers).
- SAY: That's correct! Today I would like for us to take it up a notch! Bam! *(pull out a triangle pattern block or a picture of any three-sided shape).*
- Ask student volunteers if they can tell what they know about the prefix "tri" (guide the student to answer that "tri" means 3). Do the same with the remaining prefixes: quad, pent, hex, oct, dec and poly.
- As the students answer, have the students complete their chart either on their worksheet or in their math journals.
- When the students are done, remove the chart and transition the class into the application step.

- Application
  - Distribute the cards that are cut up from Teacher Resource 5A-B entitled, “Polygon Prefix Game.” Each student will receive a card, which could have a picture or a prefix on it.
  - SAY: We are going to play a game to see who remembers what we learned about prefixes.
  - Write the directions written on the board:
  - Each student will be given a card with a picture or a word on the card.
  - You must walk around the classroom asking questions until you find the
    person with the matching cards.
  - You cannot say any of the prefixes when you are asking questions. You
  - may ask about the number of sides.
  - Students will walk around the room and search for their missing picture or prefix. After the students think they have found a match, the two students will approach you and make sure. If they are correct, they will take a seat back at their desks.
  - When everyone is seated, distribute Student Resource 3 entitled, “How many sides?”
  - Answers to the worksheet can be found on Teacher Resource 6.
  - SAY: Now it is your turn to show what you have learned so far about prefixes.
  - Remind students that this is individual work. After approximately 5 minutes, collect the papers and transition into the assessment which is a quick exit ticket.

- Differentiation
  - Reteach
    - The lesson will be modified to meet the needs of the special education students by allowing the students to continue to use the pattern block manipulatives (polygon shapes).
    - Have the special education student draw or outline
    - the pattern block shapes onto blank paper and count the sides, placing a mark (tick mark) on the side as it is counted.
    - Reteach the concept to those students who were unable to correctly answer the questions on Student Resource 2.

  - Enrich
    - Extend the lesson for the students who easily understood the concept. Challenge the students to find words that have the prefixes “poly, tri, quad, pent, hex, oct, dec” in magazines and newspapers. Once the student has found a

list of words they are to define the words and tell the class about the new words they found.

- Assessment
  - The student will be complete an exit ticket (Student Resource 4 with answers on Teacher Resource 7) by using the skills that were introduced during the lesson.

Day 2 Defining Polygons

- Engagement
  - Read the book, "The Village of Round and Square Houses" by Ann Grifalconi, Show the front and back cover of the book and ask the students to predict what they think the story might be about.
  - Ask a volunteer to identify the round house and another to identify the square house from the front cover. Read the preface and page one.
  - ASK: Do you think you know what the girl might be talking about?
  - Then read a few more pages making sure to stop frequently and ask the students to predict what the grandmother or the girl might say next.
  - **Note: This story is about a grandmother who lives in a village on the side of a volcano and explains why the men in her village live in square houses and the women in round ones. This village really exists in the remote hills of the Cameroons.
  - SAY: We have just read a story about circular and square houses.
  - ASK: Can someone tell me which of the two is a polygon? (answer = square)
  - SAY: Can someone tell me why the circle is not a polygon? (answer = A circle has curved lines, while a polygon is made up of straight line segments)
- Exploration
  - SAY: Now that we have had a discussion and determined what a polygon is let's see if you can hunt for them in a scavenger hunt.
  - Distribute Student Resource 5 facedown on the students' desks.
  - SAY: Working individually, each person will have a list of items to find. You are to stay within the parameters of our classroom. Use what you know about polygons to help you find your answers. I will give you a signal when to begin and when to end. Do not share your answers because you are the hunter and the classroom is your jungle. When I say "start", you may turn over your list of questions and start your hunt. But when I say "stop" you must stop hunting

and have a seat. At the end, we will see who has found the most objects.

- Explanation
  - *Vocabulary Words*: plane figure, open figure, closed figure, polygon, triangle, quadrilateral, pentagon, hexagon, octagon, regular polygon, composite
  - SAY: We will now take these prefixes that we have learned and link them to math vocabulary words.
  - *Note:* Use Student Resource 6, "Polygon Vocabulary" as an overhead, math journal, or worksheet. The answers to the Polygon Vocabulary can be found on Teacher Resource 8.
  - As you are speaking, the students will be recording notes in their math journals/worksheets. Frequently pause to ask students if they have any questions and to check for understanding.
  - After the students have finished copying down the vocabulary words, and given examples for each polygon, the teacher will lead them in a discussion.
  - Ask students to think about the shape of a rolled cookie before it is baked and then after it is baked.
  - ASK: What is one difference between the two? (pause for comments).
  - SAY: Before a rolled cookie is baked, it is flat and then after it is baked, the heat makes it puff up or rise.
  - *Note:* To give the students a visual, you may have an example of a cookie before and after it is baked.
  - SAY: Before the cookie is baked and is flat, it is an example of a plane figure. A plane figure lies flat on a plane or flat surface. Plane figures can be either open or closed. If you place your pencil outside a closed figure, you cannot get inside.
  - Draw an example and demonstrate:

  - SAY: In an open figure, you can get inside and move around.
  - Draw another example and demonstrate with an open figure.

  - ASK: Which type of figure do you think a polygon would be? Open or closed? (Pause for answers - closed).
  - SAY: There is something else that is unique about a polygon.
  - ASK: Does anyone think they may know what that might be? (pause for answers)

- SAY: A polygon is a closed figure whose sides are all straight line segments. Can a circle (draw a circle on the board) be a polygon? (pause – No).
- ASK: Can someone from each group name a polygon and tell us where they may find such a polygon? (Listen to various answers)
- SAY: For example: (You may choose to use Teacher Resource 9 for real world examples of polygons). The yellow yield sign is a triangle and a triangle is a polygon because it is a closed figure that is made up of line segments. There are no curves. Pause for various answers. You may choose to write down answers on board.

- Application
  - To elaborate upon today's lesson you will introduce the process of creating a foldable. Distribute Student Resource 7 entitled, "Polygon Foldable." Answers can be found on Teacher Resource 10.
  - SAY: We are about to make a foldable. A foldable is resource that you will be able to use at home or in class to help you study your polygon vocabulary.
  - Review the instructions with the class:
  - ~ Cut on the dotted lines
  - ~ Fold on the solid lines
  - ~ There are two sections
    1. Section one gives the names of the polygons
    2. Section two is where the student will fill in characteristics of the polygons.
  - The students will then work on their foldables.

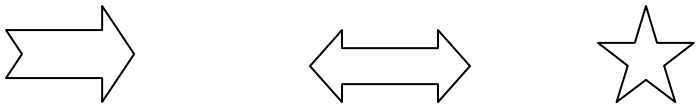
- Differentiation
  - Reteach
    - The lesson will be modified to meet the needs of the special education students by allowing the students to use Student Resource 6 on the application and assessment portions of the lesson.
    - Write the vocabulary words on sentence strips and post them on a math word wall to make them visible to students.
    - Modify the lesson to meet the needs of the special education students by allowing the students to use the polygon pattern blocks as a visual when describing the characteristics of the polygons.
    - Reteach the concept to those students who were unable to correctly answer the questions on the students' foldables.

  - Enrich
    - Extend the lesson for the students who easily understood the concept. Challenge the students to create polygon

shapes that are different from the polygon tangram pattern blocks. They should create at least one or two for each polygon discussed in class.

- Example:

Octagon Decagon Decagon



- Assessment
  - The student will complete an exit ticket entitled, "Polygon Exit Ticket" (Student Resource 8 with the answers on Teacher Resource 11) by using the skill that was introduced during the lesson.

Day 3 Shapes within a Shape (composite figures)

- Engagement
  - Activity: Polygon Puzzle As students enter the classroom, give each student a puzzle piece that has been made using Teacher Resource 12.
  - SAY: You have all been given a puzzle piece and your job is to find the others pieces that can be connected to your piece to make a polygon. Use what you know about polygons and the shapes that can be used to make a shape. Also, keep in mind that you have to match the pattern of your puzzle piece as well. Good luck!
  - Give the students about five minutes in order to build their polygons. After all the polygons are together, lead the class in a short discussion on the techniques that they used to find the answers.

