Earth and Space Science Readers:
The World of Rocks and Minerals

Publishing Credits

Editorial Director
Dona Herweck Rice

Creative Director
Lee Aucoin

Associate Editor
Joshua BishopRoby

Illustration Manager
Timothy J. Bradley

Editor-in-Chief
Sharon Coan, M.S.Ed.

Publisher
Rachelle Cracchiolo, M.S.Ed.

Science Contributor
Sally Ride Science

Science Consultants
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Planetary Geologist
William B. Rice,
Engineering Geologist

Teacher Created Materials Publishing
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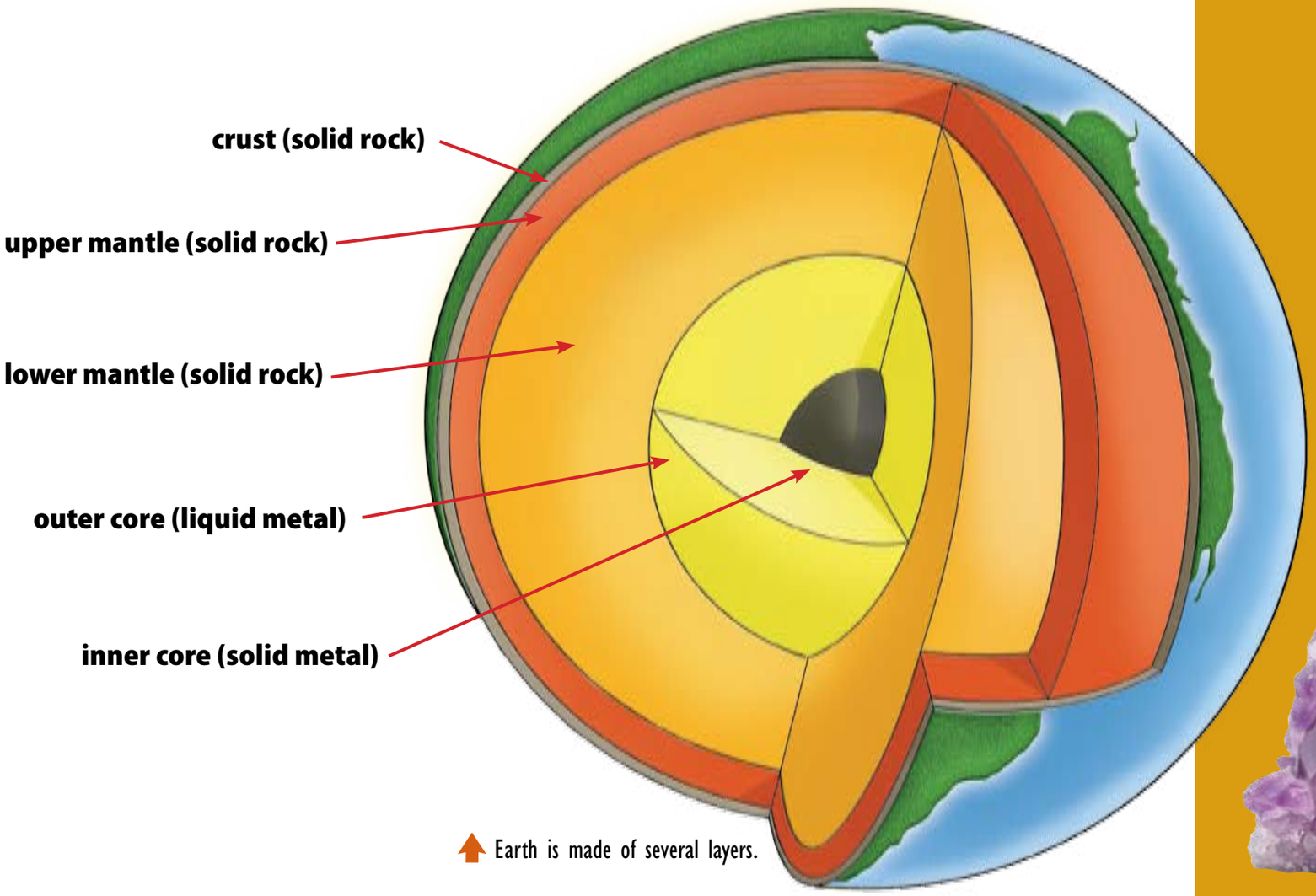
Table of Contents

Rock Factory: It's Right Beneath Your Feet

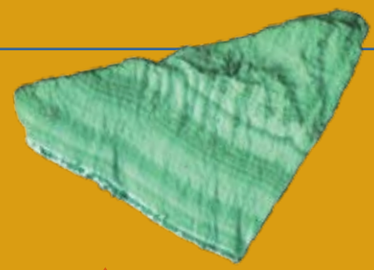
Rocks are found everywhere on Earth. We see them in our yards, in parks, and even just lying in the middle of the road. It is a simple thing to walk outside and find a rock. But have you ever thought about what rocks are and where they come from?



