

# Science & Literacy Activity

**GRADES K-2**

## OVERVIEW

This activity, which is aligned to the Common Core State Standards (CCSS) for English Language Arts, introduces students to scientific knowledge and language related to minerals. Students will read content-rich texts, visit the Harry Frank Guggenheim Hall of Minerals, and use what they have learned to complete a CCSS-aligned writing task, creating an illustrated text about minerals.

### Materials in this packet include:

- Teacher instructions for:
  - Pre-visit student reading
  - Visit to the Guggenheim Hall of Minerals and student worksheet
  - Post-visit writing task
- Text for student reading: “Making Sense of Minerals”
- A sample T chart for the post-reading discussion
- Student Worksheet for the Guggenheim Hall of Minerals visit
- Student Writing Guidelines
- Teacher rubric for writing assessment

### Common Core State Standards:

W.K-2.2, W.K-2.8  
RI.K-2.1, RI.K-2.2, RI.K-2.4, RI.K-2.7, RI.K-2.10

### New York State Science Core Curriculum:

PS 3.1b

### Next Generation Science Standards:

PE 2-PS1-1

DCI PS1.A: Structure and Properties of Matter

Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties.

### SUPPORTS FOR DIVERSE LEARNERS: An Overview

This resource has been designed to engage all learners with the principles of Universal Design for Learning in mind. It represents information in multiple ways and offers multiple ways for your students to engage with content as they read about, discuss, view, and write about scientific concepts. Different parts of the experience (e.g. reading texts, or locating information in the exhibit) may challenge individual students. However, the arc of learning is designed to offer varied opportunities to learn. We suggest that all learners experience each activity, even if challenging. We have provided ways to adapt each step of the activities for students with different skill-levels. If any students have an Individualized Education Program (IEP), consult it for additional accommodations or modifications.

## 1. BEFORE YOUR VISIT

This part of the activity engages students in reading a non-fiction text about the properties of minerals. The reading will prepare students for their visit by introducing them to the topic and framing their investigation.

### Student Reading

Have students read “Making Sense of Minerals.” Have them write notes in the large right-hand margin. For example, they could underline key passages, paraphrase important information, or write down questions that they have. They may also use this space for drawings of minerals that are described in the reading.

As a class, create a T-chart to compare the properties of two minerals from the reading. Ask students for help in listing the properties of two minerals, such as quartz and talc. After the T-chart is complete, discuss the information that the class has collected. Ask students to list the properties of minerals that they will record as they explore the Guggenheim Hall of Minerals. (*Answers will include color, size, shape, and texture.*)

### SUPPORTS FOR DIVERSE LEARNERS: Student Reading

- “Chunking” the reading can help keep them from becoming overwhelmed by the length of the text. Present them with only a few sentences or a single paragraph to read and discuss before moving on to the next “chunk.”
- Provide “wait-time” for students after you ask a question. This will allow time for students to search for textual evidence or to more clearly formulate their thinking before they speak.

## 2. DURING YOUR VISIT

This part of the activity engages students in exploring the hall.

### Museum Visit and Student Worksheet

Explain to students that they will be observing mineral specimens and using worksheets to gather all the necessary information about these minerals. Back in the classroom they will refer to these notes when completing the writing assignment. Teachers or chaperones should help students find minerals, including large mineral specimens that are easy to see and touch. Ask students to describe their minerals out loud first, and then help them record their observations on the worksheet.

### SUPPORTS FOR DIVERSE LEARNERS: Museum Visit

- Review the Student Worksheet with students, clarifying what information they should collect during the visit.
- Have students view the hall in pairs, with each student completing their own Student Worksheet.
- Encourage student pairs to ask you or their peers for help locating sources of information. Tell students they may not share answers with other pairs, but they may point each other to places in the hall where answers may be found.
- For those who may have trouble taking notes in the hall, teachers and chaperones may use the included worksheets to transcribe students' observations. Teachers and chaperones may also take photos for students to refer to back in the classroom.

## 3. BACK IN THE CLASSROOM

This part of the activity is to engage students in an informational writing task that draws on the pre-visit reading and on observations made at the Museum.

