Click® Teacher Guide: September 2018

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Shapes and Patterns

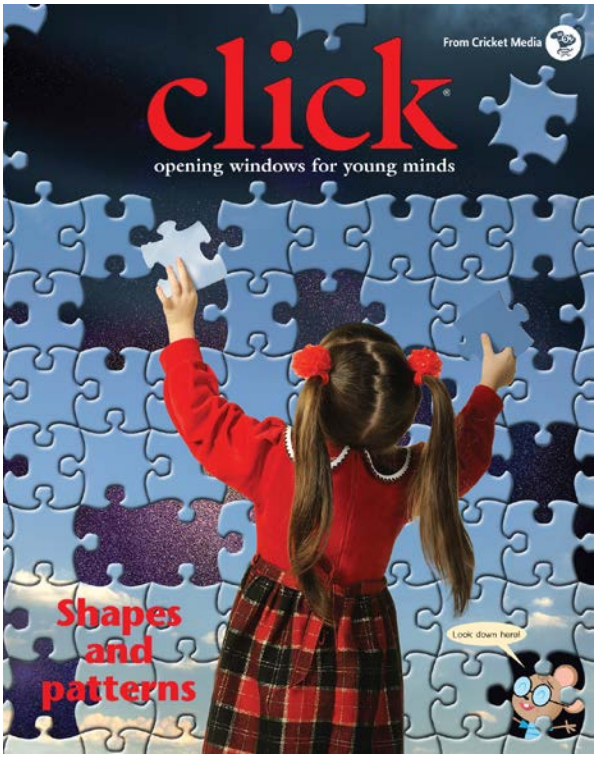
Shapes and patterns organize and enhance our surroundings. This issue of CLICK explores many different types of patterns and teaches young readers the geometric names for various shapes. Delve into this publication and encourage students to become more aware and better informed about the world in which we live.

CONVERSATION QUESTION

Why are patterns and shapes an important part of our world?

TEACHING OBJECTIVES

- **Students will learn how different types of symmetry are created.**
- **Students will learn about special patterns called tessellations.**
- **Students will learn the basic geometry of polygons.**
- **Students will compare and contrast two different forms of symmetry.**
- **Students will identify and record tessellations in their surroundings.**
- **Students will obtain and record information stated in the text.**
- **Students will discover and define a third type of symmetry (translational).**
- **Students will explore the use of tessellations in engineering, design, and nature.**
- **Students will research the root words contained in mathematical terms.**



In addition to supplemental materials focused on core STEM skills, this flexible teaching tool offers vocabulary-building activities, questions for discussion, and cross-curricular activities.

SELECTIONS

- **Seeing Symmetry**

Expository Nonfiction, ~450L

- **Tessellations**

Expository Nonfiction, ~850L

- **Polly Shapes**

Graphic Nonfiction, ~350L

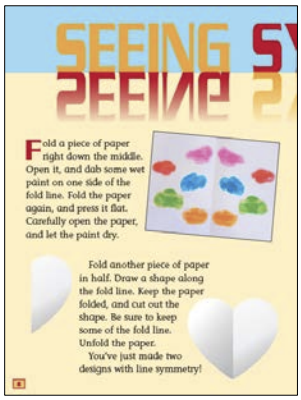
Click® Teacher Guide: September 2018

Seeing Symmetry

pp. 8–12, Expository Nonfiction

This article brings young readers on a journey into the world of symmetry. Simple text and refined photographs present two different forms of symmetry (line/rotational) with clarity and excitement.

Lexile Score: ~450



RESOURCES

- Spectacular Symmetry

OBJECTIVES

- Students will learn how different types of symmetry are created.
- Students will compare and contrast two different forms of symmetry.
- Students will discover and define a third type of symmetry (translational).

KEY VOCABULARY

- ***mirror image*** **(p. 9)** an object that is identical in form to another, but with the structure reversed
- ***reflection*** **(p. 9)** the return of light from a surface
- ***rotational*** **(p. 11)** relating to a circular movement about a center

ENGAGE

Conversation Question: Why are patterns and shapes an important part of our world?

