

Mignone Halls of Gems and Minerals



GRADES 3–5 Activity Sequence

Natural Phenomenon: Minerals can have different colors, shapes, and sizes

Minerals are Earth's natural showpieces. Their crystal patterns give them remarkable shapes and properties. Some glitter and shine, some glow, some let light and images pass through them, and some sparkle with all the colors of the rainbow. No wonder humans have prized them for their beauty for thousands of years!

OVERVIEW: In this activity sequence, students will investigate the seemingly endless colors, shapes, and sizes of mineral crystals, learn why minerals are so amazingly diverse, and learn and explore the characteristics that scientists use to classify minerals.

- 1. Before the Visit:** Through a photo slideshow, students explore minerals and their colors, shapes, and sizes. Students generate questions in response to the slideshows; they will revisit their questions after the trip.
- 2. At the Museum:** At highlighted locations in the hall, students use worksheets first to examine basic information about rocks, minerals, and crystals, and then to explore their assigned mineral's colors, shapes, and sizes.
- 3. Back in the Classroom:** Students process and share what they've learned at the Museum, discuss how to group, classify, and identify minerals, and create posters about the diversity of minerals.

Correlation to Standards

This activity supports the following Next Generation Science Standards.

Performance Expectations

- **5-PS1-3: Matter and its Interactions**
Make observations and measurements to identify materials based on their properties.

Disciplinary Core Ideas

- **PS1.A: Structure and Properties of Matter**
Measurements of a variety of properties can be used to identify materials.

Crosscutting Concepts

- **Scale, Proportion, and Quantity**
Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

Science & Engineering Practices

- **Planning and Carrying Out Investigations**
Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.

Before the Visit

Through a photo slideshow, students explore minerals and their colors, shapes, and sizes. Students generate questions in response to the slideshow; they will revisit their questions after the trip.

TIME One class period

PREPARATION Teacher:

- Review the Educator’s Guide to get an advance look at the major themes of the hall and what students will encounter.
 - Review this three-part (pre/during/post) activity sequence and decide how students will engage with the content before, during, and after the visit. This sequence uses a jigsaw strategy, in which students are divided into groups of five.
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- PROCEDURE**
- 1. Students are introduced to the featured phenomenon**—that minerals have different colors, shapes, and sizes—by exploring a two-part photo slideshow (download it at amnh.org/gems-minerals-educators). This engagement activity uses the Visual Thinking Strategy (VTS) to help students practice observation, thinking, listening, and communication skills. The slideshow contains two parts:
 - **Part 1** explores three different specimens to help students understand that minerals come in different colors and shapes. The specimens progress from a single crystal (beryl), to a mineral with multiple crystals (azurite), and finally, a specimen that contains two different minerals (fluorite and sphalerite).
 - **Part 2** explores three specimens of the same mineral (tourmaline) to help students understand that (1) there is a diversity of color even within one mineral family and (2) crystal shape is a characteristic used to help group and classify minerals.

Notes for educators are included in the speaker notes section of the slideshow.

- 2. Students generate questions about minerals and their colors, shapes, and sizes.** Questions can be recorded on a class or group chart so that students can revisit the questions after their trip to the Museum. Suggested prompts are included in the photo slideshow as the concluding slides of Part 1 and Part 2.
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- 3. Teacher prepares students for the Museum visit.** (See next page.)
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At the Museum

At highlighted locations in the hall, students use worksheets first to examine basic information about rocks, minerals, and crystals, and then to explore their assigned mineral's colors, shapes, and sizes.

TIME 45 to 60 minutes

PREPARATION Teacher:

- Become familiarized with the student worksheets, the answer key, the notes to educator, and the map of the hall.
- Organize groups of five students per group.
- Assign worksheets to students within each group:
 - Worksheet A: Distribute to all students.
 - Worksheets B1 to B5: Distribute one sheet per student in each group.
- Distribute the worksheets and map to students. Review them with students.

PROCEDURE 1. **All students examine basics about rocks, minerals, and crystals** (Worksheet A). They will first visit the “Mineral Basics” section, then the “Crystal Basics” section.

2. **Each student investigates their assigned mineral** (Worksheets B1 to B5):

- Observe multiple specimens of the same mineral.
- Compare similarities and differences in the colors, shapes, and sizes of the specimens.
- Identify repeating shapes that might be clues to minerals' crystal patterns.
- Visit the Hall of Gems either to find a specimen of their mineral that has been cut and polished into a gem (Worksheets B1-4) or to learn about how gems are made (Worksheet B5).

If there is time, students can also:

- Watch a video about how minerals like theirs form.
- Use the periodic table interactive to make their own minerals.

Back in the Classroom

Students process and share what they've learned at the Museum, discuss how to group and identify minerals, and create posters about the diversity of minerals.

TIME One class period

PREPARATION Teacher:

- Review the answer key to worksheets.
- Plan how students will surface, analyze and interpret, and share information gathered at the Museum.

PROCEDURE 1. **Students gather with students from other groups who investigated the same mineral.** They share the information they collected on their worksheets to compare and discuss findings about that one mineral. Each student consolidates findings on a chart to bring back to their own group. Sample chart:

Mineral	Colors	Shapes	Sizes	Crystal Structure (3-D Shape)
Quartz				

2. **Students go back to their group to share findings about all minerals.** Students synthesize information on a five-column chart (column titles: mineral, colors, shapes, sizes, crystal structure). Sample chart:

	Characteristics			
Mineral	Colors	Shapes	Sizes	Crystal Structure (3-D Shape)
Quartz				
Beryl				
Garnet				
Fluorite				
Azurite				

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3. **Students analyze the observed characteristics in the chart.** Suggested prompts:
- Compare the minerals. How are their characteristics similar or different?

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4. **Students discuss how to classify minerals.** Prompts:
- What are different ways that you can group these minerals?
(Students can come up with as many groups as they'd like.)
 - Which characteristic would you use to group minerals? Why?

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5. **Students discuss how to identify minerals.** Prompts:
- Which characteristic would you use to tell the difference between minerals?
Why?

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6. **Students revisit the list of questions** they generated before their Museum trip to see which questions have been answered and which unanswered ones they would like to investigate further.

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7. **Each group creates a poster about the diversity of minerals.** The posters can be displayed around the classroom, and students can do a gallery walk around the room.

**ADDITIONAL
RESOURCES**

- [Reading: What Makes a Mineral?](https://www.amnh.org/gems-minerals-educators) (amnh.org/gems-minerals-educators)
Students can read about mineral properties and how they help geologists figure out which minerals are which.
- [Grow Rock Candy](https://www.amnh.org/explore/ology/earth/grow-rock-candy2) (amnh.org/explore/ology/earth/grow-rock-candy2)
With a little patience and a few household ingredients (and an adult to supervise), students can grow their own sugar crystals. Sweet!
- [Amazing Mundo](https://www.amnh.org/explore/ology/earth/the-amazing-mundo) (amnh.org/explore/ology/earth/the-amazing-mundo)
Students can take a quiz to find out about everyday objects that come from rocks and minerals.
- [All About Jade](https://www.amnh.org/explore/ology/earth/all-about-jade) (amnh.org/explore/ology/earth/all-about-jade)
Students can explore a virtual scrapbook about jade to discover why people all over the world love this tough and beautiful rock.
- [Start a Rock Collection](https://www.amnh.org/explore/ology/earth/start-a-rock-collection2) (amnh.org/explore/ology/earth/start-a-rock-collection2)
Students can collect, observe, sort, and display their own collections of rocks.