- Exploration
  - Divide the class into groups of four. Each group will be given a bag of polygon pattern blocks (See Teacher Resource 3 if pattern blocks are unavailable).
  - *Note:* There has to be enough for each student to have at least 3 pieces. Ideally having pieces left over so that the likelihood of two groups having the same pattern will be minimized.
  - Go over the instructions with the class.
  - *Instructions*: Each student takes 2 pieces from the bag at random. The group works together to create a shape on the blank paper using all 8 pieces from the bag. Once the shape has been created, they carefully trace the outer portion of the large shape. The students then carefully remove the pieces from the paper and write at the

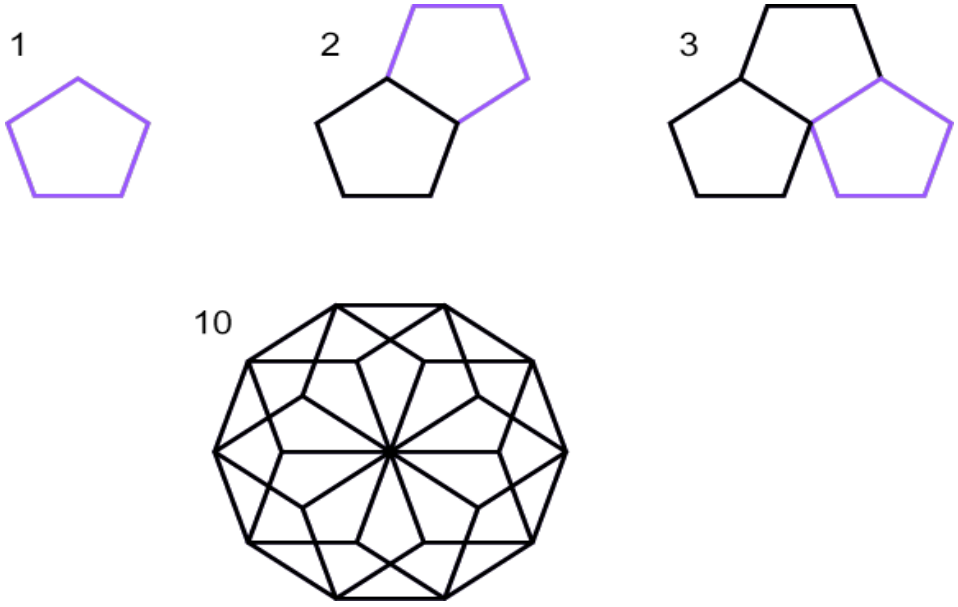
bottom of the page the number of polygons they used. They will then create a name for their group based upon the shape that they created.

- NEXT: The pieces along with the blank paper are passed to the next group. They will then try to determine where the pieces fit. All groups must start at the same time. Give the signal to begin and when to stop. The first group that completes it correctly must raise their hands.
- Example: Tangram Animals: Teacher Resource 13

- Assessment
  - Ask students to record the math vocabulary words in their journals and any other information they feel may be important.
  - To incorporate language arts in this lesson introduce the strategy Think-Pair-Share. The strategy Think-Pair-Share allows you to provoke students' thinking with a question, prompt, or observation. The students should take a few moments just to "THINK" about the question.
  - ASK: How can we use polygons in our everyday life or the real world? You may need to guide students with answers. Examples of answers would be making a quilt, designing a pattern to cover a window, wall paper, or helping an architect build a building.
  - NEXT: Using designated partners, nearby neighbors, or a desk mate, students "PAIR" up to discuss their answers. They compare their mental or written notes and identify the answers they think are best.
  - NEXT: After students talk in pairs for a few moments, call for pairs to "SHARE" their thinking with the rest of the class. Record these responses on the board or on the overhead.
  - SAY: Let's look at the word "composite" and how it can affect us in the real world (write "composite" on the board).
  - ASK: When you think about numbers as being prime vs. composite, how do we define prime? (Answer – prime is a number that has two factors – its own number and the number one). Now, when you think about a number being composite, how do we define composite? (Answer – composite is a number that has more than one factor, several factors, or several numbers that are multiplied to make up that number).
  - Example: The number "7" is prime and the only factors of "7" are "7 and 1".
  - The number "9" is a composite number and the factors of "9" are 9, 1, and 3.
  - SAY: As you can see, 9 has several factors or several parts that make up the whole number. Now let's look at the word composite in reference to polygons. Composite shapes are used with polygons.

They are defined as a shape within a shape or several shapes within a shape.

- Application
  - SAY: Let's go back to your answers you gave about using polygons in the real world.
  - ASK: Using what you know about polygons, do you think I could make a flower by making a composite shape with polygons? When the students answer they must give a reason for their answers. (Ask: why or why not)
  - Answers will probably be "no" because most flowers are made up of curved lines while polygons are made up of line segments. Demonstrate how to make a polygon flower.
  - NEXT: Distribute materials to allow the students to make polygon flowers.
  - The materials needed are: construction paper (or white paper with crayons), scissors, glue, and tangrams or polygon pattern blocks.
  - Teacher: For instructions to make Polygon Flowers:
  - *Click on the following link or copy and paste the URL into your browser.*
  - http://baharna.com/polymad/windings/windings08.htm
  - Example: Polygon Flower (using pentagons)



SAY: Now that we have had fun making flowers, let's look at a simple way to make composite figures in Polygons: Distribute Student Resource

9 entitled, “Composite Figures in Polygons.” Answers can be found on Teacher Resource 14.

- Assessment
  SAY: We have now reached the final day of our unit on polygons. I hoped that you were able to answer the question: Does Poly want a polygon? Distribute Student Resource 10A-B, “Final Assessment for “Does Poly Want a Polygon?” Answers to the worksheet can be found on Teacher Resource 15A-B.

- Differentiation
  - Reteach

    The lesson will be modified to meet the needs of the special education students by allowing the students to continue to use the pattern block manipulatives (polygon shapes).
    To assist with making the polygon flower, have the special education student draw or outline the pattern block shapes onto blank paper and count the sides, placing a mark on the side as it is counted.
    Reteach the concept to those students who were unable to correctly answer the questions on the Student Resource 9, “Composite Figures in Polygons.”

  - Enrich

    Extend the lesson for the students who easily understood the concept. Challenge the students to create a polygon puzzle. Have the students find photos or graphics of architectural buildings or desired photos/graphics in the newspaper and/or magazines. Next, the student will trace the photo/graphic onto plain white paper. The student will draw several different polygons that will fit neatly into their selected photo/graphic. The student will than duplicate the puzzle. The final step will be for the student to cut out the shapes. The final product should be an outlined shape and puzzle pieces.

Summative Assessment:

Use Student Resource 10A-B to assess students’ progress towards understanding the concepts presented in the unit. Answer key can be found on Teacher Resource 15 A-B.

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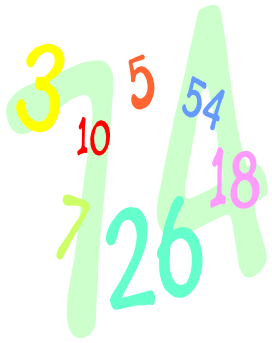
Name _____ Date _____

Pre-Assessment for "Does Poly Want a Polygon?"



1. Which prefix means "eight?"
   A. tri-
   B. pent-
   C. oct-
   D. dec-

2. What is a polygon?
   A. A closed shape with straight lines
   B. An open shape with curved lines
   C. A shape with many squiggly lines
   D. A closed shape with curved lines

3. Write the definition for a pentagon below.

_____

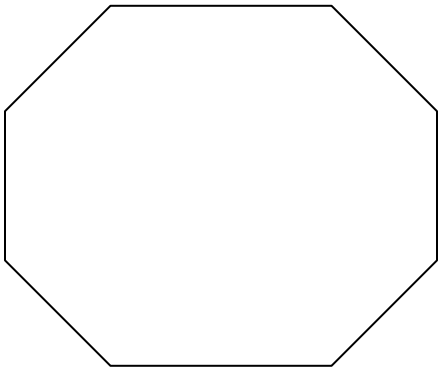
4. What two shapes make up the trapezoid?

_____

Draw a dotted line to show the two shapes.