Read aloud the definition of symmetry as explained in the first paragraph on page 9 of this article. Invite the children to look around the classroom and name objects they think have symmetry. Post responses on the board and read the article. Correct/amend the list upon conclusion of this lesson.

INTRODUCE VOCABULARY

Divide the class into groups of three. Assign each child in the group one of the three key vocabulary terms. Instruct them to locate and record a working definition of the word. They will each be responsible for teaching their word to the others in the group. Upon completion, students should have accurate definitions for all three words recorded in their notebooks.

READ & DISCUSS

Have the students remain with their partners from the vocabulary activity and read the article aloud within their group. Reconvene the class and use the following questions to ensure a comprehensive understanding of the article.

- How can you tell if a shape or design has symmetry?
- What is the difference between line symmetry and rotational symmetry?
- Do all objects have symmetry? Why or why not?

CONCEPT/SKILL FOCUS: Compare and Contrast

INSTRUCT: Review the concepts of line symmetry and rotational symmetry as defined the article. Inform students that they will be using the Venn diagram, *Spectacular Symmetry*, to compare and contrast objects with the different types of symmetry. Allow students to work in pairs to complete the graphic organizer and encourage conversation on the topic as they work. Circulate and provide clarification if necessary.

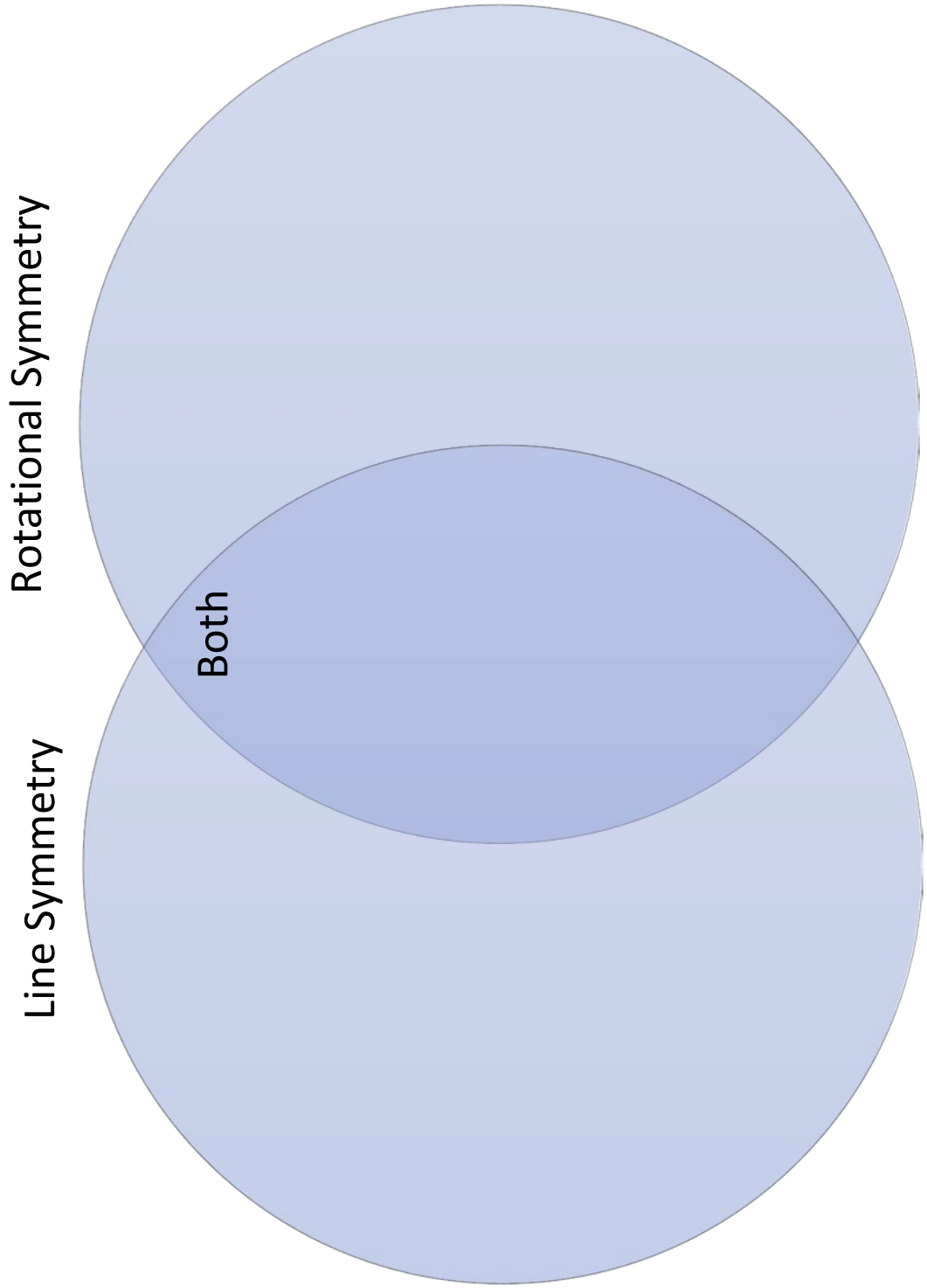
ASSESS: Evaluate the students' complete Venn diagrams. The brief written summary at the bottom of the page will identify any children in need of remediation regarding the concept of symmetry.

