

Printable & Paperless Resources

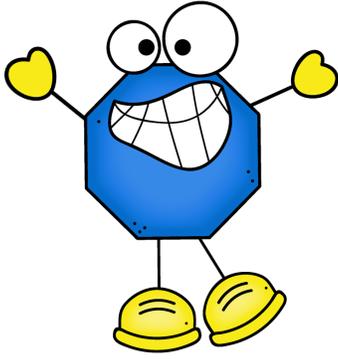
Polygon Explorations

Lessons & Activities

Laura Candler

The image features a central cartoon character, a blue octagon with large white eyes, a wide white-toothed grin, and yellow heart-shaped hands. The character is surrounded by various educational worksheets. One worksheet titled "Polygon Sorting Venn Diagrams" includes a Venn diagram and instructions: "Label the circles, sort the shapes, and record the shape numbers inside the sections." Another worksheet, "2-Dimensional Shapes 1-7", shows a grid of shapes labeled 1 through 7. A "Polygon Showdown" worksheet includes a small cartoon character and instructions: "Materials: Polygon Showdown Task Cards, Numbered polygons, Dry erase boards and markers, Ruler and/or protractor." A "Polygon Capture Game" worksheet lists materials: "Deck of Polygon Capture Task Cards, Polygon Capture Moves Card, 30 numbered 2D shapes, Dry erase boards and markers, Ruler and protractor." A "Polygon Capture Moves" worksheet has sections for "Poly Captured!" and "Poly Gone!". A "Polygon Challenge" worksheet is also visible. In the bottom left corner, there is a green tag with the text "Teaching Resources www.lauracandler.com".

Grades 3 to 5



Polygon Explorations

Teacher's Guide

by Laura Candler

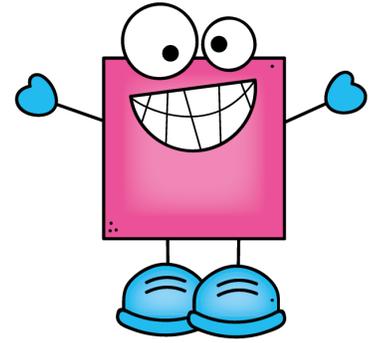


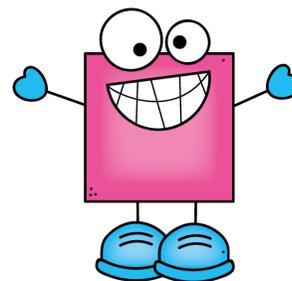
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Preview Version

Polygon Explorations

Overview and Teaching Tips



by Laura Candler

Polygon Explorations includes a variety of lessons, activities, and games for introducing polygons and teaching students how to identify polygons by their attributes. These lessons use a set of 30 numbered shapes which students will explore through hands-on activities. This teacher's guide includes directions, printable activity materials, and patterns for the shapes. In addition, Smartboard resources, PowerPoint templates, and digital images of the shapes are provided in separate folders within the product file.

2D Shape Patterns (30 Numbered Shapes)

Patterns for the printable shapes can be found on pages 5-8.

The Smartboard shapes are located in the Smartboard Resources folder, and the image files are located in the 2D Shape Images folder. Most of the shapes are polygons, but three of them are not polygons. Those were included to help students learn the difference between polygons and non-polygons. The 30 numbered shapes include the following assortment:

- 7 triangles including acute, isosceles, equilateral, right, obtuse, and scalene
- 8 quadrilaterals including a rhombus, a square, rectangles, trapezoids, and parallelograms
- 7 polygons including pentagons, hexagons, and octagons
- 8 assorted shapes including three non-polygons

Materials Needed

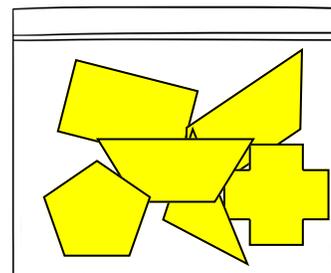
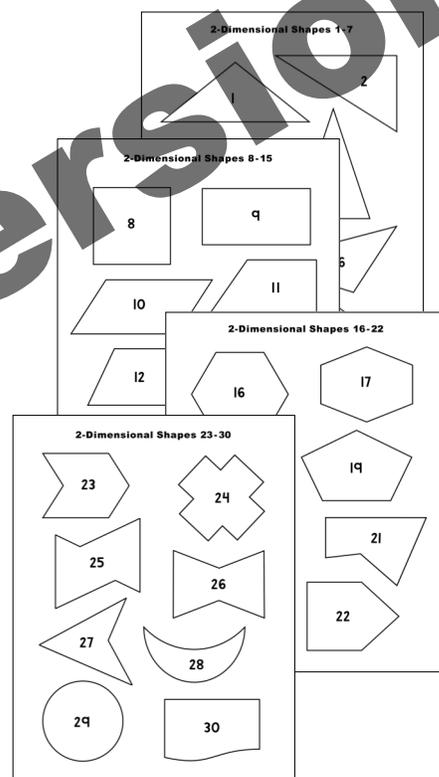
- Sets of 30 numbered 2D Shapes
- Rulers and/or protractors for measuring
- Large T-charts and Venn diagrams
- Dry-erase markers
- Individual dry erase boards

In addition to the items listed above, some of the lessons and games may require extra materials. Before you begin, skim through this teacher's guide and jot down the materials needed for each activity. Then follow the steps below to prepare the shapes and charts.

Advanced Preparation

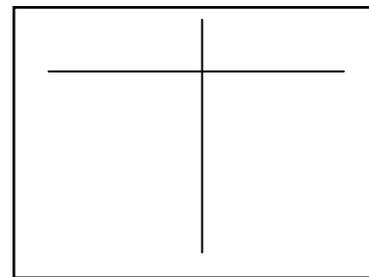
1. Print and Cut Out the Shapes

Use the polygon patterns on pages 5-8 and print one set of 30 numbered shapes for each team. If possible, print each set on a different color paper or cardstock so that if a shape drops on the floor, you'll know where it belongs. Laminate the pages, cut out the shapes, and store them in plastic zippered bags.



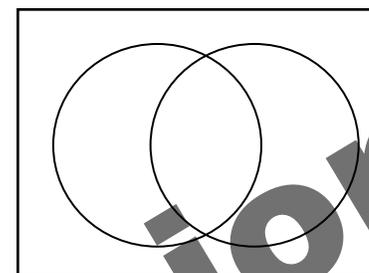
2. Prepare Team T-charts and Venn Diagrams

To prepare for the Polygon Sorting Activities, you'll need to create a large T-chart and a large Venn diagram for each team. Draw the graphic organizers on 12" x 18" sheets of heavy paper and laminate them so students can write on them with a dry erase marker. If the paper is thick enough, you can draw the two charts on opposite sides of one sheet of paper. When you're ready to switch from the T-chart to the Venn diagram or vice-versa, ask your students to flip over the paper.



3. Prepare the 2D Shapes for Class Demonstrations

You'll need a set of shapes to use for demonstration purposes when introducing new concepts, games, and activities. The classroom technology you have available will determine the method you use to display the shapes. Three technology options are listed below, but no matter which option you choose, you need at least one set of paper shapes to use for hands-on demonstrations.

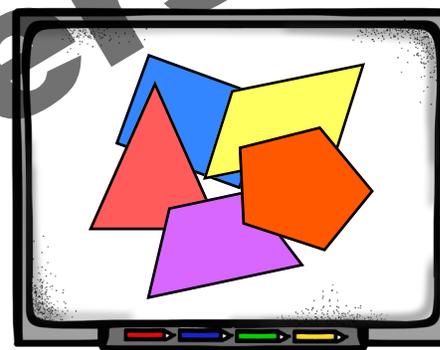


- **Document Camera and Projector Option**

Place the shapes under a document camera and project them onto a screen to display them.

- **PowerPoint Option**

Open the PowerPoint Sorting Templates file and save it under a new name to prevent the original file from being overwritten. Click through the slides to become familiar with the resources, and select one of the slides to use as your background for sorting. Drag the shapes onto the slide to display them.