Earth is made of several layers.

There are many different kinds of rocks. They come in an amazing variety of shapes, sizes, colors, and textures. Rocks are not all formed in the same way, though.

Factories use different processes to make things. They use heat, water, and the force from machines to form their products. Our earth is like a giant rock factory. Wherever you are right now, if you could dig down far enough, you would find rocks being made deep inside the earth.

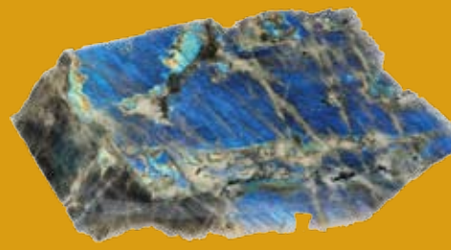


malachite

agate

turquoise

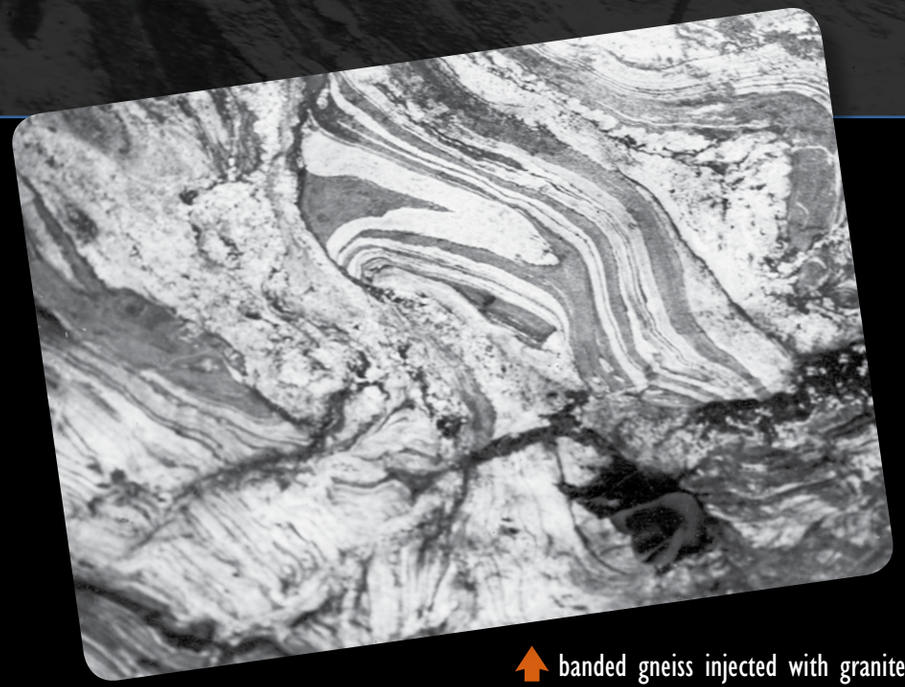
amethyst



opal

Metamorphic Rocks

Deep underground, high pressure or heat or both can force rocks such as sandstone or granite to change. They might liquefy and turn into magma, or they might melt just a little bit, cool down, and then become solid again. Because they were not melted completely, they don't become magma. They are now called metamorphic, which means something that has changed. (In this case, a rock.) Some examples of metamorphic rocks are schist, gneiss, and quartzite.



banded gneiss injected with granite

quartzite

specimen of folds in a schist

Write On!

Long ago, children in schools didn't use paper every day. They still needed something to write on, though. Students sometimes carried their own small chalkboards. These chalkboards were actually made of **slate**—a type of metamorphic rock.

Slate begins its life as shale. Heat and pressure change it. The rock becomes metamorphic, turning it into slate. Slate makes good writing material because it is smooth, flat, and dark in color—perfect for chalk to write on. (And chalk is a kind of rock, too!)

Lab: Observing to Learn About Rocks

You can learn a great deal about rocks just by looking at them. Follow these steps to see what you can learn.

Materials

- five different rocks
- water
- magnifying glass
- notebook
- pen or pencil

Procedure

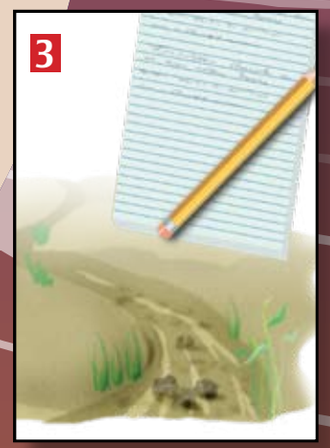
1 You will need to find five different rocks in nature. It is important that they are different. Look around outside in different places. Find them in widely different areas. In your notebook, record where you find each one.