### Writing Task

Distribute the Student Writing Guidelines handout, which includes the following prompt for the writing task:

Based on the article "Making Sense of Minerals," your visit to the Guggenheim Hall of Minerals, and your discussions, write an essay in which you:

- Explain what a mineral is.
- Describe at least one mineral using information like color, size, and shape.
- Include a labeled drawing of your mineral that gives the name of the mineral.

Support your discussion with evidence from your reading and the Guggenheim Hall of Minerals.

Go over the handout with students. Tell them that they will use it while writing, and afterwards, to evaluate and revise their essays.

Before they begin to write, have students use the prompt and guidelines to frame a discussion around the information that they gathered in the Guggenheim Hall of Minerals and compare their findings. They can work in pairs, small groups, or as a class. Referring to the writing prompt, have students underline or highlight all relevant passages and information from the reading, the T-chart exercise, and their notes from the hall that can be used in their response to the prompt. Instruct each student to take notes on useful information that their peers gathered as they compare findings. Students should write their essays individually.

### SUPPORTS FOR DIVERSE LEARNERS: Writing Task

- Re-read the "Before Your Visit" assignment with students. Ask what they saw in the hall that helps them understand minerals.
- Allow time for students to read their essay drafts to a peer and receive feedback based on the Student Writing Guidelines.

## Sample T-Chart

<b>quartz</b>	<b>talc</b>
<b>hard</b>	<b>soft</b>
<b>white, gray, black, purple</b>	<b>white or green</b>
<b>long crystals</b>	<b>small crystals</b>

## Student Reading:

# Making Sense of Minerals

How can you tell it's going to rain before the first drop falls? Maybe the sky turns gray. Or you hear the rumble of far-off thunder. Sometimes the air feels damp. The air might even smell a little different. You are using your senses to learn about the world around you. You use your eyes for vision, ears for hearing, nose for smelling, and skin for feeling – and don't forget your tongue for tasting!

Scientists use their senses to learn about the world, too. They use their senses to make observations, like a scientist watching a hawk or listening to its calls. Then scientists write down their observations to remember and share with others.

Scientists use their senses to learn about all kinds of things – from living things like animals to nonliving things like minerals. Let's find out more about minerals and how scientists observe them.

Have you ever seen a rock with lots of tiny specks? Those specks are different kinds of minerals. Minerals are the tiny pieces that make up rock. And have you ever noticed that rocks have lots of different colors and textures? That's because they're made of different minerals.



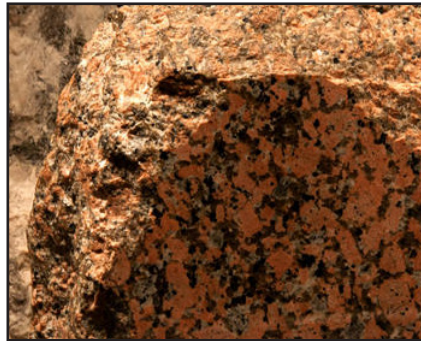
© AMNH

barite

All minerals form in repeating shapes called crystals. Most minerals are small crystals inside of rocks. Sometimes a mineral is found by itself as a large crystal.



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The quartz crystals inside this rock are so small it's hard to see the shape. But sometimes quartz is found as large crystals.

There are many kinds of minerals. How do scientists tell minerals apart? Just like birds have different traits, like their shape, size, and color, minerals have different properties. Some properties that describe a mineral are color, hardness, and shape – or how it feels. Scientists use their senses and other tools to describe these properties.

Take a closer look at three minerals. What properties can you learn about each one?

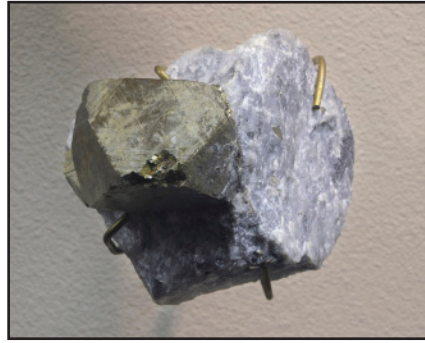
**Quartz** is a hard mineral. It is hard enough to scratch glass! Quartz crystals are often long and thin. Some have sharp points. Most quartz crystals are clear like glass or white and cloudy. They also come in different colors. They can be light pink, dark purple, and even black.