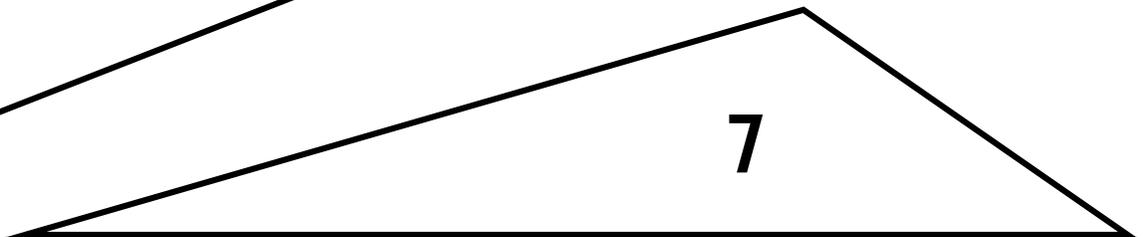
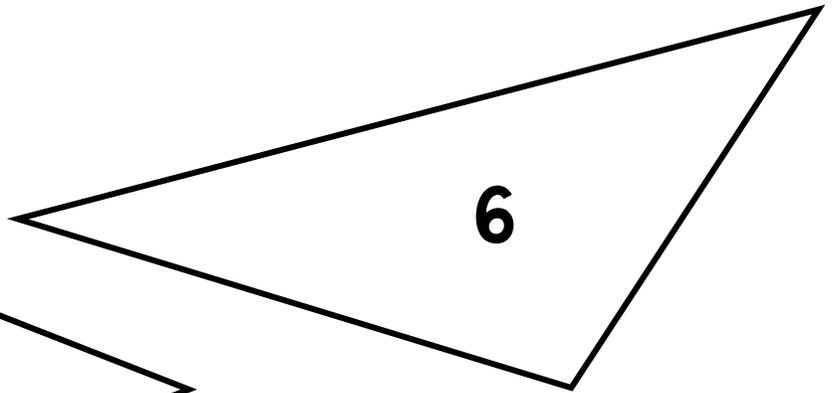
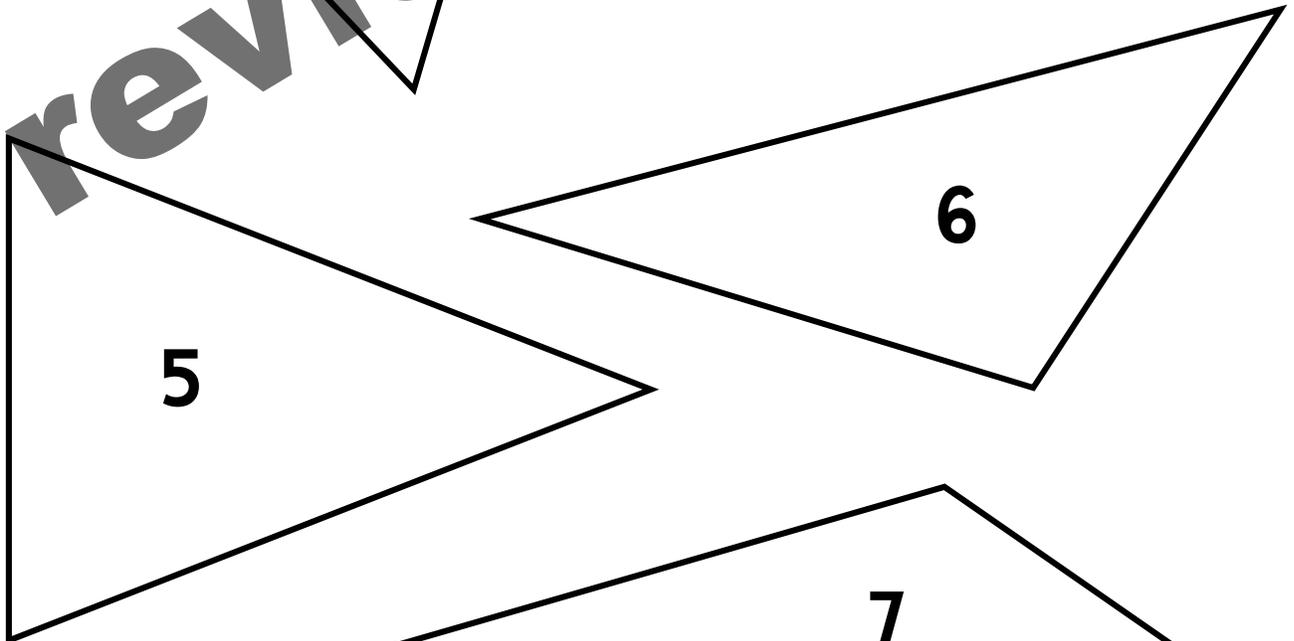
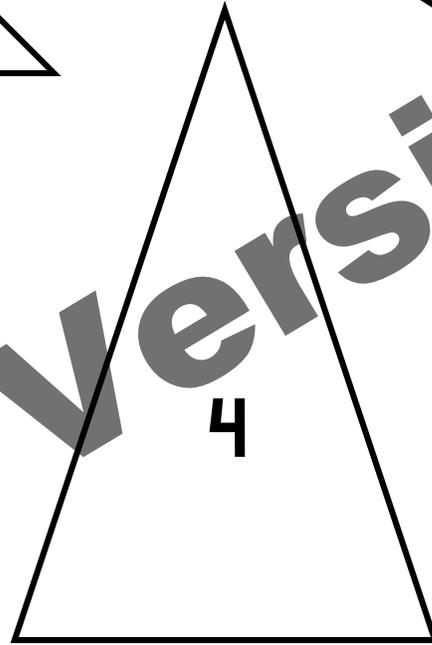
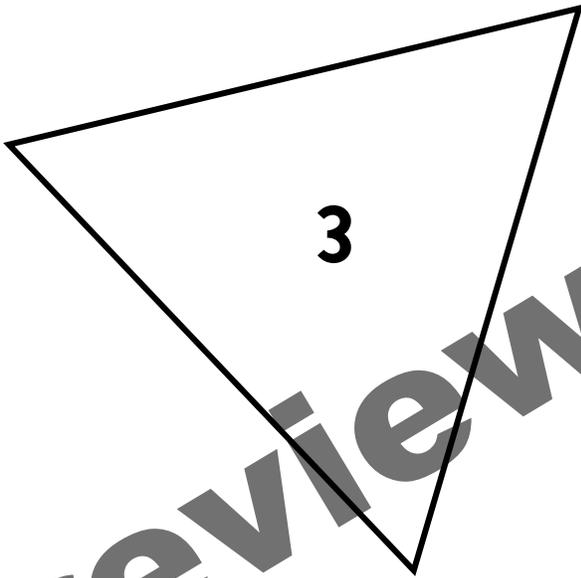
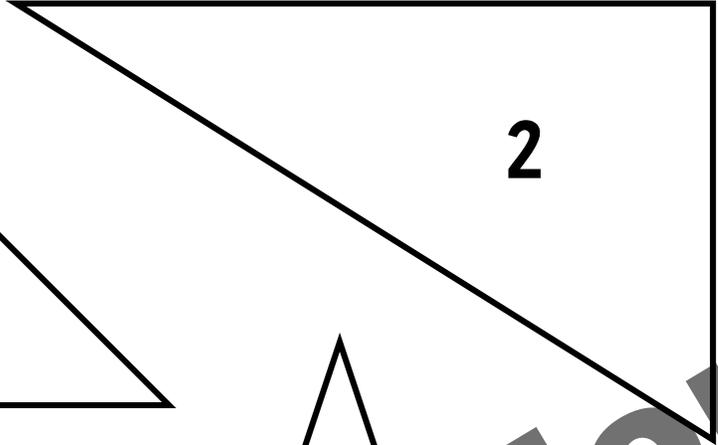
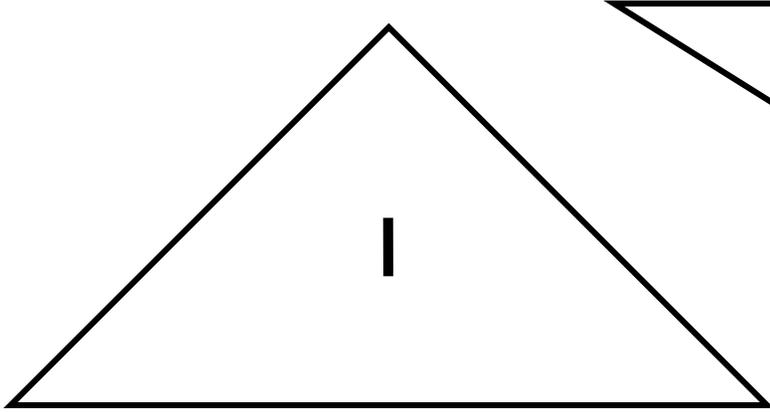
- **Smartboard Option**

First, follow the directions below to install the Polygon Explorations Shapes Gallery. Then, open the Smartboard Notebook file titled Polygon Explorations SB and save it under a new name to prevent the original file from being overwritten. Click through the pages to become familiar with the options available. Practice moving, rotating, and cloning the shapes before using the Smartboard resources with your students.

