LESSON 1

Sharing What We Know about Rocks

Overview and Objectives

Most children are interested in rocks. The brainstorming and class discussions in this introductory lesson acknowledge that interest and offer students an opportunity to share their ideas and questions about rocks. These activities serve as a pre-unit assessment of students' knowledge about rocks. As they explore three rocks and discuss their similarities and differences, students will provide information that you can use to assess their observing, describing, and recording skills. The activities also introduce students to the concept of properties and prepare them for further exploration of rocks in Lessons 2 and 3.

- Students set up science notebooks in which they will record their observations, ideas, and questions.
- Students share their ideas about rocks and discuss what they would like to learn about them.
- Students observe three rocks and record their descriptions of them.
- Students discuss their observations of rocks with their classmates.
- Students connect their descriptions of rocks with the properties of rocks.

Background

Most people refer to any earth material they pick up as a "rock." Rocks, however, are usually aggregates of minerals. Because of this, minerals are sometimes called the "building blocks" of rocks. Rocks may contain fossils, the remains of trees and other plants, animals, or compacted shells.

The mineral content of a rock helps determine its value. Geologists study rocks and minerals because of their value to society and because they can provide information about the history and formation of our earth.

The features geologists study when they classify rocks are called physical properties. **Properties** are those characteristics of matter that can be used to describe it. **Physical properties** are characteristics of an object that can be observed without altering its composition. The greater the number of unique properties an object has, the easier it is to identify. When two or more objects have similar properties, they sometimes must be examined carefully before being identified. This examination usually involves performing physical and chemical tests. When geologists are out in the field, they study the properties of rock samples by using observations and simple physical and chemical tests, called **field tests,** some of which students will learn in this unit.

The three rocks students explore in this lesson are granite, gneiss, and conglomerate. You may find it helpful to examine three or four samples of each of these rocks before you teach the lesson. **Granite** is a very hard rock formed deep within the earth when a molten mixture called **magma** cools rapidly to form solid mineral grains. Granite is composed primarily of the minerals quartz and feldspar. **Gneiss** (pronounced "nice") is a coarse, grainy rock formed from other rocks such as granite and sandstone that were changed underground by extreme heat and pressure. Granite and gneiss share many properties. It may be hard to tell them apart; in fact, one pun among geologists is "Don't take gneiss for granite!" **Conglomerate** is formed from coarse fragments of other rocks that have been released by weathering and transported by water to a site of accumulation. Conglomerate frequently looks like a chunk of concrete. Students will learn about these rocks and nine others in Lessons 1–3 and in Lesson 16. In Lessons 4–15, they will focus on minerals.

This first lesson, like the entire unit, is designed to increase your students' knowledge of rocks and minerals, to develop their process skills in observing, describing, and recording properties, and to give them an opportunity to apply their knowledge and skills to the study of new rocks and minerals. The names of rocks and minerals, as well as the terms used to describe their properties and the processes through which they were formed, are useful communication tools. Some students may be eager to learn all of the names and terms; others may not. It is important to remember that the use of scientific terminology and spelling should always **follow** exploration of the concepts. The ability to name does not indicate that learning has occurred—in other words, "naming isn't knowing." The use of scientific terminology is not a focus of this unit. Please refer to pgs. 6–12 in this guide for additional information on the assessment of students' learning.

Materials

For each student

- 1 science notebook, with pockets and fasteners for loose-leaf paper
- 1 **Record Sheet 1-A: Rocks—Record of My Observations**
- 1 hand lens

For every two students

- 1 *Rocks and Minerals* Student Activity Book
- 1 set of three rocks, labeled 1–3
- 1 cardboard tray

For the class

- 4 sheets of newsprint, 60 × 90 cm (24 × 36 in)
- 3 plastic containers
- 1 colored marker

Management Tip: Students will record their observations, ideas, and questions in their science notebooks each day. In some lessons, students also will use record sheets, which they will store in their notebooks. Teachers have found that a folder with pockets and fasteners for loose-leaf paper works best for storing the record sheets. Students may use a spiral notebook if they create a pocket on the inside of one cover.