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quartz

**Pyrite** is a shiny, gold-colored mineral. It looks so much like gold, people have called it "fool's gold." Pyrite crystals are shaped like little boxes. This mineral is very heavy. It is also hard, but not as hard as quartz.



© AMNH

pyrite

**Talc** is a very soft mineral. It's so soft, you could leave a scratch on a piece of talc with your fingernail. Talc crystals are usually too small to see. Together, these tiny crystals form chunks that can be white to green, and not very shiny.



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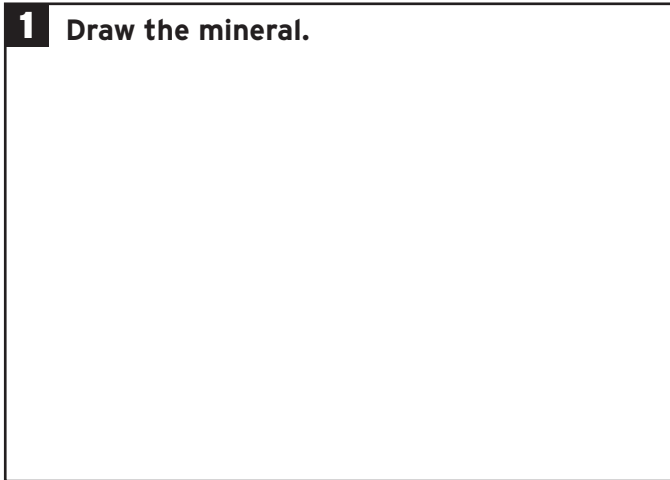
talc

# Student Worksheet: Guggenheim Hall of Minerals

Name: \_\_\_\_\_

Today you will see many minerals at the American Museum of Natural History. Pick three minerals to observe. Record your observations below.

**1** Draw the mineral.



Name of Mineral: \_\_\_\_\_

Describe this mineral specimen:

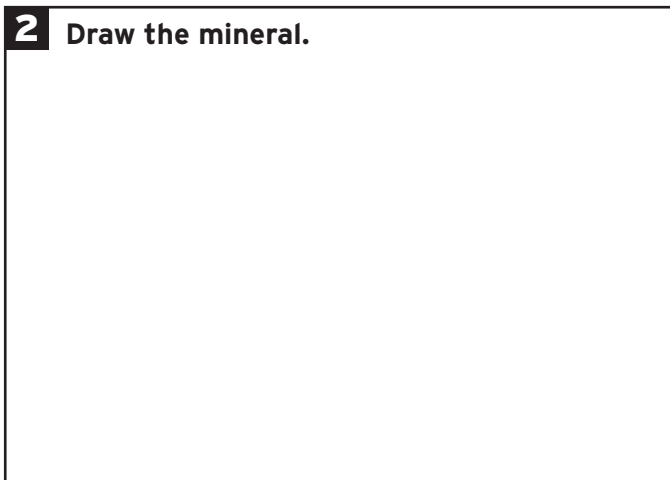
\_\_\_\_\_

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**2** Draw the mineral.



Name of Mineral: \_\_\_\_\_

Describe this mineral specimen:

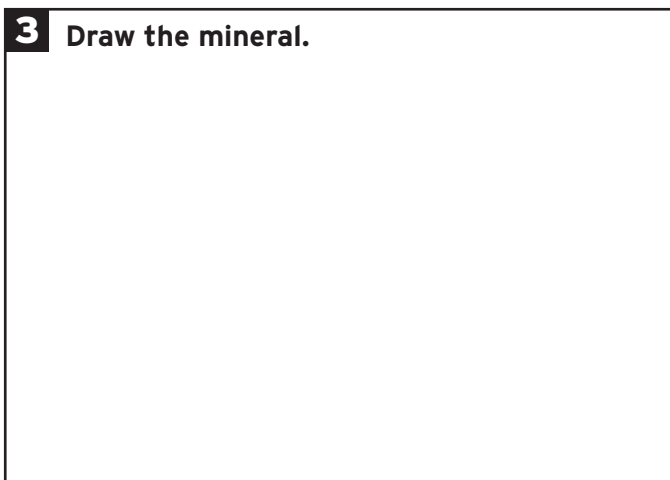
\_\_\_\_\_

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**3** Draw the mineral.