2 Wash each rock in water, one at a time. Look at each rock when it is wet. Observe what it looks like. Pay attention to details. Use the magnifying glass to help you see better. What do you see? Record your observations. Here are some things to notice in particular:

- the color or colors
- presence of crystals
- size and shape of crystals or particles
- shininess of crystals or particles
- amount of one kind of crystal or particle compared to others

3 Look again at each rock when dry. Pay attention to the details again. What do you see? Record your observations. Use the same list as above.

4 Where did you find each rock? What does its location tell you about the rock? Did you find it in a stream bed? Was it on a mountain or valley? Was it in a field, by a lake, or at the ocean? Was there anything important near where you found the rock that might have affected it?



Conclusion

Geologists ask themselves many questions when studying the earth and rocks. In order for you to learn about and identify rocks, you'll want to ask lots of questions like the ones listed above. If you want to study rocks even further, you can also test them for hardness or conduct chemical testing. You will need special tools and a lab for these sorts of tests. With the right tools and the right teacher, you can learn many things about the world of rocks and minerals.

Table of Contents

Table of Contents (cont.)

Why This Kit?

This kit was developed to provide teachers with a way to integrate their teaching of language arts and science while making accommodations for differences in student reading abilities and levels of understanding. Whether your students are above level, on level, or below level, or even English language learners, this program offers lessons and activities designed to meet standards for reading, writing, and science.

For each of the eight units provided in this kit, you'll find two different readers related to the topic. One reader is designated for students who are on- or above-level and the other is designated for students who read below-level.

Unit Organization

Each unit is structured in a similar manner. First, you'll find an overview of the unit with a suggested time line. Then you'll see the reading, writing, and science objectives for the unit. These objectives are the same for both readers, but the activities themselves have been adapted to be appropriate for struggling learners or for those who need more of a challenge.

Following the time line and objectives, you'll find a section that provides a whole-class introductory activity and other components of the unit, as well as a whole-class concluding activity for the end of the unit. Each unit includes a lab activity related to the topic featured in the readers. The lab provides detailed instructions for conducting the activity. There is also a lesson plan that serves as a guide for you as you lead students through this exciting activity.

Next in the unit, you'll find differentiated lesson plans for the two readers. These provide step-by-step instructions for leading the students through the process of reading the text. This instruction highlights the specified objectives. Each lesson also incorporates the use of data analysis activities on reproducible pages as well as a follow-up quiz to check for comprehension.

All Together: Science, Language Arts, Inquiry, and Literacy

As the expectations for student achievement in both science literacy and reading skills continue to rise, so does the need for quality materials that teach content area knowledge and critical reading skills through meaningful literature. The *Science Readers* address both these needs through a series of leveled readers each focused on a single strand: physical, earth and space, and life science. Students journey through a complete and comprehensive unit of study which includes all the components of complete guided reading instruction and concept application through data analysis and hands-on lab activities. Students see, hear, read, touch, and think the concepts presented in each lesson. They are offered numerous opportunities to explore the ideas presented and build upon their previous experiences to gain new knowledge. Students then construct and share personal insights and opinions regarding the advancements in science and their effects on the Earth and society. By participating in the lessons in these units, students will become scientifically literate.

Why a Focus on Science?

Over three decades ago, the American Association for the Advancement of Science began a three-phase project to develop and promote science literacy: Project 2061. The project was established with the understanding that *more* is not *effective* (1989, p. 4). Shortly thereafter, in 1993, the Association developed benchmarks for science literacy. Since every state has its own science standards, these benchmarks were prepared as a tool to assist in the revision of the states' science, mathematics, and technology curricula (1993, p. XV).

Values, Attitudes, and Skills

Scientists work under a distinctive set of values. Therefore, according to the American Association for the Advancement of Science, science education should do the same (p. 133). Students whose learning includes data, a testable hypothesis, and predictability in science will share in the values of the scientists they study. Additionally, "science education is in a particularly strong position to foster three [human] attitudes and values: curiosity, openness to new ideas, and skepticism" (1989, p. 134). *Science Readers* addresses each of these recommendations by engaging students in thought-provoking, open-ended discussions and projects. Throughout their study, students continuously reflect on the contributions of important scientists and the advancements they have brought to society.

Within the recommendations of skills needed for scientific literacy, the American Association for the Advancement of Science suggests attention to computation, manipulation and observation, communication, and critical response. These skills are best learned through the process of learning, rather than in the knowledge itself (1989, p. 135). This is exactly what happens when students engage in lesson labs and review labs conducted by others in the *Science Readers* program. Students follow formulas and calculations to compute numbers; they use calculators to apply computation skills quickly and accurately; they manipulate common materials and tools to make scientific discoveries; they express findings and opinions both orally and in writing; they read tables, charts, and graphs to interpret data; they are asked to respond critically to data and conclusions; and they use information to organize their own data and draw their own conclusions.