How to Install the Polygon Explorations Shapes Gallery

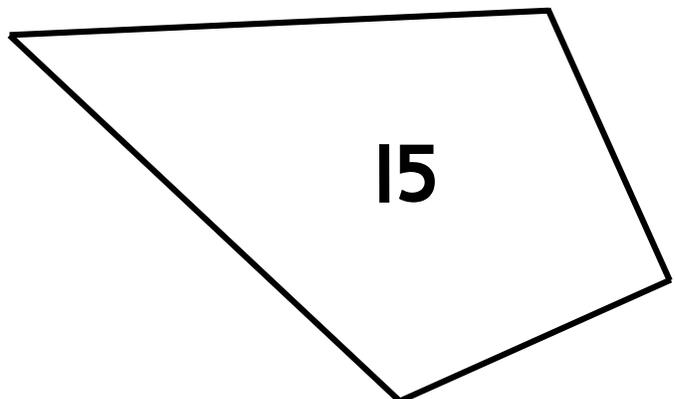
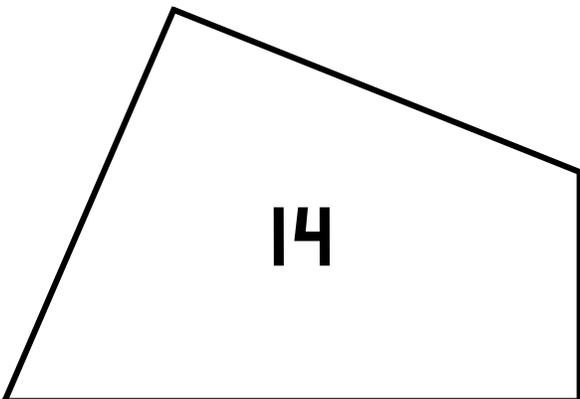
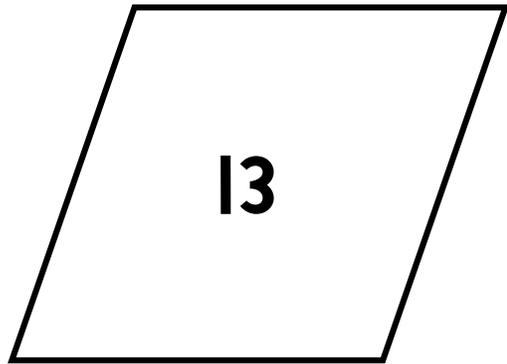
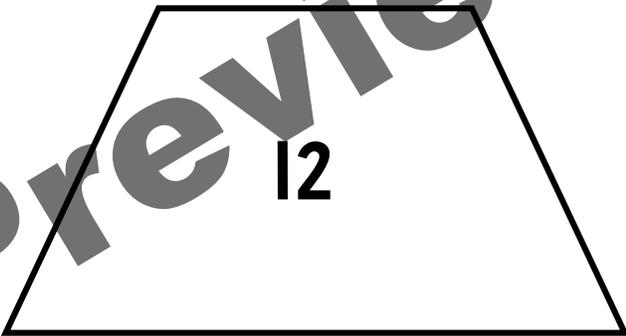
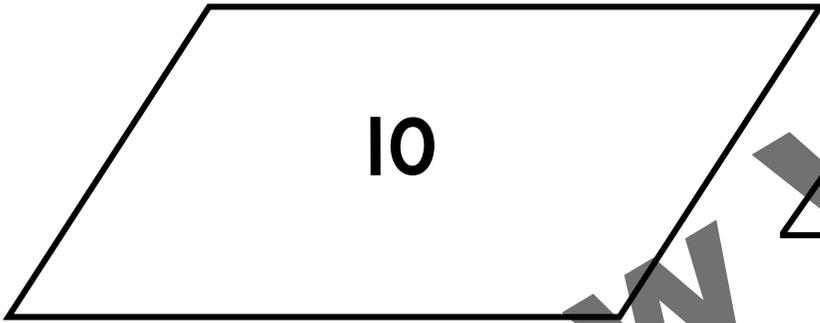
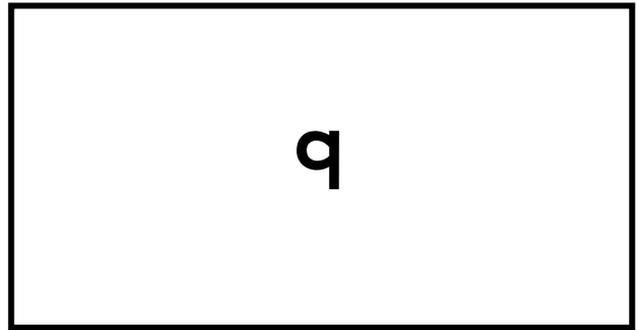
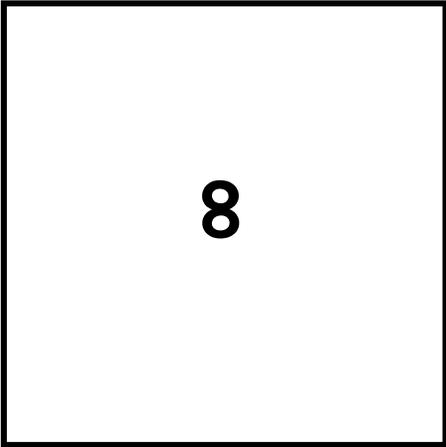
1. To use the Smartboard resources, you'll need to access the Polygon Explorations product folder from a computer with Smartboard software installed. If the Polygon Explorations file is not on the computer you are planning to use for your lessons, download it again from TpT or upload it to a private Dropbox folder that you can access from school.
2. Locate the Smartboard Resources folder and open the file titled Polygon Exploration Shapes. Save it using a different name and then close the file. The gallery of 30 shapes will be installed automatically.

2-Dimensional Shapes 1-7

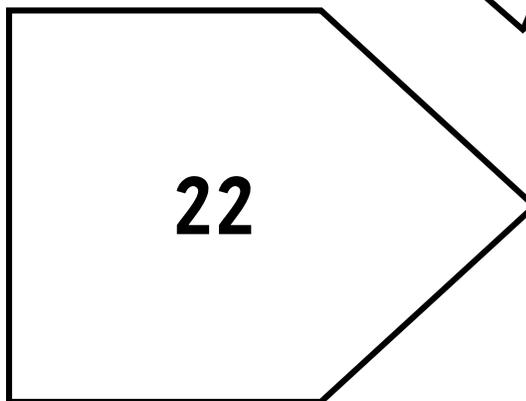
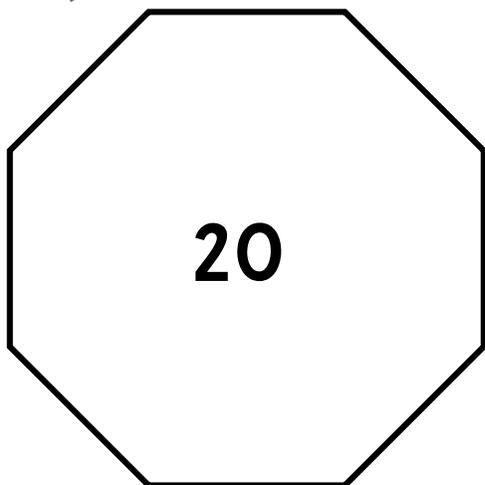
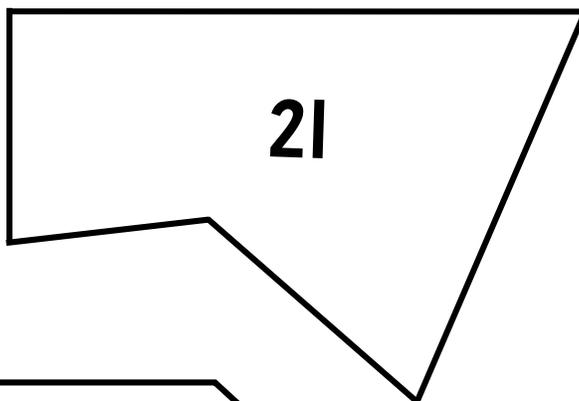
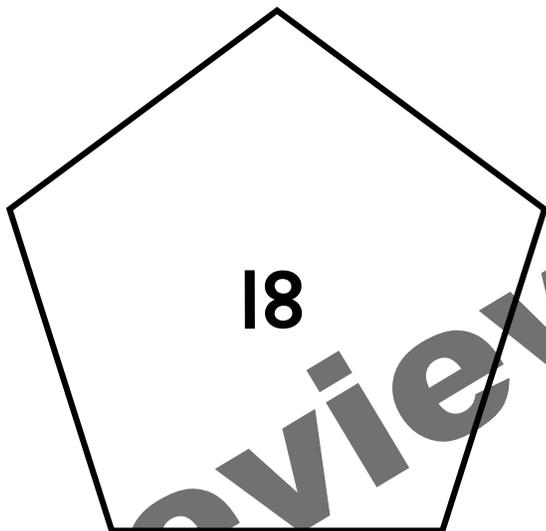
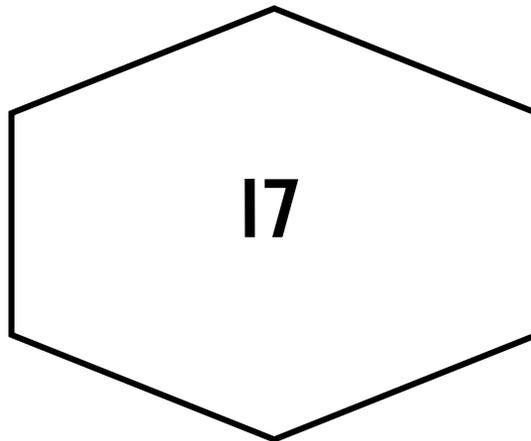
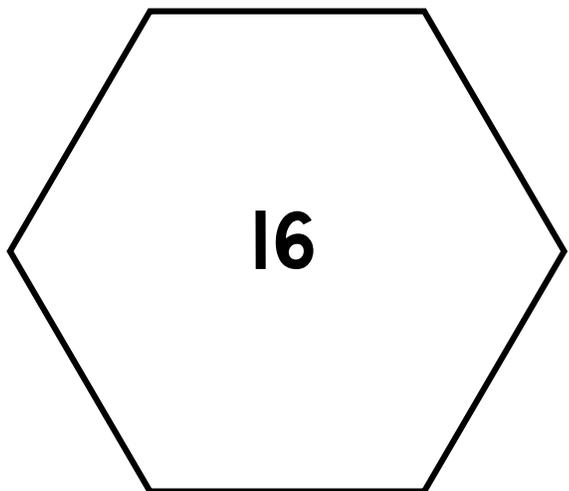