Name of Mineral: \_\_\_\_\_

Describe this mineral specimen:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

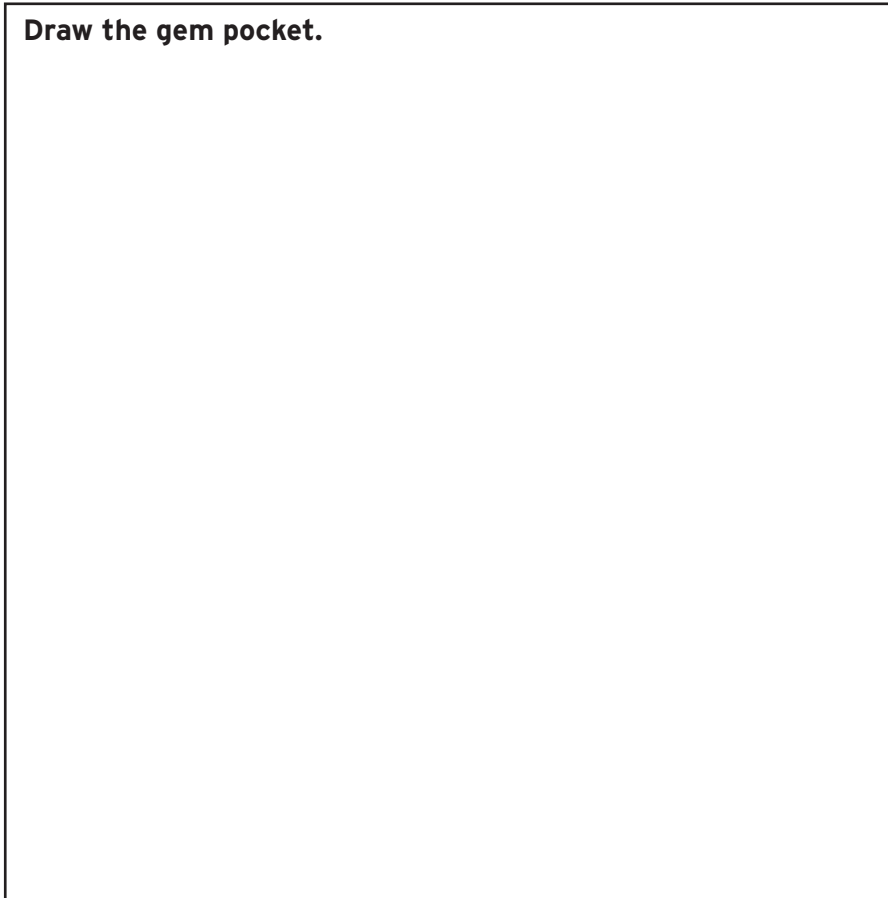
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## Student Worksheet: Morgan Hall of Gems

Find the large gem pocket in this hall. Scientists call gem pockets *pegmatites*.

Look inside it and describe what you see to other students. Record your observations below.

**Draw the gem pocket.**



Describe the minerals that you see inside the gem pocket. Remember to include size, shape, color, and texture.

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If you have time, go back out into the Guggenheim Hall of Minerals. See if you can find minerals that look like the ones inside of the gem pocket. How will you know if two minerals are the same or different?

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# ANSWER KEY

## Student Worksheet: Guggenheim Hall of Minerals

Name:

Today you will see many minerals at the American Museum of Natural History. Pick three minerals to observe. Record your observations below.

**1** Draw the mineral.

Name of Mineral: \_\_\_\_\_ (*Quartz*)

Describe this mineral specimen:

*(This is a giant white crystal. This crystal has six sides and a pointy top. It is very smooth. There are many cracks inside of the crystal, and the bottom looks like it was broken off.)*

**2** Draw the mineral.

Name of Mineral: \_\_\_\_\_

Describe this mineral specimen:

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**3** Draw the mineral.

