

Recognizing and describing patterns

GRADE LEVEL K - 3rd

SUBJECTS Patterns

DURATION Prep time: 10 minutes; Activity time: 50 minutes

SETTING Classroom; outdoor environment (schoolyard or park)

OBJECTIVES

In this lesson, students will:

1. gain experience recognizing patterns in an outdoor environment; and
2. describe a pattern in multiple ways.

MATERIALS

- "Recognizing and describing patterns" worksheet (1 per student)
- Pencil (1 per student)
- Clip boards (1 per student)
- Colored pencils, markers, or crayons

VOCABULARY

- » **Pattern:** any natural or manmade form or event that exists or occurs in a repeating and predictable way

BACKGROUND FOR EDUCATORS

Patterns are all around us. Humans are inherently skilled at recognizing patterns from our observations of the world. Patterns can be found in the phases of the moon, in the symmetry of tree rings, or in the footprints of an animal's tracks (see A Framework for K-12 Education, 2011). Patterns are an important tool that can help us organize our observations and make predictions about why or how things are as we observe them.

Patterns are also identified as one of the seven Crosscutting Concepts of the Next Generation Science Standards. Crosscutting concepts are valuable because they are tools students can use to connect their thinking across different content areas in science and engineering. Patterns also are

defined as a key concept across the spheres of art education, appearing in California's Visual and Performing Arts Content Standards in the contexts of visual arts, dance, and music. Whether patterns are encountered in art, science, math, history, or everyday life, we can approach them with a few consistent processes.

In this activity, students will practice their ability to **recognize** and **describe** patterns that they discover in an outdoor environment, and will use their observations to describe a pattern in different ways.

TEACHER PREP

1. Select a familiar outdoor environment that is close to your classroom. This can be the schoolyard or a nearby park.
2. Make copies of the "Recognizing and describing patterns" worksheet (1 per student).
3. Gather materials (see Materials list).

INTRODUCTION

1. Begin by introducing your students to the concept of patterns. There are many ways to do this. You can do the Patterns Card Sort activity as an introduction, or you can show your students different pictures of patterns in the natural or designed world or look around the classroom and ask if they recognize patterns. You also can read a story and ask if your students can find any patterns in the book's words or pictures. Be sure to ask students to explain their reasoning and to provide evidence for why they think something is a pattern.
2. Next tell students that they will be searching for patterns outside. Before departing the classroom, be sure to:
 - assign students to groups of two or three (students can work in the same pairs as in the Patterns Card Sort



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- activity);
- gather all materials; and
- set clear expectations for appropriate behavior while outside of the classroom.

PROCEDURE

- Travel to the outdoor destination you have selected for students to look for patterns. Once you have arrived, gather the students in a circle.
- Explain to your students that they will be exploring the outdoor environment and looking for patterns. Encourage them to think creatively and, using all of their senses, to look for patterns that might not be obvious. For instance, patterns might be found in the movement of people walking through the outdoor space, the repeating sound of a bird singing, or the texture on the wings of a beetle.
- Remind students that patterns can be found in natural or manmade structures and events, and that they occur in repeating and predictable ways. If you did the Patterns Card Sort activity, revisit the definition of patterns that your class developed.
- Tell students to team up in their groups and let them know that will have 15 minutes to freely explore the outdoor area. During this time, the team should try to find as many patterns as possible. They should record a list of the patterns they found (part 1 on their worksheets).
- After 15 minutes, gather everyone back in a circle. Have a few students talk about the patterns that their teams found.
- Have each student select one of the patterns that their team found during their exploration. Tell them to describe this pattern by using three different methods (part 2 on their worksheets). They should circle the three different ways they are describing that pattern and to record their descriptions in boxes 1, 2, and 3 on their worksheet.
- Explain the different methods that students can use to describe their pattern:
 - Color: use colored pencils or markers to show the different colors in your pattern.
 - Group: break your pattern down into its different parts. Group similar parts together.

- Poem: use a rhyme to describe your pattern with words.
 - Detail: zoom in on a single part of your pattern and make a detailed drawing of it.
 - Outline: use lines to create the shape of your pattern.
 - Words: use as many descriptive words as you can think of to portray your pattern.
- Give students 20 to 30 minutes to describe the pattern they selected in three different ways.
 - Tell students that they will be sharing their descriptions when they return to the classroom. Gather everyone up and return to the classroom.
 - Once you have returned to the classroom, have students display their work in worksheet boxes 1, 2, and 3 on their desks.
 - Give students 10 minutes to do a gallery walk and explore one another's work. During this gallery walk, students should try to identify the different methods each student used to describe a pattern.
 - Have students gather their worksheets and find their seats.