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2-Dimensional Shapes 8-15

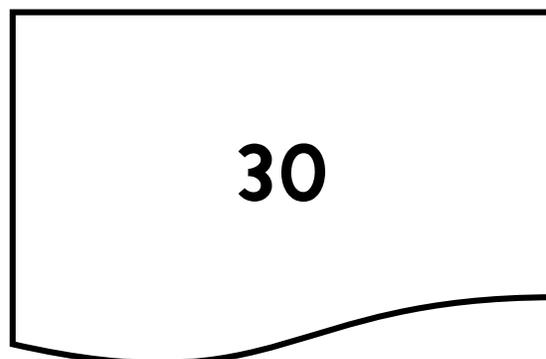
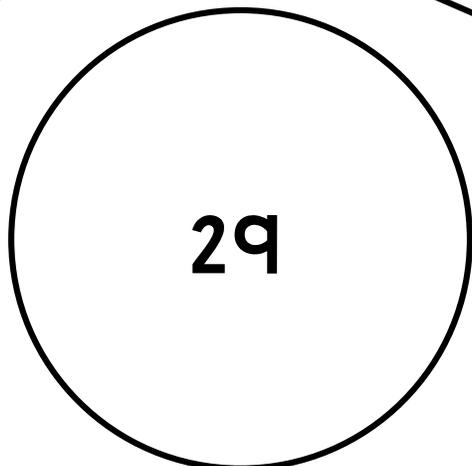
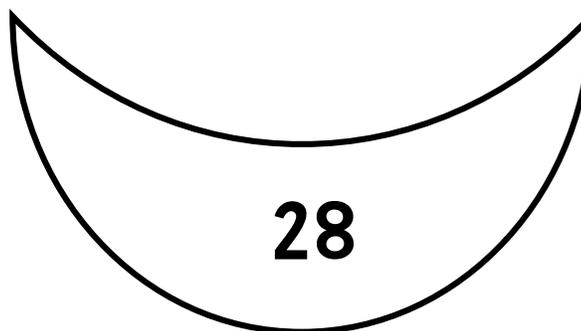
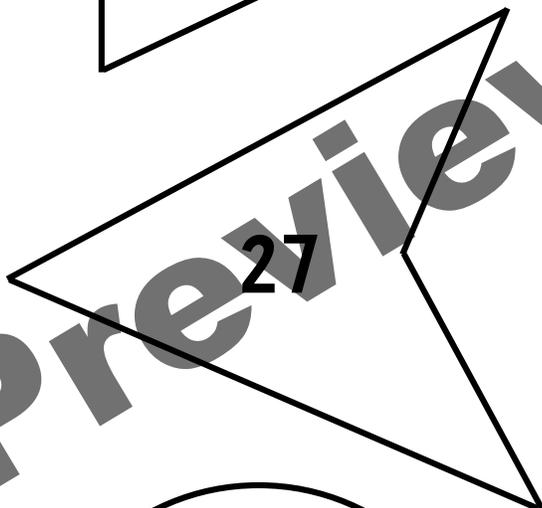
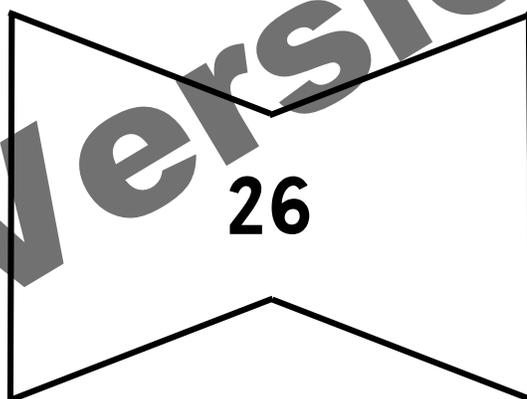
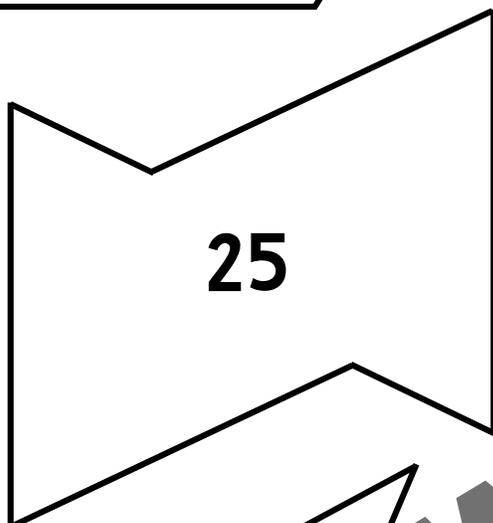
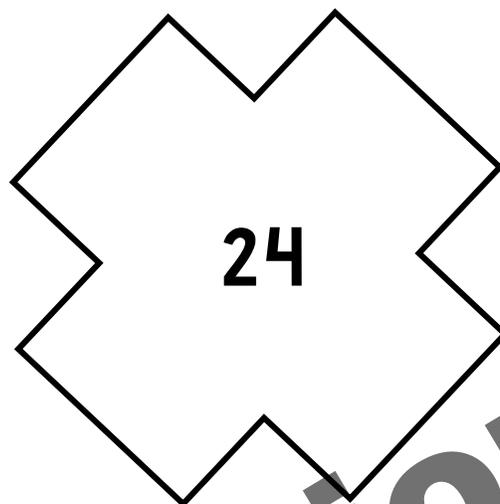
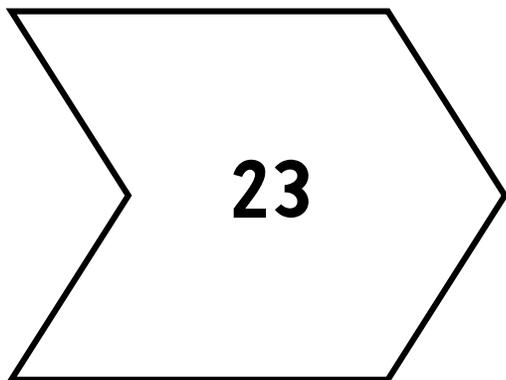


2-Dimensional Shapes 16-22



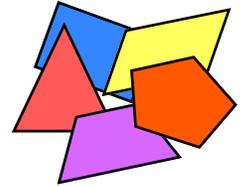
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2-Dimensional Shapes 23-30



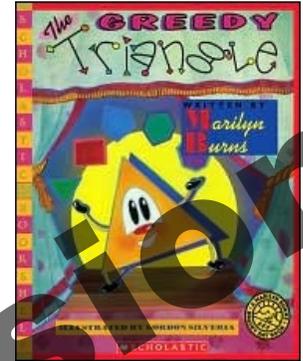
Lesson Suggestions and Teaching Tips

If you prepare the two-dimensional shapes before starting your geometry unit, you'll be able to use them to support almost every concept you teach. Take a look at these starter ideas, but feel free to develop your own. You'll be amazed at how easy it is to come up with your own strategies!



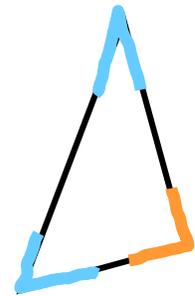
1. Introduce Polygons with Children's Literature

Reading [The Greedy Triangle](#) by Marilyn Burns is a great way to introduce students to polygon names and how polygons appear in everyday life. The triangle in the story is not happy to be just a triangle and wishes he had more sides. He visits the Shape Shifter who turns him into a quadrilateral. But you guessed it—he's not happy as a quadrilateral either! As the story unfolds, the triangle is transformed into one polygon after another. Eventually he realizes that life was good back when he was a triangle! Kids of all ages love the story and enjoy looking for polygons in their own environment.



2. Finding Types of Angles Within Polygons

After you have introduced your students to the three types of angles (acute, obtuse, and right), have them look for angles in geometric shapes. Choose one of your demonstration shapes, such as shape #2, the right triangle. Trace the shape and identify each interior angle as right, obtuse, or acute. Teach your students how to outline the interior angles using a different color for each type of angle. For example, they could trace over all of the acute angles in blue, all of the right angles in orange, and all the obtuse angles in green.

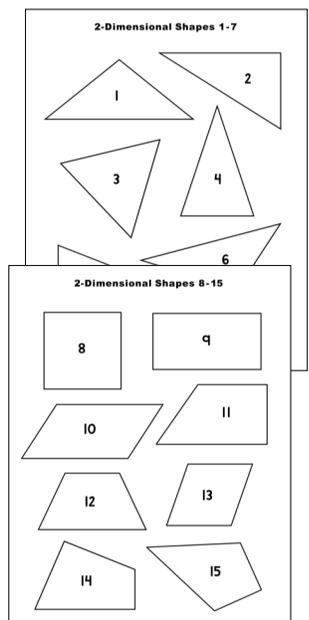


After you demonstrate the procedure, assign an assortment of polygons to your students and have them take turns tracing the shapes and outlining them in the designated colors.