Inquiry-based Learning

Project 2061 recommends pedagogical practices where the learning of science is as much about the process as the result or outcome (1989, p.147). Following the nature of scientific inquiry, students ask questions and are actively engaged in the learning process. They collect data and are encouraged to work within teams of their peers to investigate the unknown. This method of process learning refocuses the students' learning from knowledge and comprehension to application and analysis. Students may also formulate opinions (synthesis and evaluation) and determine whether their processes were effective or needed revision (evaluation). The National Science Education Standards view inquiry as "central to science learning" (p. 2 of Overview). In this way, students may develop their understanding of science concepts by combining knowledge with reasoning and thinking skills. Kreuger and Sutton (2001) also report an increase in students' comprehension of text when knowledge learning is coupled with hands-on science activities (p. 52).

Each unit in the *Science Readers* program provides an engaging lab activity at the end of the reader, complete with a lesson plan that includes activities before, during, and after the lab. In addition, the data analysis activity pages reconstruct related experiments and share data the students can analyze to apply their learning from the readers. This program offers students multiple opportunities to engage in both personal hands-on activities and related experiments described in full detail.

Nonfiction ≠ Textbooks

As Project 2061 began, researchers questioned the appropriateness and effectiveness of science textbooks and methods of instruction. Since textbook instruction puts more emphasis on learning correct answers and less on exploration, collaboration, and inquiry, the Association asserts that this manner of instruction actually "impedes progress toward scientific literacy" (1989, p. 14). This same concern resurfaced over a decade later by Daniels and Zemelman (2004) who call textbooks "unfriendly." Most adults, when choosing literature, do not pick up their son or daughter's science textbook. Daniels and Zemelman assert that today's textbooks are best used as reference books when students need large amounts of information on a particular topic within a subject area. Instead they recommend the use of "authentic, real-world nonfiction."

Likewise, researchers and educators alike suggest using quality nonfiction materials, which "provide the reader with a sense of discovery" (Nevett, 2004). Nevett also cautions teachers to consider the design of the books, the author's style, and the author's ability to excite the reader. Each of the leveled readers in *Science Readers* provides just that. Both the on- and below-leveled readers for each unit include real-life photos, charts, illustrations, and sidebars. Although the books present facts and information, they are written to tell a story about their subject. The information is presented in an interesting manner to foster students' curiosity and encourage continued exploration of a concept.

Using The Futures Channel Videos

On the included DVD, you can find eight short videos from The Futures Channel. These videos are ideally suited to introducing concepts, activating prior knowledge, and inspiring interest in sometimes complex and abstract concepts.

Communications Satellites

Running time: 2 minutes, 43 seconds

A rocket scientist talks about the function of communications satellites, the differences between Low Earth Orbit and Geosynchronous Orbit, and the operation of satellite networks.

This video is especially appropriate for *From Hubble to Hubble*.

Discussion Question: Brainstorm with students on the different technologies in use today that use communications satellites.

Eyes on the Universe: Looking Into Time

Running time: 3 minutes, 25 seconds

Two astronomers describe how the Multiple Mirror Telescope uses mirrors and lenses to see deep into space.

This video is especially appropriate for *The Wonder of Outer Space*.

Discussion Question: Ask if anyone has visited an observatory or looked at the stars through a telescope. Have students share their experiences.

Eyes on the Universe: Planetary Systems

Running time: 3 minutes

Two astronomers talk about planetary systems, touching on both our own solar system as well as other systems beyond the Sun.

This video is especially appropriate for *The Wonder of Our Solar System*.

Discussion Question: Review Galileo's discovery of the moons around Jupiter. Have students share experiences where they saw something new or different that allowed them to understand a difficult concept.

Eyes on the Universe: What's Next?

Running time: 3 minutes, 53 seconds

Two astronomers talk about the placement of observatories on mountaintops and in orbit. It will be possible to discover extrasolar planetary systems and oxygen on distant planets.

This video is especially appropriate for *Astronomers Through Time*.

Discussion Question: Lead a discussion with students about orbital telescopes, which can cost millions of dollars. Are the discoveries worth the costs?

Searching for Water on Mars

Running time: 1 minute, 40 seconds

The Mars rover design team explains how they are designing robotic rovers to explore Mars and how those rovers use electromagnetic pulses to search for water.

This video is especially appropriate for *The Wonder of Our Solar System*.

Discussion Question: The search for water on Mars continues with the Spirit and Opportunity rovers. Activate students' prior knowledge about these rovers by having them share what they know.
You can also explore the Mars Exploration Rover homepage at http://marsrovers.nasa.gov.

Space Weather

Running time: 1 minute, 56 seconds

Joe Hirman and Joann Joselyn of NOAA discuss "space weather" throughout the solar system, focusing on the effects of solar flares.

This video is especially appropriate for *The Wonder of Our Solar System*.

Discussion Question: Discuss with students why it might be useful to have a "space weather forecast." Who would need such a thing? Why?

Tornado Chase

Running time: 2 minutes, 45 seconds

Two meteorologists describe their work in chasing and tracking tornados. The power, formation, and nature of storms is featured, as well as the tools used to measure them: computer models, Doppler radar, and field recording.