5. Draw a decagon in the space provided below:

6. Divide the shape into 8 triangles.

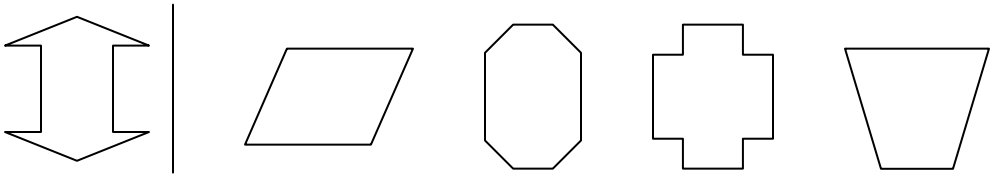


7. What makes a shape a polygon?

a. _____

b. _____

8. Study the polygon on the left. Circle the letter of the polygon that has the same name.



9. A. In the space provided below, draw a quadrilateral.

_____

B. Explain how you got your answer by using what you know about polygons. Use words, numbers, and/or symbols in your explanation.

Prefix Chart

Prefixes	Definition	Examples
Tri-		
Quad-		
Pent-		
Hex-		
Oct-		
Dec-		
Poly-		

Name _____ Date _____

How Many Sides?

Today, we learned about prefixes and how they represent a number.

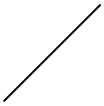
uni- = one bi- = two tri- = three quad- = four pent- = five
hex- = six hept-= seven oct- = eight non- = nine dec- = ten

Underline the prefix in each word below. Then draw the correct number of sides by using line segments in order to finish each figure and illustrate the word. Use the meaning of the prefixes above to help you.

1. quadrilateral

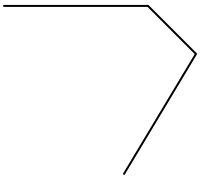
2. octagon

3. triangle

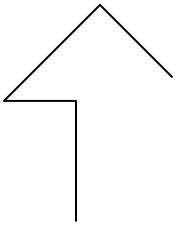


4. pentagon

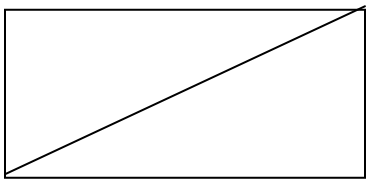
5. hexagon



6. decagon



Use a word from above to complete the sentence about the figure.



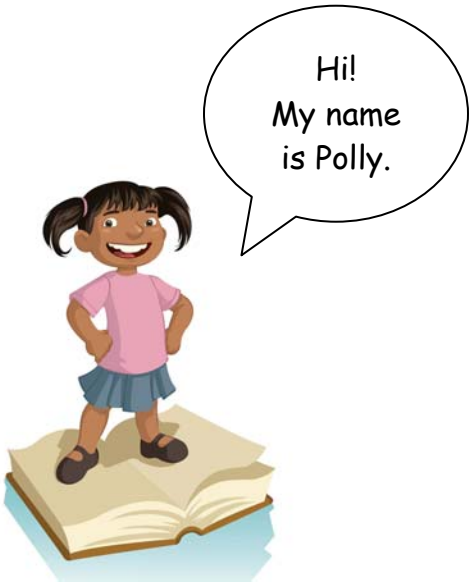
You can put two triangles together to make a _____.

Name _____ Date _____

Polly Prefix Match!

Today in our math lesson, we learned about the meaning of prefixes. Match the prefixes below with the meaning and use the letters to solve the riddle.

Riddle: How did Poly get to her destination?



_____ Tri-	L. Six
_____ Hex-	D. Zero
_____ Quad-	P. Three
_____ Pent-	A. Four
_____ Dec-	C. Seven
	E. Ten
	N. Five

Answer: _____

* BONUS! *

Draw an example of a polygon below:

Name _____ Date _____

Going on a Scavenger Hunt!

Directions: In the classroom, look for polygons that have the prefixes that we talked about yesterday. Once you have located a polygon, try drawing it and putting it in the space provided. Make sure you explain what it was in the classroom! Try to find 3 examples for each polygon.

Polygon	Drawing/Picture
Triangle	
Quadrilateral	
Pentagon	
Hexagon	
Octagon	
Decagon	

What polygon did you find most often? _____

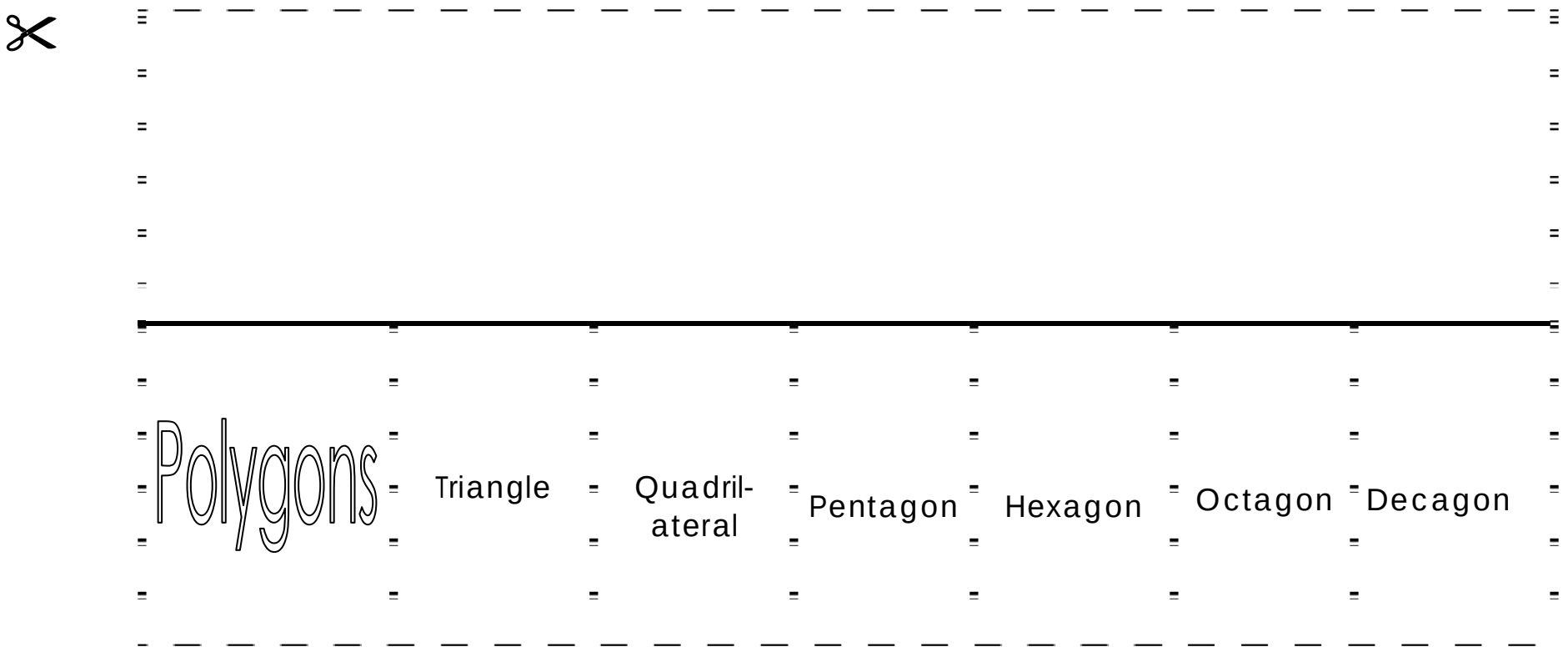
What polygon did you find least often? _____

Name _____ Date _____

Polygon Vocabulary

Vocabulary Word	Definition	Example
Plane Figure		
Open Figure		
Closed Figure		
Polygon		
Triangle		
Quadrilateral		
Pentagon		
Hexagon		
Octagon		
Decagon		
Composite		

Polygon Foldable



Directions

1. Cut on the dotted line.
2. Fold on the solid line.
3. Draw your polygon on the inside and write the characteristics for each one.

Name _____ Date _____

Polygon Exit Ticket

1. The prefix Oct- means: _____.
2. A shape that has a prefix of Dec- is called a _____.
3. A polygon is a _____ shape with _____ sides.
4. An example of a polygon is a _____.

