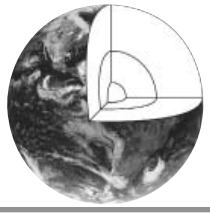


Minerals

5

☑ *Lesson Objectives*

Core Content Objectives

Students will:

- ✓ Explain that much of our knowledge of the earth and its history is the result of the work of many scientists
- ✓ Identify common minerals in the earth
- ✓ Explain how minerals are used by people

Language Arts Objectives

The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Compare and contrast different types of rocks (RI.1.9)
- ✓ Draw pictures and write sentences to describe the characteristics of a classmate (W.1.2)
- ✓ With assistance, categorize, and organize facts and information within a given domain to answer questions (W.1.8)
- ✓ Describe different kinds of rocks in detail (SL.1.4)
- ✓ Write and illustrate detailed descriptions of different types of rocks and discuss with one or more peers (SL.1.5)

Core Vocabulary

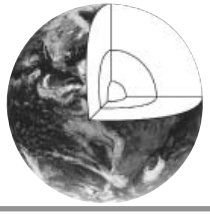
characteristics, *n.* Ways we can describe and group people or things
Example: Two characteristics of winter are that it is the coldest season and that it can snow.
Variation(s): characteristic

gemstones, *n.* Precious stones that can be cut, polished, and used in jewelry
Example: We were amazed at the sizes and brilliant colors of the gemstones on display in the museum.
Variation(s): gemstone

minerals, *n.* Natural substances found in rocks or in the ground
Example: Minerals such as diamonds and gold come in many shapes and sizes.
Variation(s): mineral

traces, *n.* Very small amounts
Example: Even after cleaning, there were still traces of dust on his glasses.
Variation(s): trace

At a Glance	Exercise	Materials	Minutes
Introducing the Read-Aloud	**What Have We Already Learned?**		10
	Essential Background Information or Terms	cookies with at least two visible ingredients (chocolate chips, nuts, berries, raisins, etc.)	
	Purpose for Listening		
Presenting the Read-Aloud	**Minerals**	salt	15
Discussing the Read-Aloud	**Comprehension Questions**		10
	Word Work: Characteristics	drawing paper, drawing tools	5
 **Complete Remainder of the Lesson Later in the Day**			
Extensions	**Rock Sort**	Instructional Master 5B-1; drawing tools; bins for sorting rocks; 4 different kinds of small/ medium-sized rocks for each student [This exercise requires advance preparation.]	20
Take-Home Material	**Family Letter**	Instructional Master 5B-2	*



Minerals

5A

Introducing the Read-Aloud *10 minutes*

What Have We Already Learned?

Review with students what they learned about rocks in the previous read-alouds. Most of the earth is made of rocks, and there are many different types of rocks on the earth.

Essential Background Information or Terms

Note: Be sure to follow your school's policy regarding food distribution and allergies.

Tell students that rocks are made of minerals. Show students a cookie with at least two visible ingredients, such as chocolate chips, nuts, berries, etc. Tell them to pretend that the cookie is a rock. The chocolate chips, nuts, berries, raisins, etc., are the minerals that make up the rock. Sometimes we find minerals by themselves in nature, just like chocolate chips can be eaten by themselves. Mostly, minerals are found in rocks, just like when there are chocolate chips in cookies. Most rocks contain several different minerals. You may wish to pass out cookies to students and have them describe the size, shape, color, and texture of the cookies to their partners. Remind students that the cookie is similar to a rock and the chocolate chips, etc., are similar to minerals found in rocks or by themselves in nature.

Purpose for Listening

Tell students that in the next read-aloud, Gerry the Geologist is going to share some special rocks and minerals with them. Tell students to listen carefully to hear all of the different ways rocks can be described.

Presenting the Read-Aloud — *15 minutes*

Minerals

Show image 5A-1: Gerry with his rock collection

As a geologist, it is my job to study rocks. There are many, many different kinds of rocks out there in the world. And I have collected quite a few rocks during my time as a geologist!

Show image 5A-2: Polished gemstones [1]

Here are some of the rocks and minerals from my collection. I have polished these in a special machine called a rock tumbler, which makes them shiny and really brings out the color. In this pile alone, I can see amethyst, tiger's eye, rose quartz, turquoise, red jasper, agate, unakite, onyx . . . whoa! Sorry, I get carried away sometimes.