This video is especially appropriate for *Investigating Storms*.

Discussion Question: Review with students the risks and benefits of chasing tornados. Would anyone in the class chase tornados?

Voyage of the Ventana

Running time: 5 minutes, 12 seconds

Oceanographer Jim McFarland presents the mysteries of the ocean and the robotic submarine Ventana used to investigate them. Submersible robots are used because the water pressure would crush a diver.

This video is especially appropriate for *Spaceship Earth*.

Discussion Question: What might the Ventana find deep underwater? How might the Ventana's discoveries benefit mankind? Discuss the possibilities with the class.

Unit 2: *The World of Rocks and Minerals* and *The First Geologists*

Timeline for the Unit

	The World of Rocks and Minerals	*The First Geologists*
Day 1	Complete the **Introductory Activity** (page 44) as a class.	
	Before Reading (page 49) in reading groups	**Before Reading** (page 57) in reading groups
Day 2	**During Reading** (page 50) in reading groups Use: *Digging into the Past* worksheet (page 52) *Digging into the Past* transparency	**During Reading** (page 57) in reading groups Use: *The Lifecycle of Rocks* worksheet (page 60) *The Lifecycle of Rocks* transparency
Day 3	**After Reading** (page 50) in reading groups Use: *Rock Hard Beauty* worksheet (page 53) *Name that Stone!* worksheet (page 54) *Reader Quiz* (page 55)	**After Reading** (page 57) in reading groups Use: *Rock to Mineral* worksheet (page 61) *Geology Trail* worksheet (page 62) *Reader Quiz* (page 63)
Day 4	Complete the **Lab Activity** (page 47) as a class.	
Day 5	Complete **Concluding Activity** (page 45) as a class.	

Unit Learning Objectives

- Students will use questioning strategies to better understand text. (Nonfiction Reading Objective)
- Students will write in response to nonfiction text. (Expository Writing Objective)
- Students will explore concepts related to geology. (Science Content Objective)

Unit Overview

Introductory Activity

1. Geologists estimate there are over 4,000 minerals that help make up rocks. The students' homes and school are filled with rocks and minerals, and they are probably not even aware of it! Before beginning this unit, collect and bring to school, or send home notes for students to bring a toothpaste container (with list of ingredients), a clay pot, a mirror, talcum powder, a magnet, a radio with cord, a CD, a pencil, a brick or other stone product, and something made of brass. You will need at least one of each item.

2. Display these items, and have students discuss in pairs or small groups what they all have in common. Explain that they all are made of naturally occurring rocks or minerals. List the minerals below and have students guess which items could be made of each one. Challenge the class to discover other items at home or in school made of rocks and minerals. Explain that their reading will help them understand how rocks and minerals form.

Item	**Rock or Mineral**				
toothpaste	fluorite	barite	calcite		
pot	clay	metallic minerals in glaze			
mirror	feldspar	silica	silver		
powder	talc	mica			
magnet	cobalt				
radio & cord	aluminum	copper	gold	iron	
CD	aluminum				
pencil	limestone	mica	clay	silica	talc
brick	graphite	clay	silica		
brass	copper	zinc			

Using the Readers

3. Divide students by reading levels into reading groups. Students on or above a fifth-grade reading level should read the *The World of Rocks and Minerals* reader. Students needing a lower-level book should read the *The First Geologists* reader.

4. Within these groups, complete the activities described in each lesson plan.
   - *The World of Rocks and Minerals* (pages 49–56)
   - *The First Geologists* (pages 57–64)

5. At the end of the unit, bring the students back together as a group to complete the concluding activity on the next page.

Unit Overview *(cont.)*

Using the Lab Transparencies

6 One transparency per reader supports an interactive lab activity guided by student worksheets (pages 52 and 60 for the readers in this unit). Use these transparencies to support and extend the information and concepts presented in the before, during, after, or concluding activity, as presented in the lesson.

Completing the Lab

7 Following the **After Reading** activities, students complete a lab activity. Each reader includes a themed lab activity on pages 28 and 29. See page 47 in this Teacher's Guide for the lab of this unit.

Concluding Activity

Complete this concluding activity as a whole class following completion of the lab activity.

8 After the students have completed the activities for the two levels of readers, gather students together along with their journals.

9 Instruct the *The World of Rocks and Minerals* group to share the questions they originally had and how they were able to determine the answers. Encourage discussion as students share their questions and answers.

10 Next, have students in *The First Geologists* group share their original questions and the answers they found.

11 Invite both groups to share questions they had that were not answered by the text. Allow students to offer any information they might have to answer these questions. Then have the students decide a plan of action for locating more information related to these topics.