WRAP UP

Hold a classroom discussion about the process of recognizing and describing patterns. You might want to ask some of the following questions:

- » What types of patterns did you see when your team was exploring outside?
- » Did you see more manmade patterns or more natural patterns while you were outside?
- » During the gallery walk, did you find that you had described the same pattern as someone else? Did you describe it in the same way? How were your descriptions of the same pattern similar or different from one another?
- » What other ways can you think of to describe a pattern?

REFERENCES

Achieve, Inc. Next generation science standards, 2013. <http://www.nextgenscience.org/next-generation-science-standards>

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Achieve, Inc. Appendix G. Crosscutting concepts, Next generation science standards. 2013. [http://www.nextgenscience.org/sites/ngss/files/Appendix G - Crosscutting Concepts FINAL edited 4.10.13.pdf](http://www.nextgenscience.org/sites/ngss/files/Appendix%20G%20-%20Crosscutting%20Concepts%20FINAL%20edited%204.10.13.pdf)

National Research Council. A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. Washington, DC: The National Academies Press, 2012.



Fine Arts
Museums of
San Francisco
de Young
Legion of Honor



CALIFORNIA
ACADEMY OF
SCIENCES

Patterns in Art and Science

The *Framework for K-12 Science Education* identifies **patterns** as one of the seven cross-cutting concepts of the Next Generation Science Standards. These concepts are described as bridging disciplinary boundaries and holding value across all the sciences as well as in engineering. Meanwhile, **patterns** are also a key concept across the spheres of art education, appearing in California's *Visual and Performing Arts Content Standards* in the contexts of visual arts, dance, and music.

Whether patterns are encountered in art, science, math, history, or everyday life, we can approach them with a few consistent processes. These steps can help students understand and give meaning to patterns of any kind.

recognize	students can: <ul style="list-style-type: none">• recognize simple patterns found in the environment and works of art;• identify patterns in the natural and designed worlds
describe	students can: <ul style="list-style-type: none">• describe repeated patterns in nature, in the environment, and in works of art;• use observations to describe patterns
interpret	students can: <ul style="list-style-type: none">• interpret rhythm and movement in works of art and the environment;• use similarities and differences in patterns to sort, classify, and analyze natural phenomena
predict	students can: <ul style="list-style-type: none">• formulate questions and predict reasonable outcomes based on patterns

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STANDARDS ADDRESSED

Next Generation Science Standards

Crosscutting Concepts:

Patterns

Common Core State Standards

Reading Standards for Foundational Skills

Kindergarten

2.a Recognize and produce rhyming words.

Speaking and Listening Standards

Kindergarten, Grades 1, 2, and 3

1. Participate in collaborative conversations with diverse partners about kindergarten / grade 1 / grade 2 / grade 3 topics and texts with peers and adults in small and larger groups.

Visual and Performing Arts Content Standards Kindergarten

Creating

Cr1.2Ka. Engage collaboratively in creative art making in response to an artistic problem.

Cr2.3Ka. Create art that represents natural and constructed environments.

Grade 1

Creating

Cr1.2.1a. Use observation and investigation in preparation for making a work of art.

Grade 2

Creating

Cr1.1.1a. Brainstorm collaboratively multiple approaches to an art or design problem.

Cr3.1.2a. Discuss and reflect with peers about choices made in creating artwork.

Responding

Re7.1.2a. Perceive and describe aesthetic characteristics of one's natural world and constructed environments.

Grade 3

Cr 2.3.3a Individually or collaboratively construct representations, diagrams, or maps of places that are part of everyday life.

Cn 10.1.3a Develop a work of art based on observations of surroundings.



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PATTERNS

1 Find as many patterns as you can! Record the patterns you find in the space below.

2 Pick 1 pattern you found. Circle 3 ways you will describe this pattern.

COLOR GROUP POEM

DETAIL OUTLINE WORDS

Name _____
Date _____

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PATTERNS

1	2	3

Name _____

Date _____