3. Exploring Specific Types of Polygons

The two-dimensional shapes are perfect for exploring specific types of triangles and quadrilaterals. For instance, if you want to introduce special types of triangles, have your students find all of the triangles, shapes 1 through 7, and set the other polygons aside. When you introduce each type of triangle, ask your students to hold up all the triangles that fit the definition.

As you explore the different types of triangles, your students will discover that most triangles have two names, one that describes the type of angle (right, acute, or obtuse) and another that describes the lengths of the sides (isosceles, equilateral, and scalene). Most quadrilaterals have more than one name as well. For example, a square is a rectangle, a rhombus, and a parallelogram.



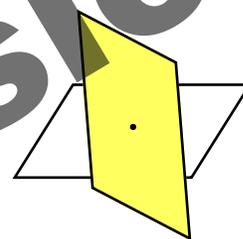
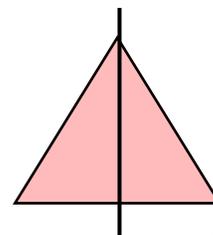
4. Introducing and Exploring Symmetry

The two-dimensional shapes also work well for symmetry lessons. The lessons suggestions below are teacher-directed activities. As you work through the lessons, monitor your students closely to be sure they are grasping the concepts.

→ For **line symmetry**, give each student one pipe cleaner cut into several pieces. Have them place the pieces on top of the shapes to show lines of symmetry. You can also have students trace the shapes on paper, cut them out, and fold them. This strategy is helpful for the kinesthetic learners who need to manipulate the polygons to find lines of symmetry.

→ For **rotational symmetry**, ask each student to choose a shape and trace it. Demonstrate how to mark a point exactly in the center and rotate the shape around the point to see if it matches the tracing before it returns to the starting position. For example, if the shape matches after a quarter turn, the shape has 90° rotational symmetry.

The parallelogram on the right does not have 90° rotational symmetry; however, if you rotate it another quarter turn, you'll see that it does have 180° rotational symmetry. If you're using the Smartboard or PowerPoint shapes, you can demonstrate this concept by cloning polygons and rotating them around a center point.

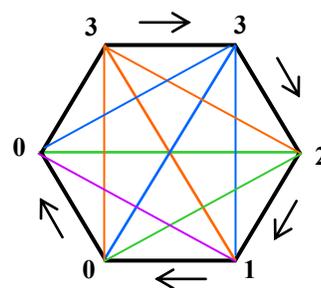


5. Introducing and Exploring Diagonals

Laminated shapes can be used to explore diagonals of polygons. If you don't want students to draw directly on the shapes, ask them to trace the shapes on unlined paper before completing the suggested activities.

→ Drawing Color-Coded Diagonals

Explain that a diagonal is a line segment that connects two non-adjacent vertices. Ask students to select any shape, trace it, and draw the diagonals. Students often have trouble finding and counting ALL the diagonals of a shape with many sides. To solve this problem, start at one vertex, draw all the diagonals from that vertex in one color, and write the number next to the vertex. Move to the next vertex, use a different color to draw all new diagonals possible, and record the number. Move in a clockwise direction around the shape until you can't add any new diagonals, and then count the numbers.



→ Exploring Diagonal Relationships

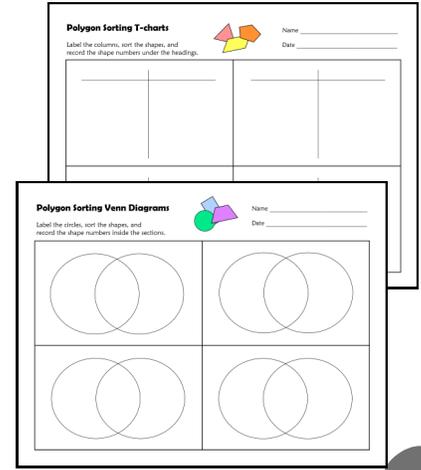
After students know how to draw and count diagonals, discuss the relationships of the diagonals to each other and to the sides. Are they intersecting, parallel, or perpendicular to each other? Challenge: Try to find the relationship between the number of sides and diagonals. Make a chart to compare the number of sides and number of diagonals. Ask students to study the results and draw conclusions. (Answer shown at right)

Sides	Diagonals
4	2
5	5
6	9

$$s(s-3) \div 2 = d$$

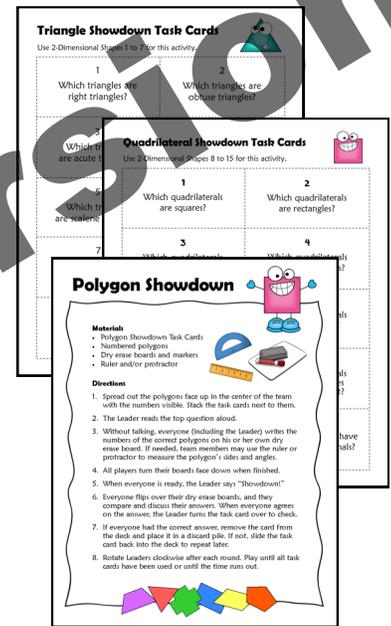
6. Polygon Sorting Activities

Polygon Sorting is a highly effective strategy for deepening understanding of geometric concepts. The activity involves examining the attributes of the shapes and sorting them into categories. The first guided lesson is an open sorting activity, which is followed by a lesson on sorting polygons on a T-chart. The final lesson teaches students how to sort shapes on a Venn diagram according to two different attributes. Each lesson should take about 20 minutes, but it will be time well spent! Polygon Sorting is especially powerful when students work together in cooperative learning teams, discussing and justifying the placement of each polygon.



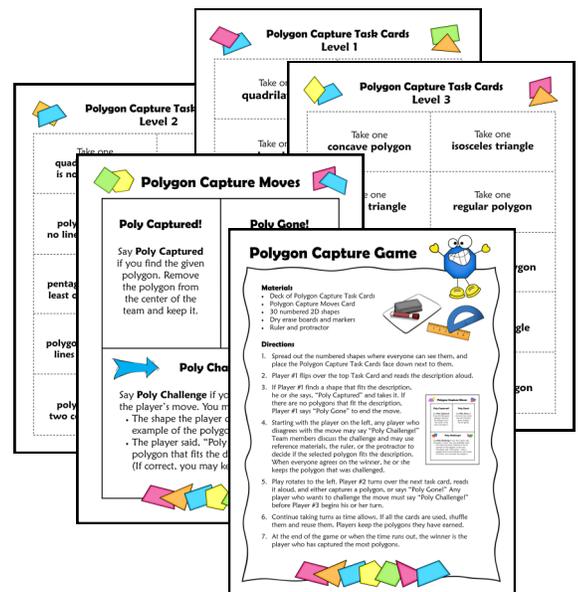
7. Polygon Showdown

Polygon Showdown is an exciting cooperative learning review activity that works best with teams of three or four students. The student directions, task cards, and answers for this activity can be found on pages 17 to 22. In addition to these materials, each team will need a set of 30 numbered shapes, and each student will need a dry erase board and a marker. The first set of task cards includes questions about triangles, so only shapes 1 through 7 are needed for this activity. The second set of task cards includes questions about quadrilaterals, so shapes 8 through 15 are the only ones needed. If you'd like to create additional task cards, you can use the PDF task cards template in this teacher's guide or the editable PowerPoint template. To make the activity self-checking, print or write the answers on the backs of the task cards. If your students are not familiar with Showdown, display the Polygon Showdown student directions on page 17 and ask a team to help you model the activity. After you demonstrate the procedures, distribute the materials and assign the first leader in each team. Then walk around the room to observe and assist as needed.



8. Polygon Capture Game

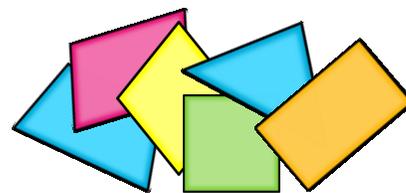
Polygon Capture is more competitive than Polygon Showdown, which makes it even more challenging and fun! Teacher directions, student directions and three levels of task cards can be found starting on page 23. To play the game, students spread all 30 shapes out in the middle of the team. Players take turns selecting a task card and trying to "capture" a polygon that fits the description on the card. Players may challenge moves they don't agree with, and team members must work together to decide the winner of each challenge.



Polygon Sorting Activities: Step by Step Lessons

Materials Needed

- 30 numbered 2D shapes, laminated, 1 set per team
- T-charts and Venn diagrams, laminated, 1 set per team
- Large T-chart and Venn diagram for display
- Polygon Sorting Recording Pages, 1 per student, optional



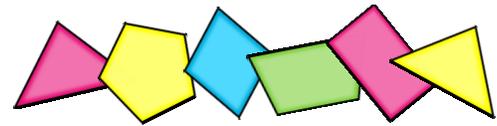
Introduction: Open Sorting Activity

1. Seat your students in teams of three or four. If they have flat desks, ask them to group their desks together to form a large open workspace in the center. If they don't have flat desks, seat them at tables or in small groups on the floor.
2. Give each team a set of shapes, and ask them to spread the shapes out, number side down, so that everyone can see and touch the shapes. Hiding the numbers will keep the focus on the attributes of each shape rather than on its number. When the numbers are visible, students assume that the shapes need to be oriented so the numbers are readable which may deter them from rotating the shapes to view them from different angles.
3. Give your students time to explore the shapes, and ask your students to notice how the shapes are alike and different, and to create groups of shapes that are similar in some way.
4. While students are working, spread out your demonstration shapes on a table at the front of the room. If you have a Smartboard, open the Polygon Explorations SB file and find the slide with an open workspace surrounded by shapes. Or open the PowerPoint Sorting Templates to the first slide which has a blank workspace with shapes on both sides.