Unit Overview *(cont.)*

Differentiation Strategies

Above Grade Level—Student Directed

For those students who have a solid understanding of the science concepts in this unit, encourage them to apply the knowledge and information they have. Suggested enrichment activities include:

Challenge students to conduct the lab activity again at home. Encourage each student to locate rocks in different locations, such as the backyard, a neighbor's yard, a local park, etc. The student should study rocks that are in their natural locations (buried in the ground) and those that are a part of landscape. Have the student record his or her findings and share with the class.

The conclusion of the lab activity says that geologists ask themselves many questions when they study rocks and the earth. Encourage students to be inquisitive about their work with rocks and record the questions they have. Then invite students to do further research to determine the answers to their questions.

Challenge students to create a bank of comprehension questions to ask the class. Students may choose to develop a game format in which to pose their questions. Have them include questions from the other group's reader as well.

ELL and Below Grade Level—Teacher Directed

Encourage your English language learners to participate in activities with partners who are proficient in English. Emphasize the need for all students to be sensitive to each other's needs and discuss difficult words, phrases, and concepts.

Remember that while struggling readers and English language learners may have difficulty reading the text, they are often very capable of processing the concepts. Continue to encourage higher-level thinking and discussion. Take the time to review vocabulary and terminology, but continue to foster critical thinking and rich discussion.

Your English Language Learners will likely benefit from working in pairs for reading, lab activities, and other tasks related to the unit.

Take time to discuss the reader one-on-one with students. Point out photographs and drawings that illustrate key concepts in the text. Encourage students to ask questions and express their thoughts about the new information.

Lab Lesson Plan: Observing to Learn About Rocks

Find full-color step-by-step illustrations of the lab on the Teacher's CD-ROM.

Before the Lab

1. Review with students what they learned about rocks, minerals, and geology.
2. Ask the students to think about where and how different kinds of rocks form. If they were geologists out in the field, how would they determine which type of rocks or minerals they have discovered?

Introduce the Lab

3. Read the list of materials. Provide each lab group with the necessary materials, or have them ready to complete as a demonstration lesson in front of the class or at a learning station.
4. Read through the procedure with the class at least once completely before having students engage in the lab. Check for understanding of the required steps.
5. Have students predict how they think the rocks may change from when they are wet to when they are dry.
6. Show students how to record observations in a lab journal. They may create a two-column notes page (one column for observations when the rock is wet, and a second for when the rock is dry). They may then label each section vertically to record the suggestions listed: color, shininess, crystal formations, etc.

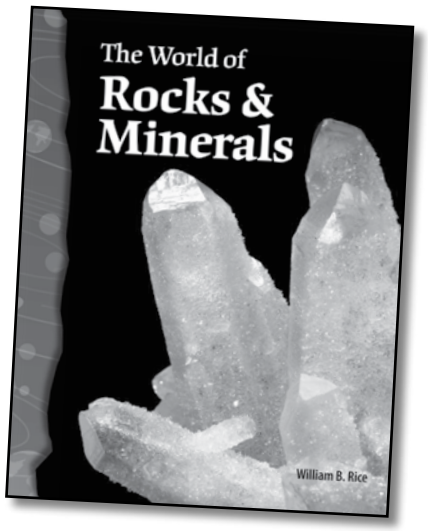
Conduct the Lab

7. Allow time for lab groups to conduct the lab, or follow the steps as a class if conducting a demonstration lab. Create one class observation chart.
8. Instruct students to write a response to the questions listed in Step 4. Be sure they use descriptive language so that anyone who reads their responses clearly understands the connection between the location of the rock and how this may help identify it.

After the Lab

9. Have each lab group share their summaries. If the students were to hypothesize as to whether each rock is sedimentary, igneous, or metamorphic, what would they say? Do any groups disagree as to each rock's type? How might they settle the dispute?

The World of Rocks and Minerals Reader



Learning Objectives

Students will use questioning strategies to better understand text. (Nonfiction Reading Objective)

Students write in response to nonfiction text. (Expository Writing Objective)

Students will explore concepts of geology. (Science Content Objective)

Resources

- paper (or journals) and pencils
- reference materials (library books, Internet, etc.)
- *Digging into the Past* transparency
- *Digging into the Past* worksheet (page 52)
- *Rock Hard Beauty* worksheet (page 53)
- *Name That Stone!* worksheet (page 54)
- materials for Lab (page 47)
- *Reader Quiz* (page 55)

Before Reading

1. Complete the Introductory Activity on page 44 with the whole class. Then divide the students into reading groups. The students who read this book should be reading on or above level.

2. Display the reader *The World of Rocks and Minerals* and allow students to discuss what they know about the subject. Explain that as they read this text, they will encounter new information that they may not completely understand.

3. Tell students that some readers read text actively by thinking critically and **asking questions**. Some readers are more passive and don't ask questions. Active readers tend to make better sense of the text they read. Explain that an active reader might approach *The World of Rocks and Minerals* by asking the following questions:
   - What genre of text is this?
   - What is the possible purpose of such a text?