Name _____ Date _____

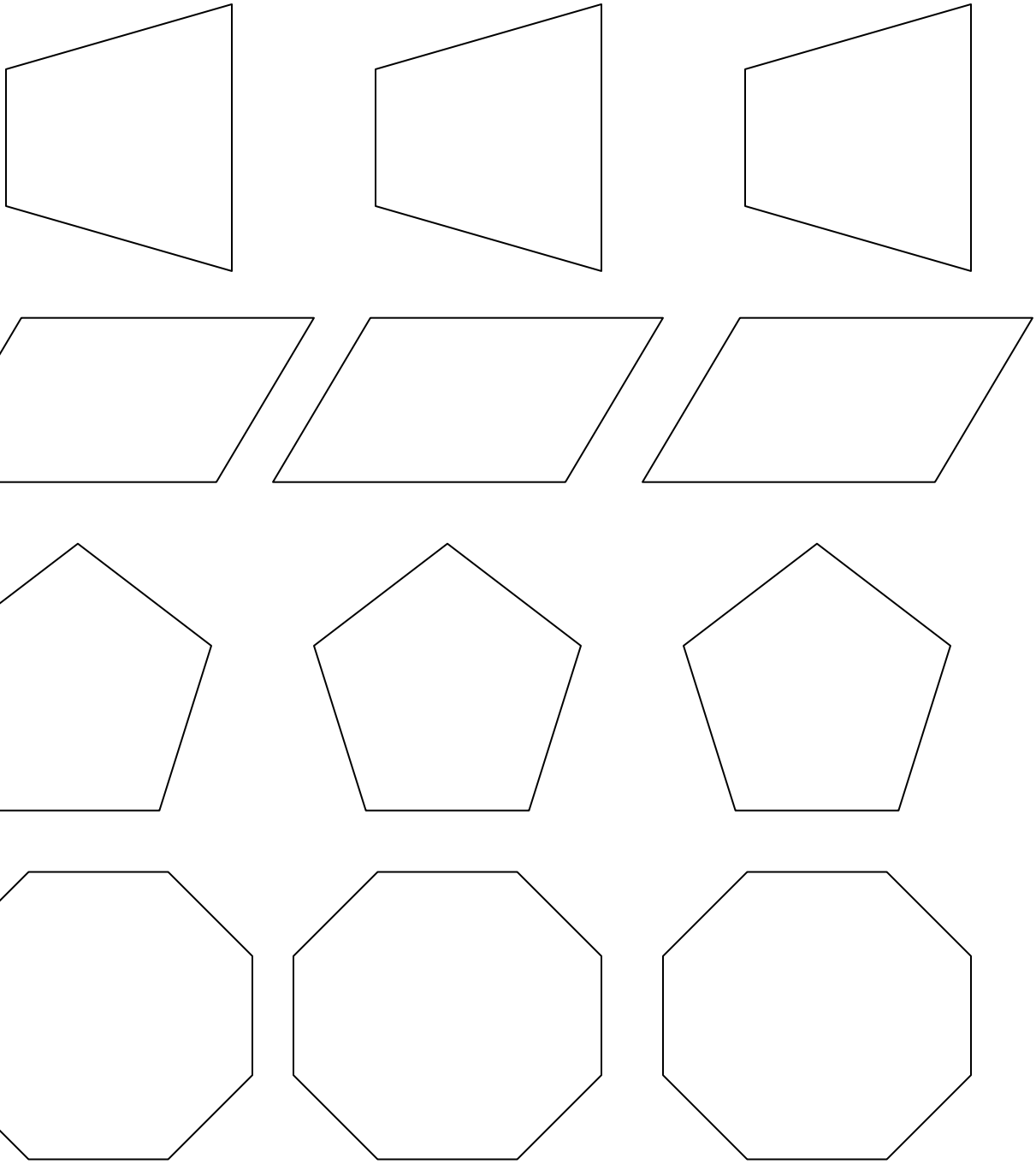
Polygon Exit Ticket

5. The prefix Oct- means: _____.
6. A shape that has a prefix of Dec- is called a _____.
7. A polygon is a _____ shape with _____ sides.
8. An example of a polygon is a _____.

Name _____ Date _____

Composite Figures in Polygons

☺ Show how the shape could be divided into triangles and quadrilaterals.
☺ Color the triangles blue and the quadrilaterals green.

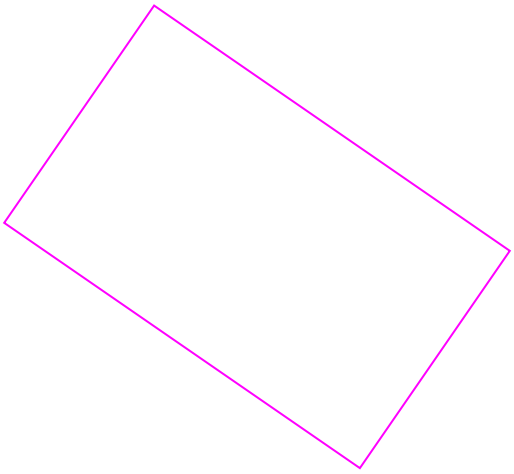


What makes a shape a polygon?

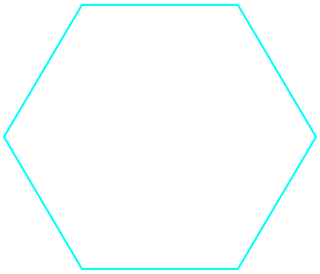
1. _____

2. _____

Divide the shape into 2 triangles

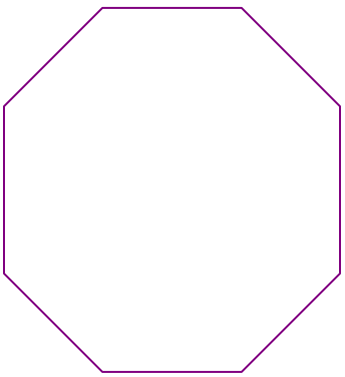


Divide the shape into 2 trapezoids

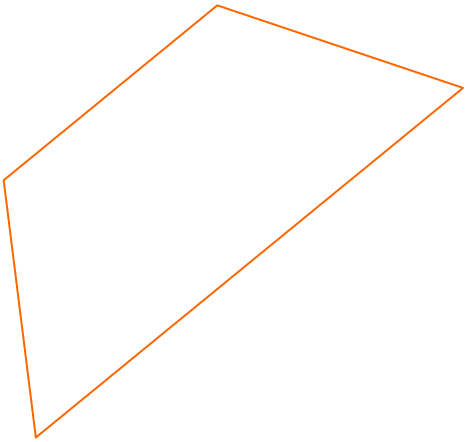


Divide shape into 1 square and 2 triangles

Divide shape into 8 triangles



Divide shape into 2 triangles



Name _____ Date _____

Final Assessment for "Poly Want a Polygon?"

1. The two attributes that define a polygon are:

_____

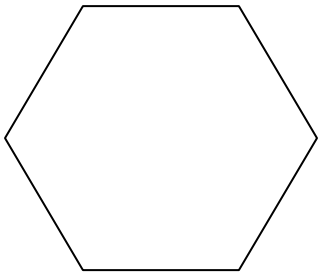
_____

2. The prefix dec- means
   a. decimal
   b. three
   c. ten
   d. decade

3. Write the definition for a quadrilateral below:

_____

4. Divide the shape below into 2 quadrilaterals:



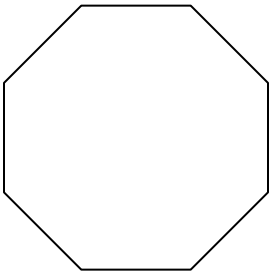
What are the names of the two shapes?