5. After giving your students time to sort their shapes into categories, ask a reporter from each team to briefly describe how their team grouped the shapes. As they mention the features they used to group the shapes, such as right angles or shapes with four sides, introduce the term “attribute,” and explain that attributes are important qualities or characteristics of shapes that allow us to classify them in meaningful ways.
6. Next, ask each team to secretly choose ONE attribute and place all polygons having that attribute in the center of the workspace. They should move all other polygons to the side. Then allow your students to move from team to team, attempting the guess the attribute that the polygons in each group have in common.
7. If time allows, ask formative assessment questions to find out what your students know about polygons. For example, ask them to find all of the quadrilaterals and place them in the center of the workspace. Your students may know that shapes #8 through #15 are all quadrilaterals, but they might not know that shape #27 is also a quadrilateral.

Polygon Sorting Lessons Continued



T-Chart Polygon Sorting Directions

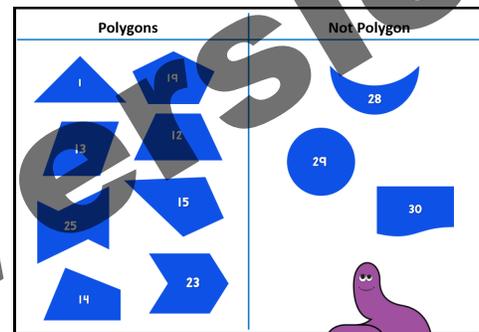
1. Place a laminated T-chart in the middle of each team and display a large copy for the class. If you're using the Smartboard file or PowerPoint Template, navigate to the page with the T-chart.
2. Give each team a set of 30 shapes, and ask them to spread the shapes out, number side down, around the edges of the T-chart.

T-Chart Category Ideas

- Polygon/Not Polygon
- Quadrilateral/Not Quadrilateral
- Convex/Concave
- Regular/Irregular
- Line Symmetry/No Line Symmetry
- Obtuse Angles/No Obtuse Angles

3. Label the demonstration T-chart with two categories. Start with the labels "Polygons" and "Not Polygons." Ask one member of each team to use a dry erase marker and write the same labels as headings on their team T-chart.

4. Explain that a polygon is a two-dimensional closed shape with at least three straight sides. Then ask your students to take turns selecting one of the 30 shapes and explaining to their team why it is or is not a polygon. Team members give a thumbs up if they agree, and if everyone agrees, the shape is placed in the correct column on the chart. If anyone doesn't agree, the team should discuss the attributes of the shape to determine its correct placement.



5. When all of the shapes have been sorted, ask students to flip them over so the numbers are visible and raise their hands to show they are finished. Check each chart, and if a team has misplaced any of the shapes, ask them to continue working without revealing which shapes are incorrect. When all groups have finished, discuss the results as a class, if needed.

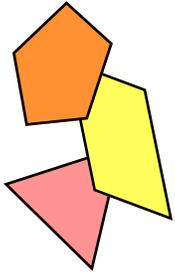
6. The Polygon Sorting T-Chart form on the right can be used for recording the results of the sorting activities. After students complete each sorting activity, they label one of the T-charts on their forms with the same titles used on the team chart. Then they record the numbers of the polygons in the correct columns under those headings. The example below shows the results of the Polygon/Not Polygon Sorting Activity.

Polygon Sorting T-charts Name _____
 Label the columns, sort the shapes, and record the shape numbers under the headings. Date _____

Polygon	Not Polygon
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27	28, 29, 30

7. Repeat the T-chart sorting activity several more times using different polygon attributes each time. Be sure to choose mutually-exclusive attributes so that polygons placed in one category will not also fit in the other category. Feel free to use the categories listed at the top of the page if those skills are a part of your curriculum. If the categories involve the lengths of sides or the sizes of angles, encourage your students to use rulers and protractors to measure the sides and angles to help them determine the placement of each polygon.

Polygon Sorting T-charts



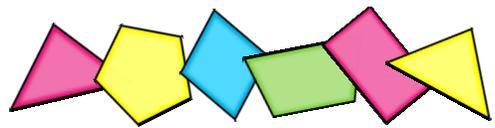
Name _____

Date _____

Label the columns, sort the shapes, and record the shape numbers under the headings.

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Polygon Sorting Lessons Continued

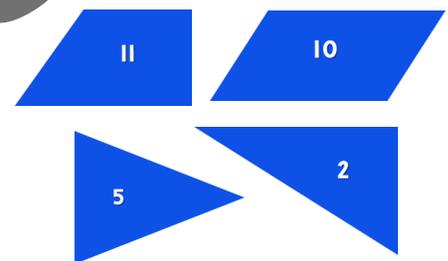
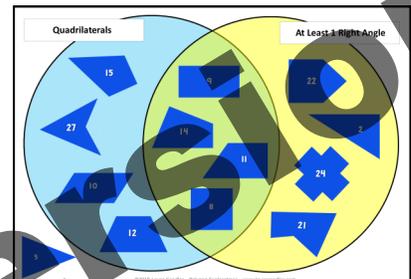


Venn Diagram Sorting Directions

1. When your students are ready, introduce the Venn diagram. Even if your students know how to use a Venn diagram, it's best to work through the first few examples together.
2. Place a laminated Venn diagram in the middle of each team, and display a large chart for the class demonstration. Open the Smartboard file or the PowerPoint template and navigate to the Venn diagram.
3. Label the class Venn diagram with two attributes that overlap, meaning that some polygons will have both attributes. For this lesson, write "Quadrilaterals" at the top of the left circle and "At Least 1 Right Angle" at the top of the right circle. Ask a member of each team to write those labels on their team Venn diagram charts.
4. Next, ask each team to find shape #10 and to discuss where to place it on the Venn diagram. It's a quadrilateral, so it belongs only in the left circle. Then ask them to find shape #11 and discuss its placement. It's quadrilateral with a right angle, so it goes in the overlapping area. Repeat this with shape #2, a triangle with one right angle that should be placed in the right circle only. For the final example, use shape #5 to show your students that shapes that don't have either attribute should be placed outside both circles.
5. When everyone understands the directions, ask team members to take turns selecting a shape and placing it in the correct area of the graphic organizer. Remind students to show a thumbs up if they agree or discuss the polygon's placement if they don't.
6. When all of the shapes have been sorted, ask students to flip the shapes over so the numbers are face up and raise their hands. Check each Venn diagram, and if a team has misplaced any of the shapes, ask them to continue working without revealing which ones are incorrect. When all groups are finished, discuss the results as a class, if needed.
7. If you want your students to record their work, give them each a copy of the Venn Diagram Sorting form on the right. After each completing activity, students record the labels and polygon numbers on their charts in the correct locations as they did with the T-chart form in the previous lesson.
8. Repeat the sorting activity several times. Feel free to use the categories at the top of the page if those skills are in your curriculum. Remind students to measure the sides and angles when classifying polygons according to those attributes.

Venn Diagram Category Ideas

- Hexagons/Parallel Sides
- Right Angles/Rotational Symmetry
- Polygons/Obtuse Angles
- Parallel Sides/Line Symmetry
- Two Diagonals/Polygons
- Convex Shapes/Line Symmetry



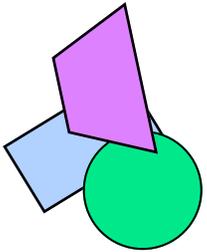
Polygon Sorting Venn Diagrams

Label the circles, sort the shapes, and record the shape numbers inside the sections.

Name _____
Date _____

Polygon Sorting Venn Diagrams

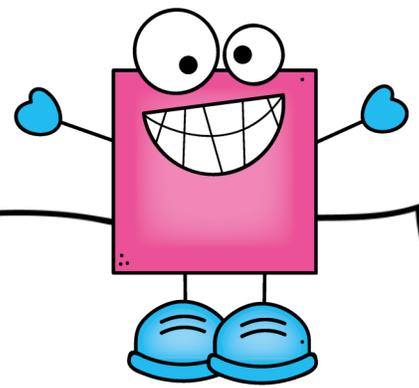
Label the circles, sort the shapes, and record the shape numbers inside the sections.