4. While reading, an active reader might ask questions such as:
   - What did that paragraph mean?
   - How could I find out more information about this topic?

5. Explain that the active reader essentially teaches himself or herself while reading and makes decisions about how to learn more. An active reader asks questions that lead him or her into further exploration of the topic.

Before Reading *(cont.)*

6 Read aloud the text on pages 4 and 5. Then encourage the students to formulate questions based on what they heard. For example:
- What's the big deal about rocks? Why should I be interested in them?
- Do all rocks come from a particular place?
- What do heat and water have to do with making rocks?

7 Explain that these kinds of questions help direct the reader's thinking and encourage an active learning process while reading.

During Reading

8 Instruct the students to read the text. You may want to have the students read independently or with partners. Encourage students to actively engage the text by asking questions.

9 As students read, have them record their questions in journals. Tell students to leave space after each question to allow for additional writing after answers are determined.

10 Paleontologists study fossils and Earth's history (page 7). Reread the two sections about fossils on pages 13 and 18. Students can then act as junior paleontologists by completing *Digging into the Past* on page 52.

11 Distribute a copy of this worksheet to each student. Read the introductory information, then share the transparency. Have students make observations about the five fossil samples. Also review the timetable. How do students believe an eon is related to an era and a period? Allow students to complete the three columns of the data table and answer the questions. (They complete the "Name" column when they answer question #3.)

After Reading

12 Ask students to respond to the following comprehension questions:
- What are the different kinds of geologists and what do they study?
- What are the different kinds of rocks and how are each formed?
- Why does the author say that rocks are important? How are they important?
- What are minerals?
- How are minerals important?

After Reading *(cont.)*

13 Have students review the questions they wrote in their journals. Instruct each student to add to the journal by writing information that answers the questions. Ask students if they were able to determine the answers to their questions as they read or if they need to explore further.

14 Have students discuss their unanswered questions with partners to determine where they might locate more information related to the topic. Allow students time to further investigate by using reference books, resource materials, and Internet searches.

15 Some more colorful, rare minerals are called gemstones. They all have their own hardness, color, and density. Reread pages 20–21 to review how minerals form, and the usefulness of the **Mohs Hardness Scale**. Then review the use of gems as birthstones on pages 24 and 25.

16 Distribute *Rock Hard Beauty* on page 53 to each student. Review the data in the chart, and allow time for students to answer the questions.

17 Discuss how the students differentiate between a rock, a mineral, and a fossil. Reread pages 8 through 17 to reacquaint the students with the three types of rocks. As a class, write a one-sentence summary for each term: sedimentary, igneous, metamorphic.

18 Distribute *Name That Stone!* on page 54 to students. Read the introductory information and allow time for students to identify each item. Afterward, have students share their illustrations with a partner.

19 A short *Reader Quiz* on page 55 is provided for your use to assess student understanding of the reader.

20 Finally, gather the students back together in a whole group to have them complete the Concluding Activity on page 45.

Digging into the Past

Mr. Temple's science class learned that fossils are what is left of living things long ago. Through the multi-step process of fossilization, the living thing's original atoms were replaced with different minerals.

Mr. Temple shared five fossilized samples with the class. Look at the transparency to see the remains the class observed. The class also learned about the different eras when these living things inhabited the Earth. Look at the chart to compare eras.

Directions: Use the information from the transparency and what you read in *The World of Rocks and Minerals* to complete the description, state whether the sample is symmetric (yes or no), and list the geologic era in the data chart for each fossilized sample.

Sample	Description	Symmetric (Y/N)	Name	Geologic Era
1				
2				
3				
4				
5				

Answer the questions.

1. Which fossilized sample is the oldest?
2. Which fossilized sample is the youngest?
3. Mr. Temple's students were asked to use the data to identify each sample by name. They knew coral came first, followed by trilobites, ammonites, dinosaurs, and sharks. Use this information to name each sample.
4. How did these fossils form?
5. How do you think these fossils resurfaced?
6. Why is the study of fossils important?

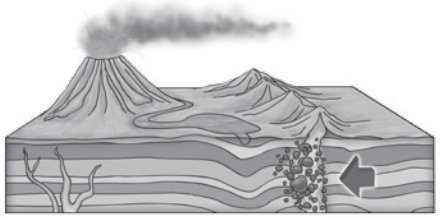
Reader Quiz

Directions: Use what you learned from reading *The World of Rocks and Minerals* to choose the best answer for each question.

1. How does the Earth naturally form rocks?
   a. Rocks have always just been there.
   b. Rocks are buried beneath the Earth's surface.
   c. Rocks are deposited by rivers and streams to new locations.
   d. The Earth uses heat, water, and pressure to constantly change rocks.