Name of Mineral: \_\_\_\_\_

Describe this mineral specimen:

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## ANSWER KEY

## Student Worksheet: Morgan Hall of Gems

Find the large gem pocket in this hall. Scientists call gem pockets *pegmatites*.

Look inside it and describe what you see to other students. Record your observations below.

**Draw the gem pocket.**

Describe the minerals that you see inside the gem pocket. Remember to include size, shape, color, and texture.

*(Sample answer: Inside the gem*

*pocket there are many crystals.*

*Some are large, and many others*

*are small. The crystals are red,*

*white, green, and black. All of the*

*crystals are attached to the rock*

*walls of the gem pocket.)*

If you have time, go back out into the Guggenheim Hall of Minerals. See if you can find minerals that look like the ones inside of the gem pocket. How will you know if two minerals are the same or different?

*(Sample answer: I think that some of the crystals in the gem pocket are quartz because they have the*

*same shape and color as the large quartz crystal that I studied. They have a pointy end, and a few sides,*

*and are a mix of white and clear parts. These crystals also look smooth on the outside.)*

## Student Writing Guidelines

### Writing Prompt:

Based on the article “Making Sense of Minerals,” your visit to the Guggenheim Hall of Minerals, and your discussions, write an essay in which you:

- Explain what a mineral is.
- Describe at least one mineral using information like color, size, and shape.
- Include a labeled drawing of your mineral that gives the name of the mineral.

Support your discussion with evidence from your reading and the Guggenheim Hall of Minerals.

**Use this checklist to ensure that you have included all of the required elements in your essay.**

- I introduced what a mineral is.
- I defined the word mineral.
- I clearly named at least one mineral and described the properties of that mineral.
- I included an illustration of at least one mineral.
- I labeled my illustration with the name of the mineral.
- I used information from “Making Sense of Minerals” to explain what a mineral is in detail.
- I used information from the Guggenheim Hall of Minerals to explain what a mineral is in detail.
- I included a conclusion at the end.
- I proofread my essay for grammar and spelling errors.

# Assessment Rubric

Scoring Elements		<b>1</b> Below Expectations	<b>2</b> Approaches Expectations	<b>3</b> Meets Expectations	<b>4</b> Exceeds Expectations
<b>RESEARCH</b>	<b>Reading</b>	Does not reference information from the text.	Presents information from reading materials using facts, vocabulary, examples, or other references but may lack accuracy or relevance.	Presents information from reading materials using facts, vocabulary, examples, or other references but may lack relevance.	Presents accurate and relevant information from reading materials to inform or explain using facts, vocabulary, examples, or other references.
	<b>AMNH Exhibit</b>	Does not reference information from the exhibit.	Presents information from Museum exhibit content using examples, quotes, or other references but may lack accuracy.	Presents information from Museum exhibit content using examples, quotes, or other references relevant to the purpose of the prompt.	Accurately and effectively presents important information from Museum exhibit to inform or explain content using examples, quotes, or other references.
<b>WRITING</b>	<b>Focus</b>	Does not address the prompt.	Addresses the prompt, but significant sections of writing are off topic.	Addresses the prompt with minimal distractions.	Addresses the prompt with no distractions.
	<b>Development</b>	No detail is included to explain the topic.	Informs or explains by presenting details.	Informs or explains using accurate details.	Informs or explains by providing accurate and relevant information.
	<b>Conventions</b>	Lacks cohesion and control of grammar, usage, and mechanics appropriate to grade level.	Demonstrates an uneven command of standard English conventions appropriate to grade level.	Demonstrates a command of standard English conventions, with few errors as appropriate to grade level.	Maintains a well-developed command of standard English conventions, with few errors. Response includes language and tone appropriate to the purpose and specific requirements of the prompt.
<b>SCIENCE</b>	<b>Content Understanding</b>	Content is irrelevant, inappropriate, or inaccurate.	Shows uneven understanding of disciplinary content related to the topic.	Presents generally accurate disciplinary content related to the topic.	Presents accurate and relevant disciplinary content to enhance understanding of the topic.