1 What colors do you see?

Show image 5A-3: Milky quartz

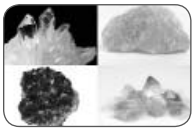
Minerals are the building blocks of rocks. All rocks contain minerals. Sometimes you can find pure minerals unmixed with other minerals, but most rocks contain several different minerals. There are over three thousand different types of minerals, and scientists still discover new ones from time to time.

Minerals come in all different shapes, sizes, colors, and textures. We use these different **characteristics** to divide minerals into groups. [2] Some of these mineral groups are quite common, whereas others are very unusual and even difficult to describe. I will tell you about a few of the best-known minerals.

2 Characteristics are ways we can describe and group things.

For instance, this is a picture of the mineral quartz. Quartz is the most common mineral in the earth's crust—not the most common in the whole earth, just the most common mineral in the crust. [3] This picture shows a type of quartz called milky quartz.

3 What is the crust of the earth?



Show image 5A-4: Varieties of quartz

Quartz comes in many varieties. Those are clear quartz crystals on the top left. [4] Some minerals form into perfect crystals like

4 Crystals are small pieces of minerals and rocks that have many sides and distinct shapes.

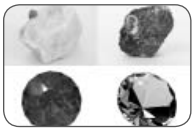
these, and some don't. It all depends on where and how they are formed within the earth.

Crystals can come in all different sizes. Some are as small as a pea; some are the size of your arm or longer.

As for the color variations in different types of quartz, these are largely caused by the addition of very small amounts of various types of metals into the mineral.[5] For instance, the beautiful purple color of amethyst is caused by **traces** of iron and aluminum metal.[6]

5 Color variations are color differences. *Variations* is another form of the word *vary,* just like *varies*.

6 Traces are small amounts.



Show image 5A-5: Ruby and sapphire

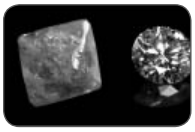
Examples of rare **gemstones** are some varieties of corundum—a mineral composed mostly of aluminum and oxygen.[7] Red corundum is known as ruby, and blue corundum is known as sapphire. Rubies and sapphires are among the most beautiful mineral crystals on earth.

7 A gemstone is a stone that is cut and polished to be used in jewelry. Can you find the gemstones in the image?

Show image 5A-6: Emerald

Here is another beauty. This is called emerald. Emerald is a variety of the mineral beryl, which also comes in many different colors, including green, blue, yellow, and red. Deep-green emerald is my favorite.[8]

8 [Have a student point to the gemstone.]



Show image 5A-7: Diamonds

And here is one of the most famous minerals. Do you know what these beauties are called?[9] These are diamonds. A diamond is the hardest mineral in the whole world. A diamond is hard enough to cut through glass or scratch other minerals. The diamond on the left is a raw diamond, fresh from the earth. The diamond on the right has been cut and polished. The sides of a cut diamond are called facets.

9 [Pause for students to answer.]

Show image 5A-8: Jeweler looking at diamond

You need special equipment and skills to cut and polish diamonds or other gemstones such as rubies and emeralds. People who cut diamonds look through powerful magnifying glasses as they do their work. This is so they can see all the tiny little facets, or sides.[10]

10 [Explain that the inset shows what the jeweler sees through the magnifying glass.]

Show image 5A-9: Salt

Here is one mineral that we use every day! Have you ever heard of salt?[11] Salt, or sodium chloride, is a common mineral that is found in the oceans and in the earth. Sodium chloride is called table salt when we use it in food and rock salt when we use it to make roads safer during winter storms.

11 [Pause for students to answer. Sprinkle some table salt in each student's hand so that each student can taste salt.]

Some people put table salt on food to make it taste better. In fact, salt is an extremely important nutrient for people as well as animals. Your body needs salt—not too much, but just enough. Too much salt is bad for you. If you eat too much salt, your body will tell you so because you will feel thirsty.

Salt appears in many forms in nature. Rock salt can be found in the form of halite crystals, like the rectangular-shaped crystal pictured on the left in the image. You can't see salt in water because it dissolves, but you'll know it's there if you ever taste ocean water.[12]

12 When salt mixes with water, the salt dissolves in the water to form saltwater.

Show image 5A-10: Gerry pointing to a blackboard

Why do all these different minerals look the way they do? Each has its own story—and it gets pretty complicated—but you can bet that there were three basic things in common:[13] heat, pressure, and time. These three factors play a role in the formation of every mineral.

13 Do you know what three things Gerry is thinking of?

Show image 5A-11: Gerry with his rock collection

An important thing to remember about the rocks you find in nature is that you should leave them there so that other people can also enjoy them. If every person took even one rock, there soon would not be very many rocks left! Without rocks, environments change dramatically.[14] If the environment changes, the plants and animals that live there might have a hard time finding food and shelter.