EXTEND

Mathematics "Seeing Symmetry" introduces the students to two types (line, rotational) of symmetry. Challenge the students to explore this branch of geometry further and discover the other main type of symmetry (translational). Assign them the task of defining this term in words and providing graphic examples.

Name _____

Spectacular Symmetry



Click® Teacher Guide: September 2018

Tessellations

pp. 13–15, Expository Nonfiction

Patterns are an important, and often beautiful, part of our world. This article introduces students to special repeating patterns (tessellations) and invites them to discover where they can be found in the world around them.

Lexile Score: ~850

RESOURCES

- Tessellation Quest

OBJECTIVES

- Students will learn about special patterns called tessellations.
- Students will identify and record tessellations in their surroundings.
- Students will explore the use of tessellations in engineering, design, and nature.

KEY VOCABULARY

- ***arranged* (p. 13)** put into a neat, attractive, or required order
- ***gaps* (p. 13)** breaks or spaces between two objects
- ***repeating* (p. 13)** recurring uniformly over a surface

ENGAGE

Conversation Question: Why are patterns and shapes an important part of our world?

Gather the class and tell them that they will be learning about special types of patterns. Depending on the level of your class, show some visual representations of basic patterns (AB, ABB, etc.) that they may be familiar with. Next, show them some examples of tessellations and ask questions that will guide them to notice similarities and differences between typical patterns and tessellations. Refer back to this discussion as your read. (Tip: Most children LOVE big words—tell them that *tessellation* will be the bonus word on this week's spelling test!)

INTRODUCE VOCABULARY

List key vocabulary terms on the board and have students use resources to define them accurately. Next, challenge the class to list synonyms and antonyms for each word. Share the word work aloud.

READ & DISCUSS

Reinforce the main concepts in this article by requiring the students to write complete answers to the questions below. Review and discuss the responses to ensure the children have clarity before proceeding to the following activities.

- What is a pattern?
- What is a tessellation?
- How can tessellations be created using different methods?

CONCEPT/SKILL FOCUS: Identify and Record

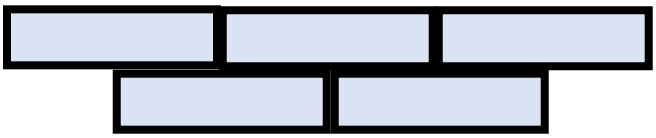
INSTRUCT: Review the definition of *tessellation* from the article. Arrange for the class to go on a search (school, playground, etc.) for tessellations. Distribute the graphic organizer, *Tessellation Quest*, and instruct students to record their findings. Allow the class to share their work upon completion. Encourage them to teach the word *tessellation* to someone at home and take another *Tessellation Quest* for HW.