Name _____

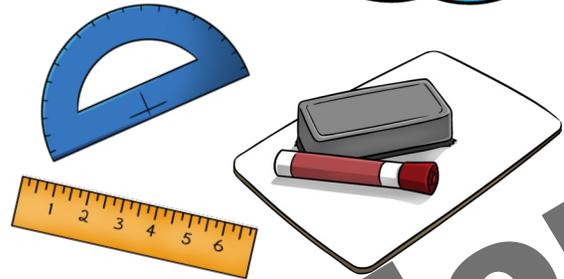
Date _____

Polygon Showdown



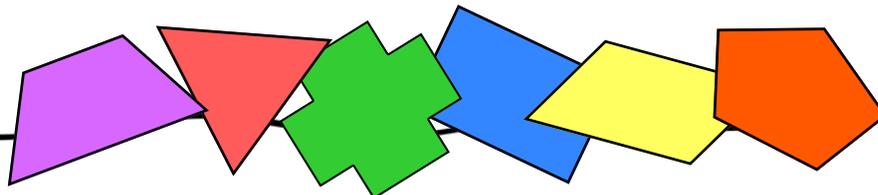
Materials

- Polygon Showdown Task Cards
- Numbered polygons
- Dry erase boards and markers
- Ruler and/or protractor

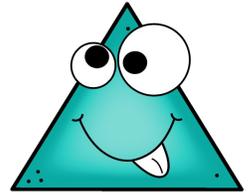


Directions

1. Spread out the polygons face up in the center of the team with the numbers visible. Stack the task cards next to them.
2. The Leader reads the top question aloud.
3. Without talking, everyone (including the Leader) writes the numbers of the correct polygons on his or her own dry erase board. If needed, team members may use the ruler or protractor to measure the polygon's sides and angles.
4. All players turn their boards face down when finished.
5. When everyone is ready, the Leader says "Showdown!"
6. Everyone flips over their dry erase boards, and they compare and discuss their answers. When everyone agrees on the answer, the Leader turns the task card over to check.
7. If everyone had the correct answer, remove the card from the deck and place it in a discard pile. If not, slide the task card back into the deck to repeat later.
8. Rotate Leaders clockwise after each round. Play until all task cards have been used or until the time runs out.



Triangle Showdown Task Cards



Use 2-Dimensional Shapes 1 to 7 for this activity.

1

Which triangles are right triangles?

2

Which triangles are obtuse triangles?

3

Which triangles are acute triangles?

4

Which triangles are equilateral triangles?

5

Which triangles are scalene triangles?

6

Which triangles are isosceles triangles?

7

Which triangles are obtuse and scalene?

8

Which triangles are right scalene triangles?

9

Which triangles have no lines of symmetry?

10

Which triangles have two congruent angles?

Triangle Showdown Answers

Print or write these answers on the backs of the task cards.

2

Answers: 6 and 7

1

Answers: 1 and 2

4

Answer: 3

3

Answers: 3, 4, and 5

6

Answers: 1, 4, and 5

5

Answers: 2, 6, and 7

8

Answer: 2

7

Answer: 7

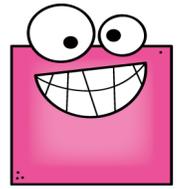
10

Answers: 1, 3, 4, and 5

9

Answers: 2, 6, and 7

Quadrilateral Showdown Task Cards



Use 2-Dimensional Shapes 8 to 15 for this activity.

1

Which quadrilaterals are squares?

2

Which quadrilaterals are rectangles?

3

Which quadrilaterals are rhombi?

4

Which quadrilaterals are parallelograms?

5

Which quadrilaterals have exactly two lines of symmetry?

6

Which quadrilaterals do not have any parallel sides?

7

Which quadrilaterals do not have any congruent sides?

8

Which quadrilaterals have adjacent sides that are congruent?

9

Which quadrilaterals have at least one obtuse angle?

10

Which quadrilaterals have perpendicular diagonals?

Quadrilateral Showdown Answers

Print or write these answers on the backs of the task cards.

2

Answers: 8 and 9

1

Answer: 8

4

Answer: 8, 9, 10, and 13

3

Answers: 8 and 13

6

Answers: 14 and 15

5

Answers: 9, and 13

8

Answer: 8, 9, 13, and 15

7

Answer: 14

10

Answers: 8, 13, and 15

9

Answers: 10, 11, 12, 13, 14, 15

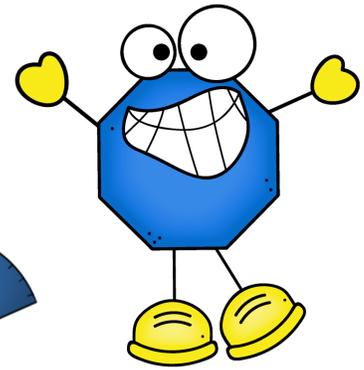
Polygon Showdown Task Cards

Create Your Own Task Cards



Preview Version

Polygon Capture Game Teaching Tips



Materials Needed for each Game:

- 30 numbered two-dimensional shapes
- Polygon Capture Task Cards (Levels 1, 2, or 3)
- Polygon Capture Game Directions
- Polygon Capture Moves Card
- Ruler and/or protractor

Overview

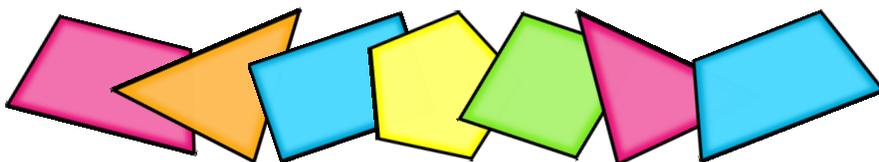
Polygon Capture uses 30 numbered shapes and three levels of task cards that describe polygons with specific attributes. Players take turns trying to “capture” polygons that match those descriptions. Players may challenge any move, and the winner of the challenge captures the polygon. To foster higher level thinking, an answer key is not provided.

Suggestions

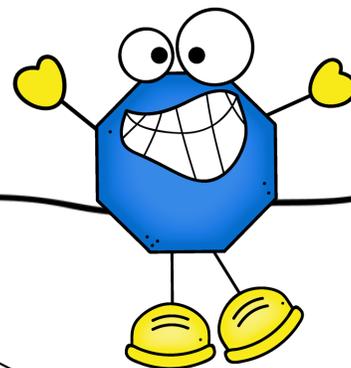
- Review the three levels of Polygon Capture task cards and print the levels that are appropriate for your class. If needed, use the Polygon Capture Task Cards template to create additional task cards. A printable PDF template is on page 29, and an editable template is located in the PowerPoint Templates folder.
- Polygon Capture works well as a cooperative learning activity or math center game. However, it’s always best to introduce the game in a whole group setting first.
- Polygon Capture is more exciting when students challenge each other, but you may have to teach your students how to issue a challenge respectfully.
- If your students seem reluctant to place challenges, walk around and challenge their moves yourself. Having to justify why a polygon was captured requires fluency with mathematical vocabulary and fosters higher level thinking and discussion.
- Teach your students strategies for deciding the winner of any challenge, such as consulting a textbook, using an online reference, or measuring the polygon’s sides and angles.

Variations

- If the game is moving too slowly, assign a time limit for each turn. In most cases, one minute should be enough time to find a polygon that fits the task card description.
- The directions don’t include a penalty for issuing a challenge and losing. However, if your students are challenging each other too frequently, you can add a penalty. For example, the loser of the challenge could give the winner one of his or her captured polygons.
- To create a faster game, ask your student to remove half the shapes (all of the odd numbers or all of the even numbers) and set them aside before the game begins.
- Normally the winner is the player with the most polygons at the end of the game, but a more challenging option is to have players **add the numbers** on their captured polygons to determine the winner. This variation requires your students to think more strategically about which polygon to capture during each round of play.

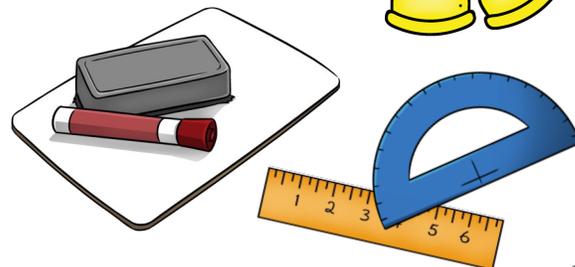


Polygon Capture Game



Materials

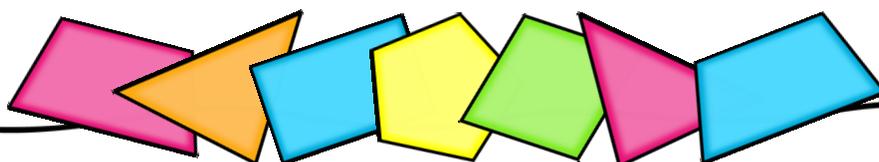
- Deck of Polygon Capture Task Cards
- Polygon Capture Moves Card
- 30 numbered 2D shapes
- Dry erase boards and markers
- Ruler and protractor

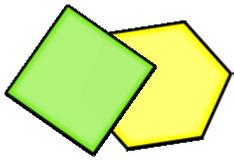


Directions

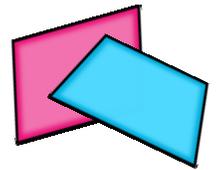
1. Spread out the numbered shapes where everyone can see them, and place the Polygon Capture Task Cards face down next to them.
2. Player #1 flips over the top Task Card and reads the description aloud.
3. If Player #1 finds a shape that fits the description, he or she says, "Poly Captured" and takes it. If there are no polygons that fit the description, Player #1 says "Poly Gone" to end the move.
4. Starting with the player on the left, any player who disagrees with the move may say "Poly Challenge!" Team members discuss the challenge and may use reference materials, the ruler, or the protractor to decide if the selected polygon fits the description. When everyone agrees on the winner, he or she keeps the polygon that was challenged.
5. Play rotates to the left. Player #2 turns over the next task card, reads it aloud, and either captures a polygon, or says "Poly Gone!" Any player who wants to challenge the move must say "Poly Challenge!" before Player #3 begins his or her turn.
6. Continue taking turns as time allows. If all the cards are used, shuffle them and reuse them. Players keep the polygons they have earned.
7. At the end of the game or when the time runs out, the winner is the player who has captured the most polygons.

