

Pattern or not?

GRADE LEVEL K - 3rd
SUBJECTS Patterns
DURATION Prep time: 20 minutes; Activity time: 45 minutes
SETTING Classroom

OBJECTIVES

- After this activity, students will be able to:
1. think critically about the concept of patterns;
 2. identify features that characterize a pattern; and
 3. recognize patterns based on a shared definition.

MATERIALS

- "Pattern or Not" cards (1 set per pair of students)

BACKGROUND FOR EDUCATORS

The framework for K-12 science education identifies patterns as one of the seven crosscutting 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 also are a key concept across multiple spheres of arts education, identified in California's Visual and Performing Arts Content Standards in the contexts of visual arts, dance, and music.

Before a pattern can be described, interpreted, or used to make predictions, it must first be recognized. Humans are remarkably good at recognizing patterns. In fact, we sometimes identify patterns where they don't actually exist. This raises the question of what we are actually looking for when we seek patterns. What characteristics make something a pattern? Many of us have difficulty articulating a definition for the concept of a pattern; like art, we know it when we see it.

The goals of this activity are to explore the concept of patterns, to think critically about how to recognize them, and to generate

a shared definition of what a pattern is. Students will sort cards into two categories: cards that show patterns and cards that do not. This activity is followed by a discussion about how they recognized the patterns and what characteristics might be used to define patterns.

Some of the images in the cards tend to fall clearly into one category or the other, while others are less clear and may be sorted by some students one way and by other students another way. The disagreements resulting from this ambiguity are sometimes more interesting than what is learned from cards that were easier to sort, leading to rich discussion about what characteristics are most important in identifying patterns. Use this discussion to generate a list of characteristics and try to craft a class definition, which can be referred to during later activities involving patterns. Repetition and predictability are concepts that students often bring up in this discussion, and a definition incorporating these concepts will be valuable in identifying and interpreting patterns.

TEACHER PREP

Print and cut out the "Pattern or Not" cards, preparing one set per pair of students.

INTRODUCTION

Tell students that they will be talking about patterns today. Ask them to look around the room and point out any examples of patterns that they see. Tell students that patterns are everywhere, and they are important in art, science, math, and other subjects. No matter what subject you are studying, before you can use or learn from a pattern, you must first be able to recognize the pattern. Our goal today is to figure out

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what to look for when we are trying to recognize patterns.

PROCEDURE

1. Have participants work in pairs. Give each pair a set of "Pattern or Not" cards.
2. Instruct the participants to sort the cards into two categories: cards that show patterns and cards that do not show patterns. Give them time to sort, and encourage them to talk about their reasons for each sorting decision. We have found that students tend to do this sort very rapidly. Reminding them to slow down and articulate the reasons for their choices will help lead to deeper thinking.
3. If time allows, have each pair team up with another pair to form a group of four. Tell students to compare the ways that they sorted the cards. Did both pairs sort the cards in the same way? If there are differences, have them explain to each other the reasoning behind their sorting decisions. Allow some time for these discussions to happen in small groups.
4. Have students stick their images to the whiteboard or poster paper at the front of the room, collecting all of the "pattern" images in one area and all of the "not a pattern" images in another area. This is a useful visual reference during the discussion to see how different groups sorted their images. Have students remain silent during the process of posting the cards, and give them a moment to observe the results quietly before beginning to talk about them.
5. Next, have a discussion with the whole class.
 - Start by asking students what it was like to sort the cards. Was it easy? Difficult? What were some questions or challenges that they had during the sort?
 - Next, focus on the images that most groups agreed on, and ask students to explain why they thought the images were or were not patterns.
 - Then move on to images that groups disagreed on and have students share their reasoning.
6. Now ask the class how they might define the word pattern. Have the class brainstorm about characteristics that they might use to identify patterns. Ask them to cite examples from their sorting experience to explain the characteristics

that they suggest. Generate a list of ideas on the board that will contribute to the definition.

7. Try to reach a class consensus about which characteristics are most important. What features are absolutely necessary in order for something to be considered a pattern? Separate those from characteristics that show up in some, but not all, patterns.
8. Finally, use these characteristics to write a definition of the word pattern. You might do this as a class, or have participants individually write definitions based on the discussion.

PHOTO CREDITS

Tree rings: Armoldius/Wikimedia Commons

Tree burl: chuckyoufarlie3

Nautilus shell: Chris 73/Wikimedia Commons

Sky: RGPhotography/Wikimedia Commons

Christmas tree farm: Public domain

Legos: Benjamin Esham



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

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Engaging in Argument from Evidence K-2: Listen actively to arguments to indicate agreement or disagreement based on evidence, and/or to retell the main points of the argument.	This activity does not address any Disciplinary Core Ideas.	Patterns K-2: Patterns in the natural and human world can be observed, used to describe phenomena, and used as evidence.

Visual Art Standards

Kindergarten

Responding

Re8.1.Ka: Interpret art by identifying subject matter and describing relevant details.

Grade 1

Re.7.2.1a: Compare images that represent the same subject.

Grade 2

Re.7.1.2a: Perceive and describe aesthetic characteristics of one's natural world and constructed environments.