_____ and _____

5. What is the difference between a pentagon and an octagon?

_____

6. The prefix quad- means
   a. quadruple
   b. five
   c. complex
   d. four



7. Divide the shape into eight triangles.

8. Draw a decagon in the space provided below:

9. A composite shape is:

_____

_____

10. What are the five different examples of quadrilaterals?

a. _____

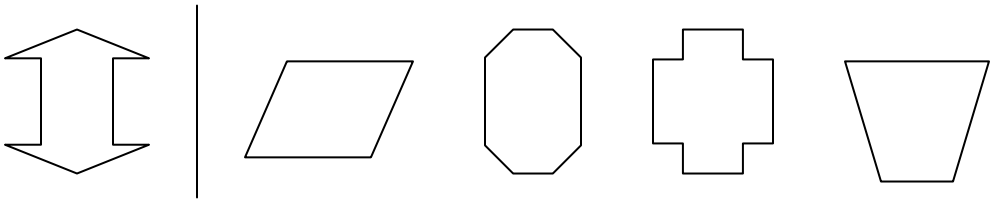
b. _____

c. _____

d. _____

e. _____

11. Study the polygon on the left. Circle the letter of the polygon that has the same name.



BCR

A. In the space provided below, draw an example of a shape that is NOT a polygon.

_____

B. Explain why you drew this shape by using what you know about polygons. Use words, numbers and/or symbols in your explanation.

_____

_____

_____

_____

_____

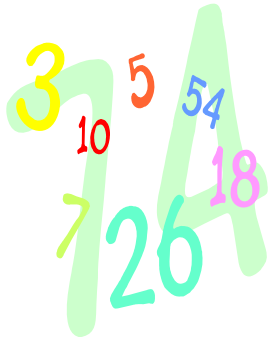
_____

_____

_____

Name _____ Date _____

Pre-Assessment for "Does Poly Want a Polygon?"



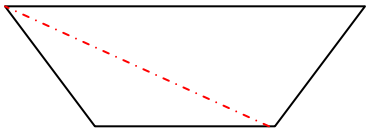
1. Which prefix means "eight?"
   - A. tri-
   - B. pent-
   - C. oct-
   - D. dec-

2. What is a polygon?
   - E. A closed shape with straight lines
   - F. An open shape with curved lines
   - G. A shape with many squiggly lines
   - H. A closed shape with curved lines

3. Write the definition for a pentagon below.

   A pentagon is a polygon with 5 sides.

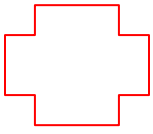
4. What two shapes make up the trapezoid?



   2 triangles

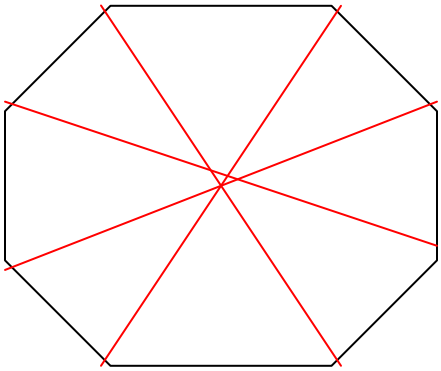
Draw a dotted line to show the two shapes.

5. Draw a decagon in the space provided below:



Student answers may vary, but all have to have 10 lines and be a closed shape.

6. Divide the shape into 8 triangles.

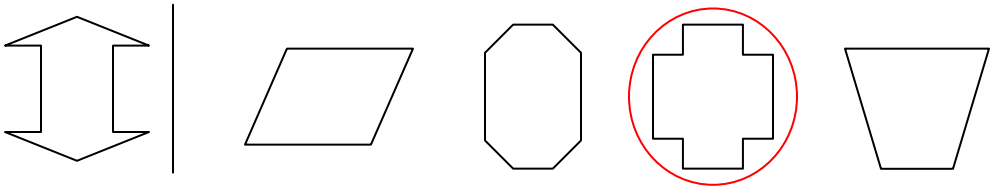


7. What makes a shape a polygon?

a. The shape has all straight sides.

b. The shape is a closed shape.

8. Study the polygon on the left. Circle the letter of the polygon that has the same name.



9. A. In the space provided below, draw a quadrilateral.

Again, answers may vary, but they have to be closed shapes with four sides.

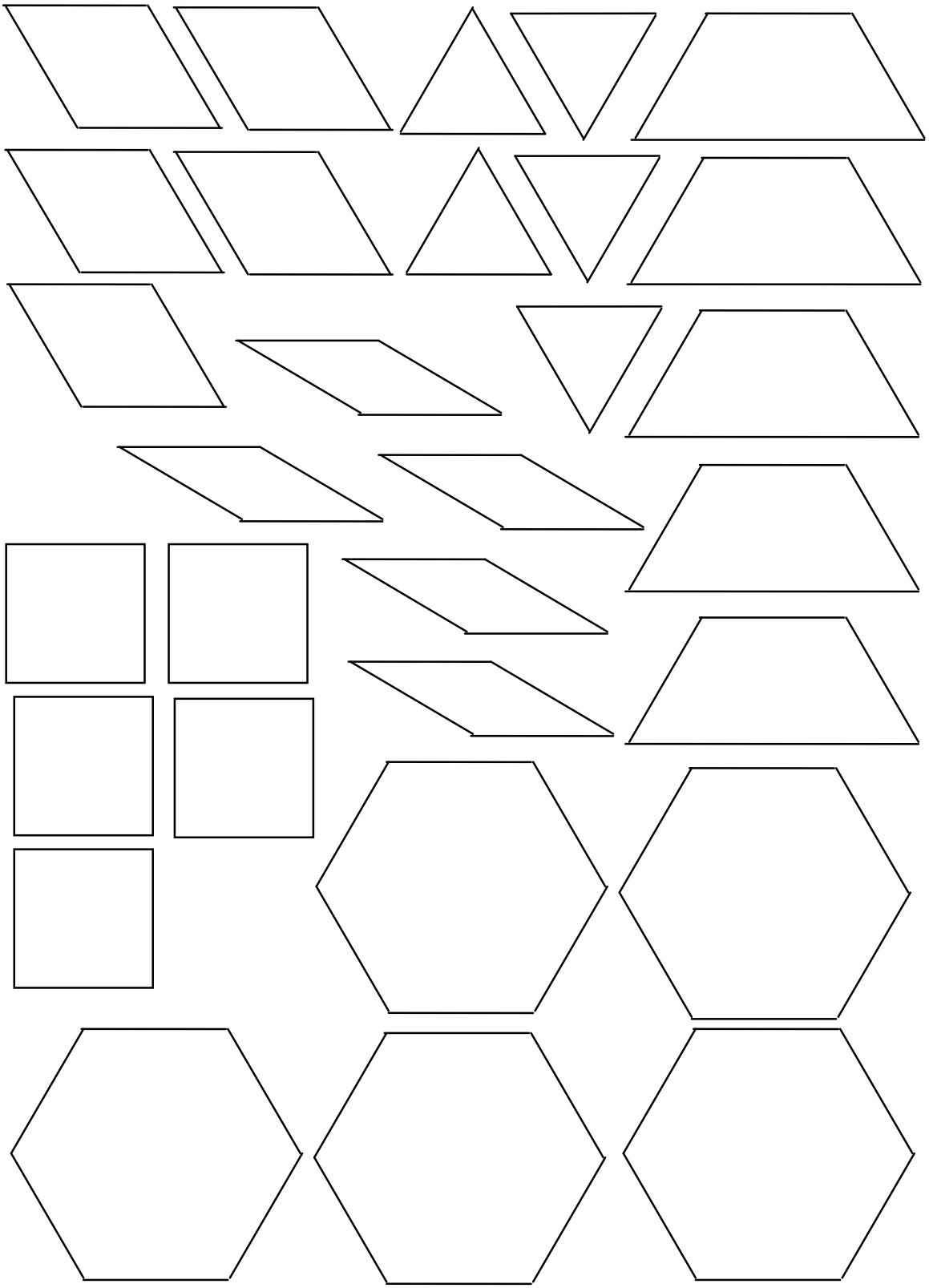
B. Explain how you got your answer by using what you know about polygons. Use words, numbers, and/or symbols in your explanation.

A quadrilateral is a polygon with four sides and four angles. A polygon is a closed shape with straight sides. I drew a rectangle because this is one example of a quadrilateral. The other quadrilaterals that I could have drawn are: rhombus, parallelogram, square, and rectangle.

Steps to Making a Paper Airplane:

1. Start with an ordinary 8 ½ by 11 inch piece of paper.
2. Fold it lengthwise.
3. Open the paper and you should have two parts. Starting from the top of the first part, fold to make the shape of a triangle. Do the same thing to the other side.
4. Refold your paper airplane into a lengthwise position, long edge on the bottom, shortest edge on the top.
5. Fold short side down until even with long side. Do this on both sides.
6. Open up your folded sheet of paper and you have made a paper airplane!