2. What natural landform do extrusive igneous rocks need to form?
   a. mountain b. volcano c. ocean d. canyon

3. This picture shows the formation of which kind of rock?
   a. sedimentary
   b. igneous
   c. metamorphic
   d. all of the above



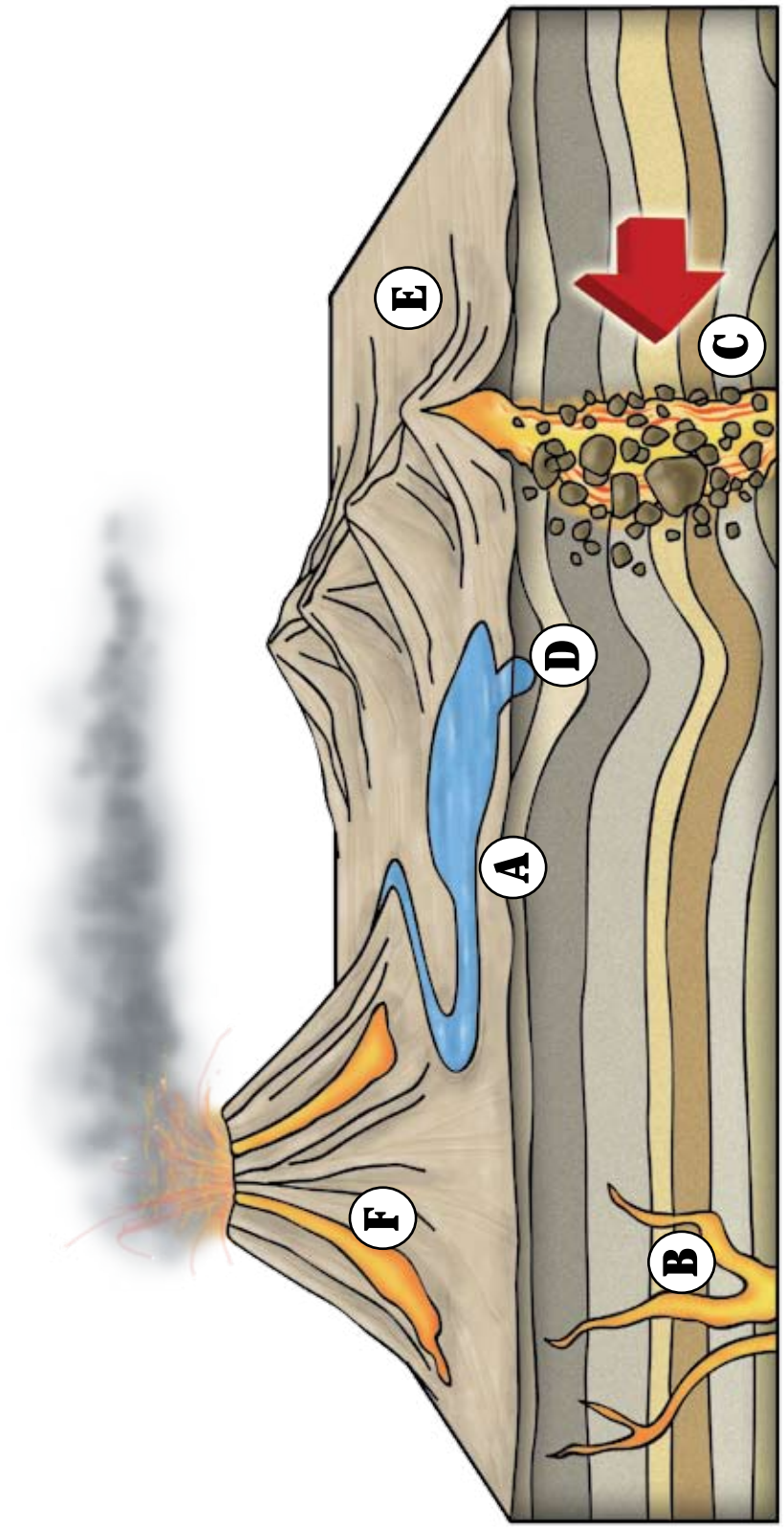
4. How do the skeletal remains of animals take part in the rock cycle?
   a. Their bones become part of the sediments that become rock.
   b. Their bones break up bits of earth that become rock.
   c. Their bones turn to dust particles so fine that they are not important in the rock cycle.
   d. Bones are not part of the rock cycle.

5. What happens when an igneous or sedimentary rock changes?
   a. It is crushed.
   b. It is melted.
   c. It becomes a metamorphic rock.
   d. It gets recycled back into the rock cycle.

6. How are rocks related to minerals?
   a. Minerals are made of elements.
   b. Elements combine to form minerals.
   c. Minerals are made from lava or pressure.
   d. Rocks are made of minerals.

7. How do people use rocks and minerals? Use details and examples from the book to support your answer.

Lifecycle of Rocks



granite

Source: Flonn Tirlea

obsidian

Source: David Brimm

sandstone

Source: Photos.com

limestone

Source: Photos.com

quartzite

Source: Nicholas Peter Gavin Davies

schist

Source: Jozef Sedmak