14 Environments are places where living things live.

Now I've told you a bit about some of my favorite minerals. Take a look at the ground the next time you go outside, and you might actually see something interesting!

Discussing the Read-Aloud **15** *minutes*

Comprehension Questions **10** *minutes*

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses.

1. *Inferential* Why does Gerry the Geologist have so many rocks? (Gerry the Geologist studies rocks.)
2. *Literal* What are minerals? (Minerals are what rocks are made of.)
3. *Literal* What were the names of some of the minerals that you heard about? [You may want to show images 5A-3 through 5A-7 and image 5A-9 as clues.] (Some of the minerals were quartz, ruby, sapphire, emerald, diamond, and salt.)
4. *Literal* What is a gemstone? (A gemstone is a stone that is cut and polished to be used as jewelry.)
5. *Literal* Where might you find the mineral salt? (Salt is found in the oceans and in the earth.)
6. *Inferential* How is salt used by people? (Table salt is used to flavor food and rock salt is used to make roads safer during winter storms.)

[Please continue to model the *Think Pair Share* process for students, as necessary, and scaffold students in their use of the process.]

I am going to ask a question. I will give you a minute to think about the question, and then I will ask you to turn to your neighbor and discuss the question. Finally, I will call on several of you to share what you discussed with your partner.

7. *Evaluative* *Think Pair Share:* Which of the minerals that you heard about is your favorite? Why? (Answers may vary.)
8. After hearing today's read-aloud and questions and answers, do you have any remaining questions? [If time permits, you may wish to allow for individual, group, or class research of the text and/or other resources to answer these questions.]

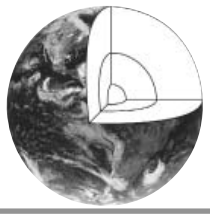
Word Work: Characteristics *5 minutes*

1. In the read-aloud you heard Gerry say, "Minerals come in all different shapes, sizes, colors, and textures. We use these different *characteristics* to divide minerals into groups."
2. Say the word *characteristics* with me.
3. *Characteristics* means more than one characteristic. A characteristic is something that makes a person, thing, or group different from others.
4. Some characteristics of diamonds are that they are colorless and that they can scratch other minerals. Some characteristics of Gerry the Geologist are that he has black hair and a mustache, and loves to study rocks.
5. What are some characteristics of your neighbor? Remember that characteristics can include the way your neighbor looks and the way your neighbor acts. Try to use the word *characteristics* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students' responses: "Characteristics of _____ are . . ."]
6. What's the word we've been talking about?

Use a *Drawing/Writing* activity for follow-up. Directions: I am going to give you a piece of drawing paper. I would like for you to draw your neighbor, including their characteristics. For example, if your neighbor has brown hair and loves to play soccer, include brown hair and soccer in your drawing. After you have drawn your picture, write a sentence about your neighbor using the sound-spelling correspondences you have learned thus far.

Give students time to share their drawings and sentences with a partner or the entire class.

Complete Remainder of the Lesson Later in the Day



Minerals

5B

Extensions

***20** minutes*

Rock Sort

Note: This activity can also be completed in partners or small groups.

Give each student or group four small/medium-sized rocks of different types. Have students use their five senses to describe their rocks to partners. Prompt students to use descriptive vocabulary as they describe their rocks, if applicable: smooth, rough, shiny, dull, striped, _____-colored, etc. Next, have students use Instructional Master 5B-1 to draw each rock (including identifying characteristics) and write a sentence describing the rock using the sound/spelling correspondences taught thus far.

After students have finished drawing and coloring their rocks, tell students that they are going to sort their rocks as a class. Place different-colored bins around the classroom and label them with the most common words used to describe students' rocks, such as smooth, rough, shiny, dull, striped, _____-colored, etc. Tell students that you are going to name a characteristic of rocks, or a way to describe them. If students have a rock that matches the named characteristic, they should raise it into the air. Confirm that all raised rocks match the named characteristic. Students should then place their rocks into the appropriate bin for that named characteristic. Repeat this process until all rocks have been sorted into the correct bin. If time permits, students can then compare the rocks within each bin to determine which rock is the most or least of the characteristic within the sorted group.

Have students share with their neighbors and with the class how they described each rock and determined in which bin to place each rock. Students can also discuss the similarities and differences they observed among rocks.

Take-Home Material

Family Letter

Send home Instructional Master 5B-2.