Polygon Capture Moves	
Poly Captured! Say Poly Captured if you find the given polygon. Remove the polygon from the center of the team and keep it.	Poly Gone! Say Poly Gone to end your turn when you can't find the given polygon (all are gone).
Poly Challenge! Say Poly Challenge if you don't agree with the player's move. You may challenge when: • The shape the player captured is not an example of the polygon on the card. • The player said, "Poly Gone," when a polygon that fits the definition is still in play. (If correct, you may keep the polygon.)	





Polygon Capture Moves

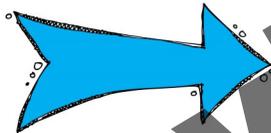


Poly Captured!

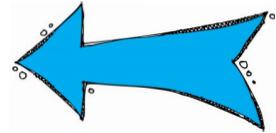
Say **Poly Captured** if you find the given polygon. Remove the polygon from the center of the team and keep it.

Poly Gone!

Say **Poly Gone** to end your turn when you can't find the given polygon (all are gone).

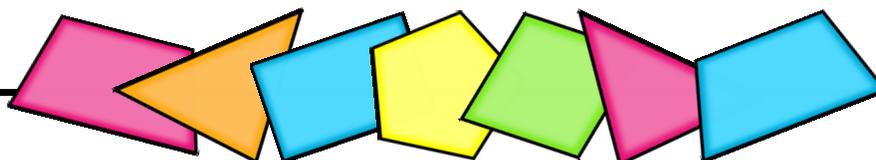


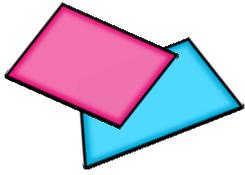
Poly Challenge!



Say **Poly Challenge** if you don't agree with the player's move. You may challenge when:

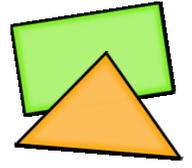
- The shape the player captured is not an example of the polygon on the card.
- The player said, "Poly Gone," when a polygon that fits the definition is still in play. (If correct, you may keep the polygon.)





Polygon Capture Task Cards

Level 1



Take one
quadrilateral

Take one
square

Take one
rhombus

Take one
octagon

Take one
pentagon

Take one
trapezoid

Take one
hexagon

Take one
rectangle

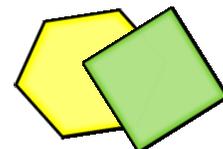
Take one
parallelogram

Take one
triangle



Polygon Capture Task Cards

Level 2



Take one
**quadrilateral that
is not a rectangle**

Take one
**shape that is
not a polygon**

Take one
**polygon that has
no lines of symmetry**

Take one
**triangle that has
one obtuse angle**

Take one
**pentagon that has at
least one right angle**

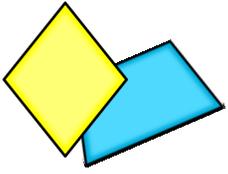
Take one
**polygon that has two
pairs of parallel sides**

Take one
**polygon that has two
lines of symmetry**

Take one
**rectangle that
is not a square**

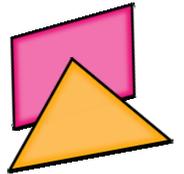
Take one
**polygon that has
two congruent sides**

Take one
**trapezoid that has at
least one right angle**



Polygon Capture Task Cards

Level 3



Take one
concave polygon

Take one
isosceles triangle

Take one
scalene triangle

Take one
regular polygon

Take one
**polygon that has
rotational symmetry**

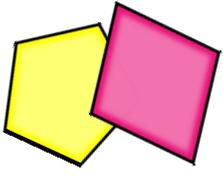
Take one
irregular polygon

Take one
**polygon that has
all sides congruent**

Take one
scalene triangle

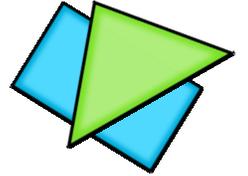
Take one
**polygon that has
perpendicular sides**

Take one
convex polygon



Polygon Capture Task Cards

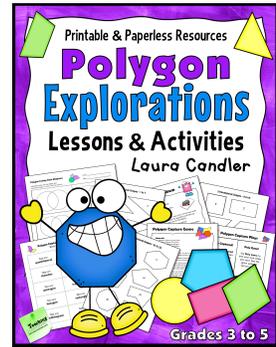
Create Your Own Task Cards



Preview Version

Common Core Alignment

Grades 3, 4, and 5



3rd Grade - Reason with shapes and their attributes.

- **CCSS.MATH.CONTENT.3.G.A.1**

Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

4th Grade - Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

- **CCSS.Math.Content.4.G.A.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.

5th Grade - Classify two-dimensional figures into categories based on their properties.

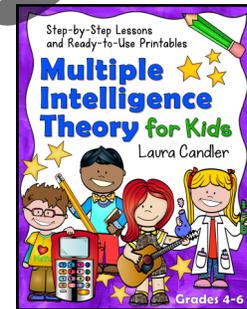
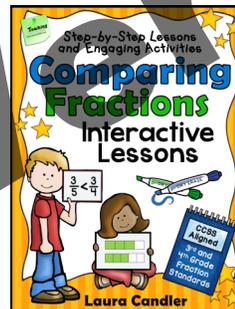
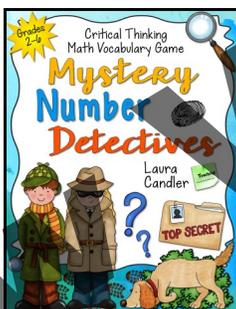
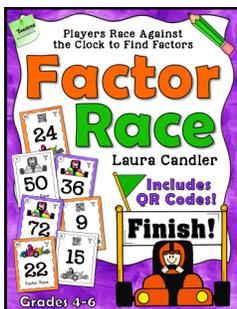
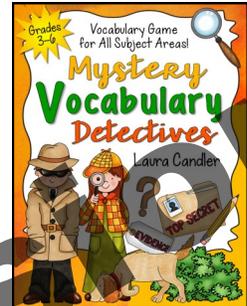
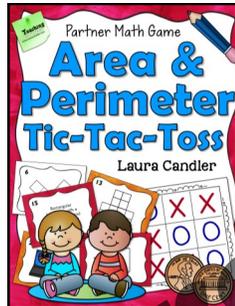
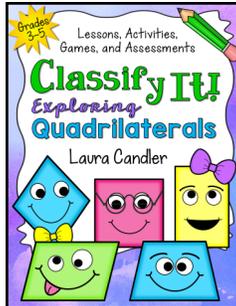
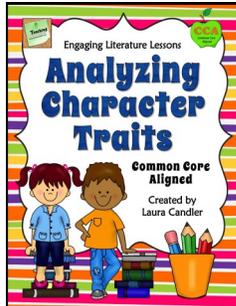
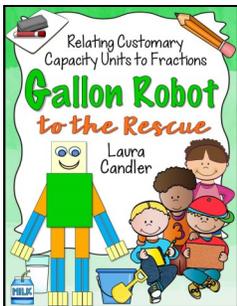
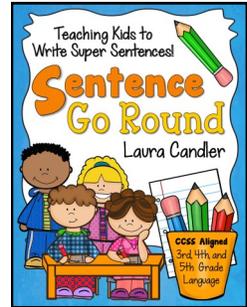
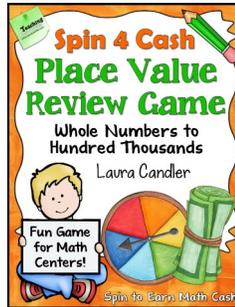
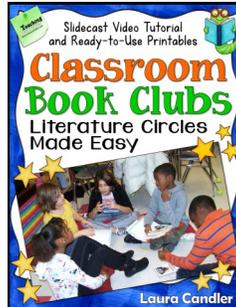
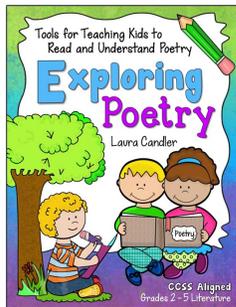
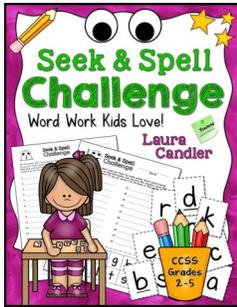
- **CCSS.Math.Content.5.G.B.3**

Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.

- **CCSS.Math.Content.5.G.B.4**

Classify two-dimensional figures in a hierarchy based on properties.

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Laura Candler



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