PATTERN BLOCKS



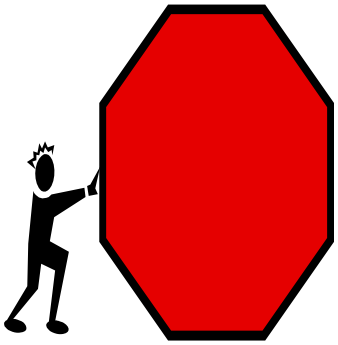
Prefix Chart for Board:

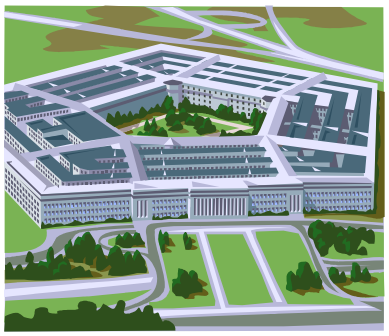
(Answer sheet)

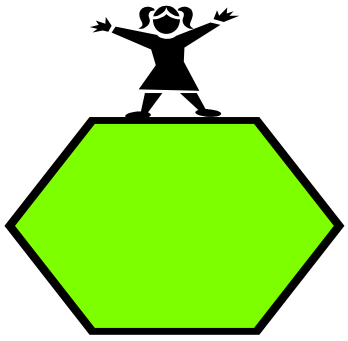
Prefixes	Definition	Examples
Tri-	**3**	**Triplets, Triangle**
Quad-	**4**	**Quadruped, Quadrilateral**
Pent-	**5**	**Pentacle, Pentagon**
Hex-	**6**	**Hexagram, Hexagon**
Oct-	**8**	**Octopus, Octagon**
Dec-	**10**	**Decade, Decagon**
Poly-	**many**	**Polygon, Polygraph**

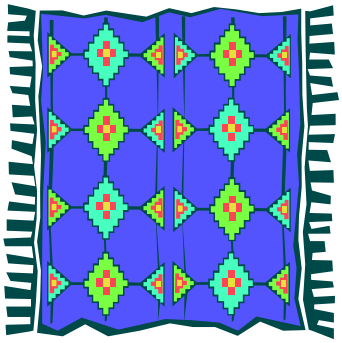
Polygon Prefix Game

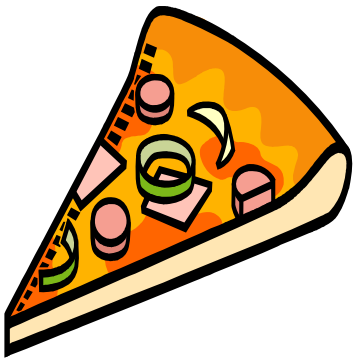
Tri-	Quad-	Pent-
Hex-	Oct-	Dec-
Tri-	Quad-	Pent-
Hex-	Oct-	Dec-

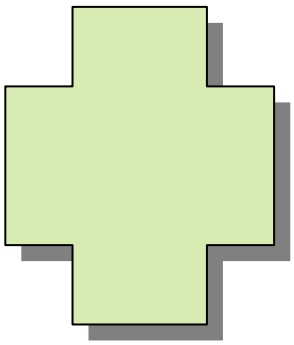


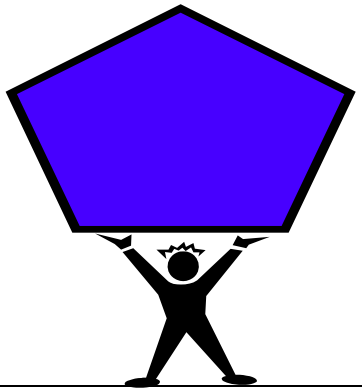


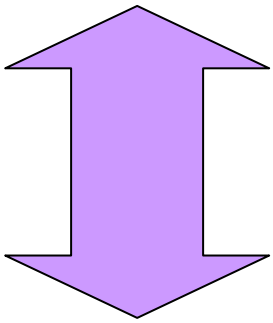












How Many Sides?

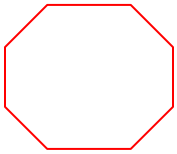
Today, we learned about prefixes and how they represent a number.

uni- = one bi- = two tri- = three quad- = four pent- = five
hex- = six hept-= seven oct- = eight non- = nine dec- = ten

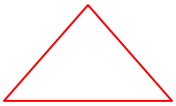
Underline the prefix in each word below. Then draw the correct number of sides by using line segments in order to finish each figure and illustrate the word. Use the meaning of the prefixes above to help you.

2. quadrilateral

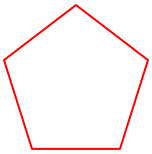
2. octagon



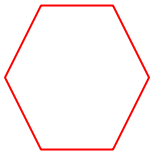
3. triangle



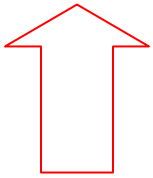
4. pentagon



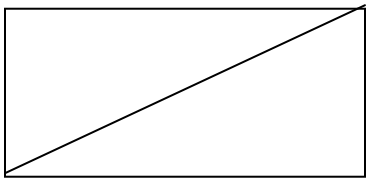
5. hexagon



6. decagon



Use a word from above to complete the sentence about the figure.



You can put two triangles together to make a quadrilateral.

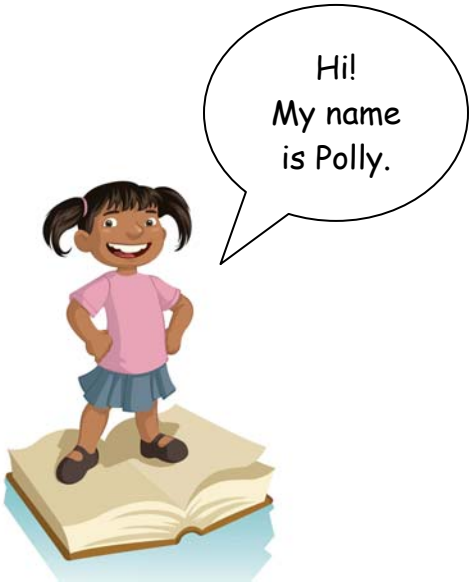
Name _____ Date _____

Polly Prefix Match!

Today in our math lesson, we learned about the meaning of prefixes. Match the prefixes below with the meaning and use the letters to solve the riddle.

Riddle: How did Poly get to her destination?

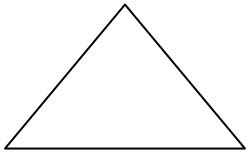
P	Tri-		L. Six
L	Hex-		D. Zero
A	Quad-		P. Three
N	Pent-		A. Four
E	Dec-		C. Seven
			E. Ten
			N. Five

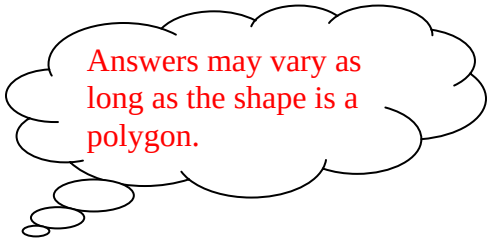


Answer: PLANE

* BONUS! *

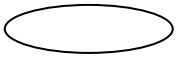
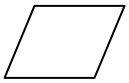
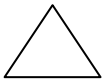
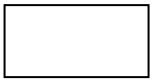
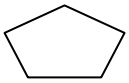
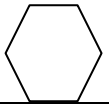
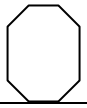
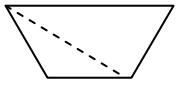
Draw an example of a polygon below:





Name _____ Date _____

Polygon Vocabulary

Vocabulary Word	Definition	Example
Plane Figure	A 2-dimensional figure that starts and ends at the same point.	
Open Figure	A 2-dimensional figure that does not star and end at the same point.	
Closed Figure	Another name for a plane figure.	
Polygon	A closed 2-dimensional figure with sides that are line segments and do not intersect	
Triangle	A 3-sided polygon	
Quadrilateral	A 4-sided polygon	
Pentagon	A 5-sided polygon	
Hexagon	A 6-sided polygon	
Octagon	An 8-sided polygon	
Decagon	A 10-sided polygon	
Composite	A shape that is made up of other shapes.	