ASSESS: Engage the class in discussion during the quest and provide clarification if necessary. Collect student worksheets to further evaluate understanding.

EXTEND

History Throughout history, humans have used tessellations in architecture and design. Additionally, we can find tessellations in nature. Have students work in groups to find examples of tessellations in each of these categories (architecture, engineering, nature). Assign them the task of finding graphic examples (computer printed or drawn) to share and discuss with their classmates. As a challenge, have them create their own tessellations. Bind finished work into a class book for your science center.

Tessellation Quest

Where did you see it?	Draw/Describe tessellation
Bathroom wall tiles	

Click® Teacher Guide: September 2018

Polly Shapes

pp. 16–21, Graphic Nonfiction

Go on an adventure with Polly as she learns how to use special names to categorize shapes. This article is presented in a child-friendly format and provides a strong introduction into the mathematical discipline of geometry.

Lexile Score: ~350

RESOURCES

- Perfectly Particular Polygons

OBJECTIVES

- Students will learn the basic geometry of polygons.
- Students will obtain and record information stated in the text.
- Students will research the root words contained in mathematical terms.

KEY VOCABULARY

- ***parallelogram* (p. 19)** a four-sided flat shape with straight sides and parallel opposite sides
- ***polygon* (p. 16)** a two-dimensional shape with closed, straight sides
- ***quadrilateral* (p. 17)** a four-sided polygon
- ***rhombus* (p. 20)** a parallelogram with four equal sides
- ***trapezoid* (p. 19)** a quadrilateral with only one pair of parallel sides

ENGAGE

Conversation Question: Why are patterns and shapes an important part of our world?

Distribute the article "Polly Shapes" and instruct students to explore the text and graphics to activate prior knowledge. Listen to predictions regarding the content of the text. Confirm that they will be learning about special shapes and introduce the term, "geometry."

INTRODUCE VOCABULARY

List the key vocabulary terms on the board with the heading, "Polygons." Tell the class that all of the other words belong under this category title. Draw visual representations of the other words and elicit definitions from the class. Assist them with accuracy if necessary. Draw attention to the words as they are disclosed in the text and encourage students to add other shape definitions that are revealed as they read.

READ & DISCUSS

Reinforce comprehension of the concept in this article by utilizing the following prompts to direct discussion.

- What must a shape have in order to be classified as a polygon?
- How do polygons get named?
- What are parallel lines?
- List some shapes that are NOT polygons and give reasons.

CONCEPT/SKILL FOCUS: Obtaining Information

INSTRUCT: Although "Polly Shapes" is written in a graphic format, guide the class to acknowledge the fact that there is a large amount of data contained in the text. Instruct the students to use the chart provided (*Perfectly Particular Polygons*) to record the important information. Emphasize that complete and accurate drawings and details are necessary when completing their organizers.

ASSESS: Circulate and have mini-conversations with the students as they are working on their graphic organizer. Collect their charts to further evaluate individual understanding.

EXTEND

Language Arts Review the concept of breaking words into different parts to arrive at their meanings. Provide some basic examples. Post the word *polygon* on the board, demonstrating that poly=many and gon=angles. *Polygon*, therefore, can be defined as a shape with many angles. (Be sure they clearly understand what a "side" and an "angle" are in geometry.) Instruct the students to select other mathematical terms from the article to deconstruct and define accurately. Challenge the class to notice a correlation between the number of sides and the number of angles in the polygons.

Perfectly Particular Polygons

Draw the polygon listed in the space provided and list specific details that define that shape.

Polygon	Characteristics
square 	• **Closed figure with four straight sides** • **Opposite sides parallel** • **All sides equal in length** • **4 (right) angles**
rectangle	
triangle	
pentagon	
hexagon	
trapezoid	
rhombus	

Why are some shapes (circle, oval) NOT polygons?