Traffic Signs

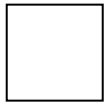
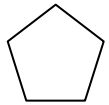
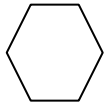
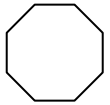
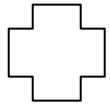

STOP


DIP


YIELD

Polygon Foldable

Teacher Resource 10

	A 3 sided polygon with 3 angles.	A 4 sided polygon with 4 angles.	A 5 sided polygon with 5 angles.	A 6 sided polygon with 6 angles.	An 8 sided polygon with 8 angles.	A 10 sided polygon with 10 angles.
						
Polygons	Triangle	Quadril-ateral	Pentagon	Hexagon	Octagon	Decagon

Directions

4. Cut on the dotted line.
5. Fold on the solid line.
6. Draw your polygon on the inside and write the characteristics for each one.

Name _____ Date _____

Polygon Exit Ticket!

9. The prefix Oct- means: eight

10. A shape that has a prefix of Dec- is called a decagon.

11. A polygon is a closed shape with straight sides.

12. An example of a polygon is a triangle, quadrilateral, pentagon, hexagon, octagon, and decagon.

Answers may vary for # 4, but needs to be one of these polygons.

Name _____ Date _____

Polygon Exit Ticket!

13. The prefix Oct- means: _____.

14. A shape that has a prefix of Dec- is called a _____.

15. A polygon is a _____ shape with _____ sides.

16. An example of a polygon is a _____.

Polygon Puzzle Instructions

1. Using a ruler, draw as many large polygons on poster paper as you have groups.
   Examples: stop sign, yield sign, fish tank, diamond, etc.

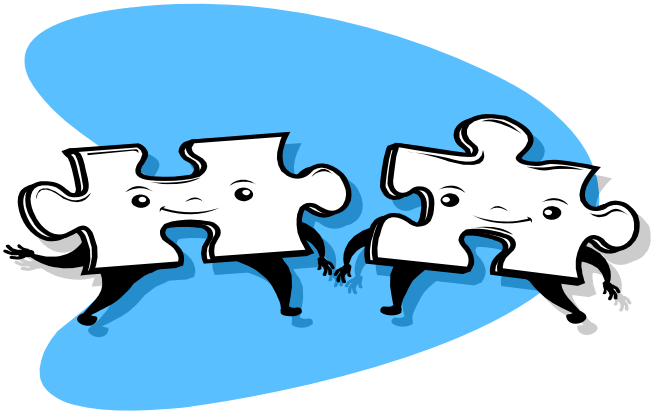
2. Divide the polygons (draw lines) into smaller pieces. Remember: the shapes must be polygons and have no curved shapes.

3. Cut the pieces. These are the pieces that will become your puzzle pieces.

4. Pass these pieces out to your class. Make sure to mix up the pieces so that they have to work to put them together to make the composite shape.

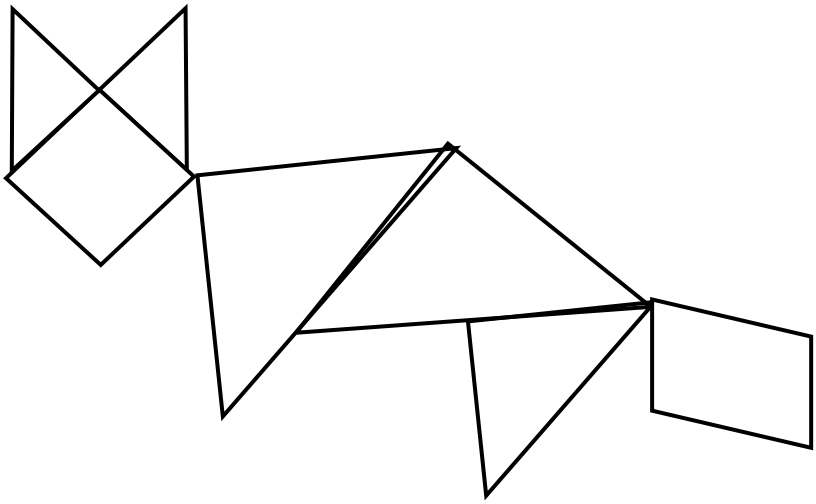
5. Make a drawing of the puzzle pieces as an answer sheet.

6. Remember to have fun!

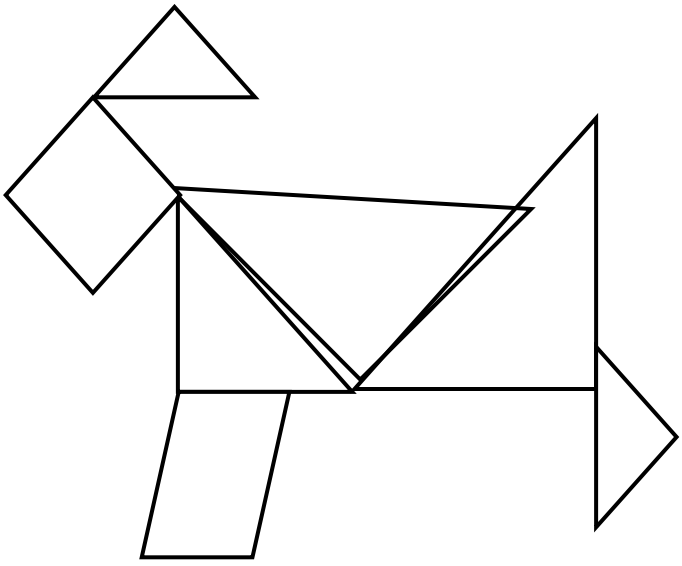


Tangram Animals

Fox



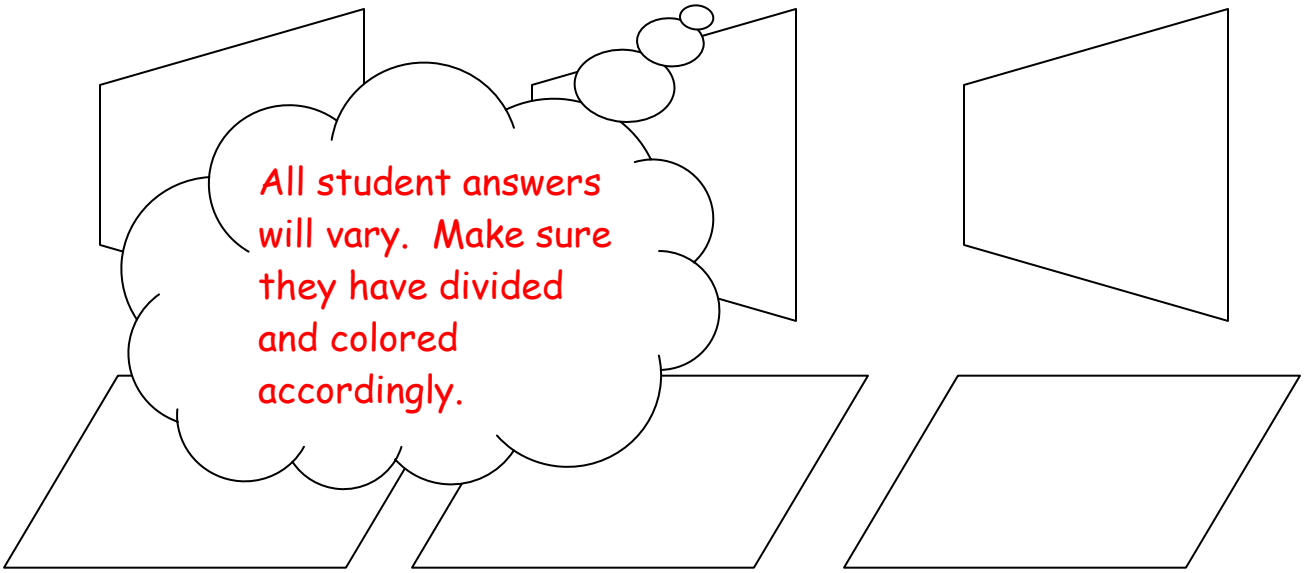
Dog

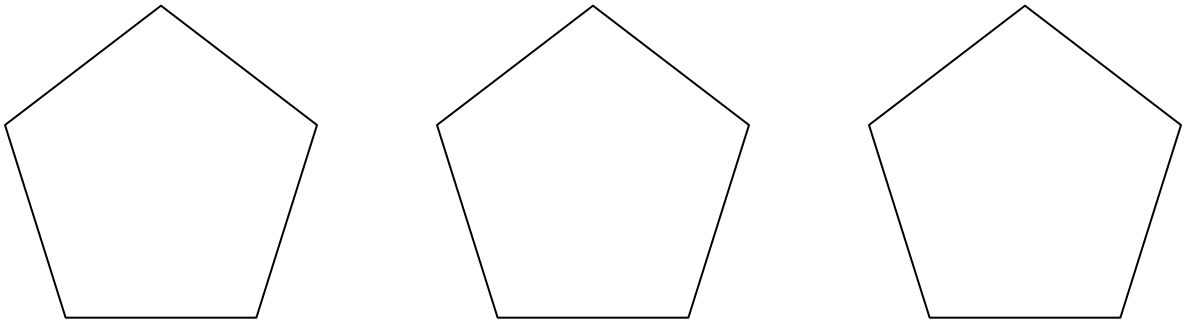


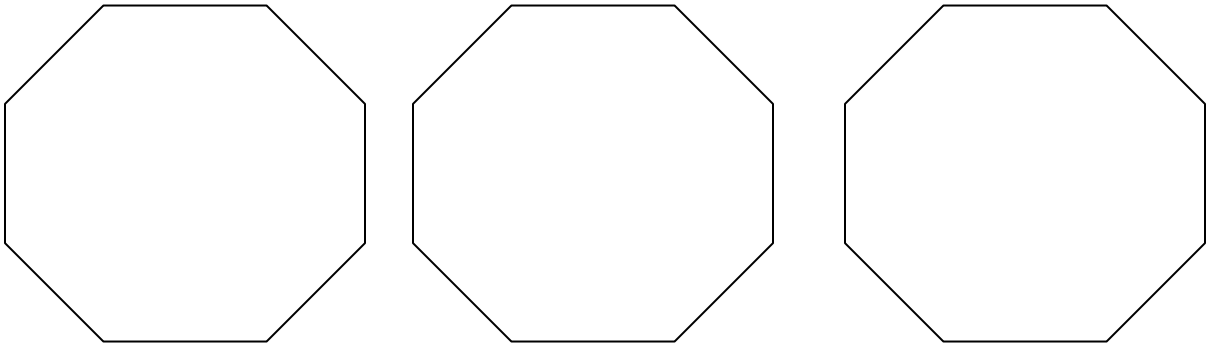
Name _____ Date _____

Composite Figures in Polygons

☺ Show how the shape could be divided into triangles and quadrilaterals.
☺ Color the triangles blue and the quadrilaterals green.





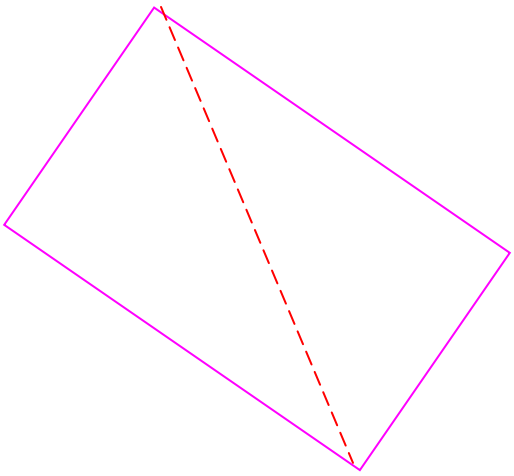


What makes a shape a polygon?

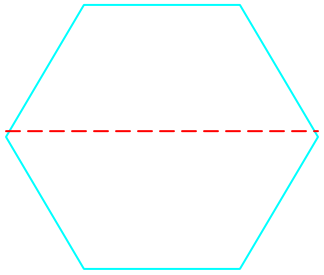
1. It has straight sides.

2. It is a closed shape.

Divide the shape into 2 triangles

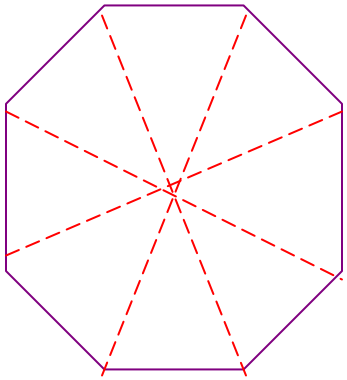


Divide the shape into 2 trapezoids

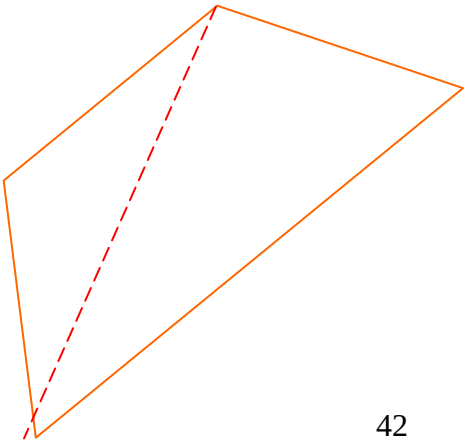


Divide shape into 1 square and 2 triangles

Divide shape into 8 triangles



Divide shape into 2 triangles



Name _____ Date _____

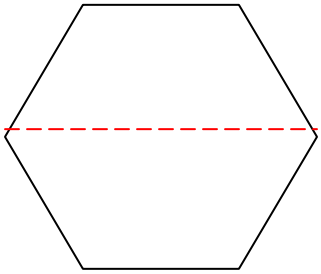
Final Assessment for "Does Poly Want a Polygon?"

1. The two attributes that define a polygon are:
A polygon is a closed shape with straight sides.

2. The prefix dec- means
   a. decimal
   b. three
   c. ten
   d. decade

3. Write the definition for a quadrilateral below:
A quadrilateral is a four-sided polygon with 4 angles.

4. Divide the shape below into 2 quadrilaterals:



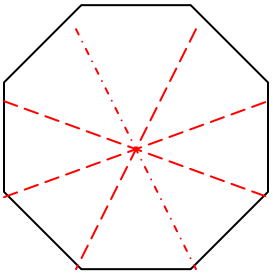
What are the names of the two shapes?

Trapezoid and trapezoid

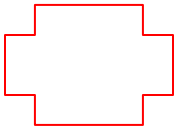
5. What is the difference between a pentagon and an octagon?
A pentagon is a polygon with 5 sides and an octagon is a polygon with 8 sides.

6. The prefix quad- means
   e. quadruple
   f. five
   g. complex
   h. four

7. Divide the shape into eight triangles.



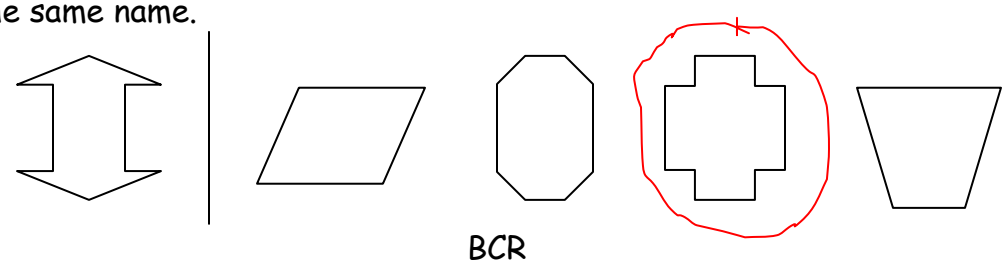
8. Draw a decagon in the space provided below:



9. A composite shape is:
   A shape that is made up of other shapes.

10. What are the five different examples of quadrilaterals?
    a. rhombus
    b. parallelogram
    c. trapezoid
    d. square
    e. rectangle

11. Study the polygon on the left. Circle the letter of the polygon that has the same name.



BCR

C. In the space provided below, draw an example of a shape that is NOT a polygon.

The answers may vary, make sure they are either open or have curved lines.

D. Explain why you drew this shape by using what you know about polygons. Use words, numbers and/or symbols in your explanation.

A polygon is a closed shape with straight sides. I drew a circle because a circle has curved lines. Examples of polygons are: triangles, quadrilaterals, pentagons, hexagons, octagons, or decagons.