Preparation

1. Review this lesson as it is presented in the Student Activity Book. Decide when you want to distribute the books to the students.
2. Label two sheets of newsprint with the words "What We Know about Rocks." Put the date on each sheet. Label the other two sheets "What We Want to Know about Rocks." Have extra sheets available.
3. Make a copy of **Record Sheet 1-A: Rocks—Record of My Observations** for each student.
4. Create a classroom materials center for distribution and storage of the rocks and other supplies. Place the three numbered rocks in separate plastic containers that have been labeled 1, 2, or 3. Figure 1-1 shows one way to set up a materials center.

Figure 1-1

Materials center

5. Decide on a process for distributing and collecting materials. Each pair of students should be responsible for storing their own materials at the end of the lesson.
6. Assign each student a partner. The language skills of the members of each pair should be complementary.

Procedure

1. Distribute a science notebook to each student. Ask students to write their names and the current date on the first sheet. Explain that they will record data and observations in their notebooks daily. Emphasize the importance of dating every entry.
2. To introduce the unit, ask students to think for a minute about rocks. Use the following questions to focus their thoughts:
   - What do you know about rocks?
   - Where have you found rocks?
   - How are rocks used?
3. Ask students to write their thoughts on the dated page in their science notebooks.

4. Have students share their ideas about rocks. Record their comments on the class list entitled "What We Know about Rocks."
5. Ask students if they have any questions about rocks. Record their questions on the class list entitled "What We Want to Know about Rocks." Figure 1-2 illustrates some responses of other third-graders. Hang both class lists prominently in the room.

Management Tip: You will add new ideas and questions to both class lists throughout the unit. The lists also will be used as a basis of comparison in the post-unit assessment. Use a different-colored marker for each addition, and record its date.

Figure 1-2

Sample student responses

6. Show a sample set of rocks 1, 2, and 3 to the class. Let students know that they will now observe and describe these rocks.
7. Ask one student from each pair to go to the materials center to collect the following:
   - 1 set of rocks 1, 2, and 3
   - 1 cardboard tray
   - 2 hand lenses
8. Encourage students to explore with the hand lens by examining the writing in their notebooks, their fingernails, a pencil, or any other nearby object. Check to make sure that all the students can see the objects clearly. It is usually easiest for students of this age to hold the object still and slowly move the hand lens back and forth above it until the object comes into focus. Scientists usually put the lens within 3 cm of the eye and then move the object to bring it into focus.
9. Let students spend about five minutes exploring the rocks. Encourage them to share observations with their partners.

Figure 1-3

Exploring with a hand lens

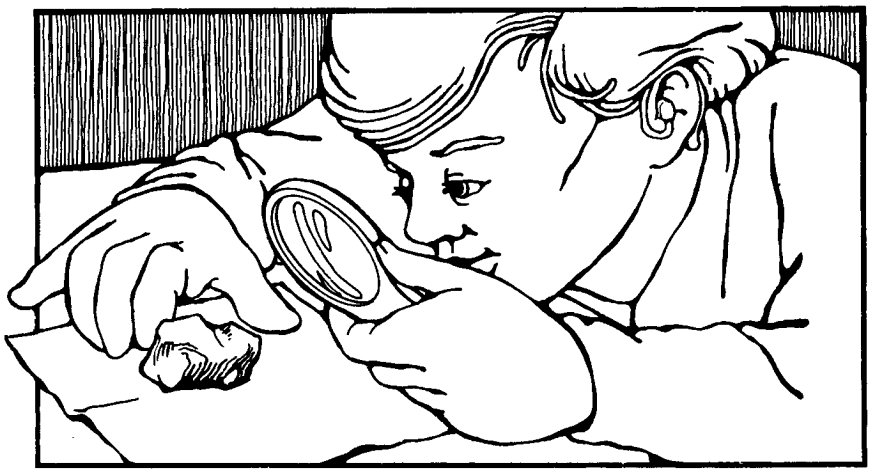
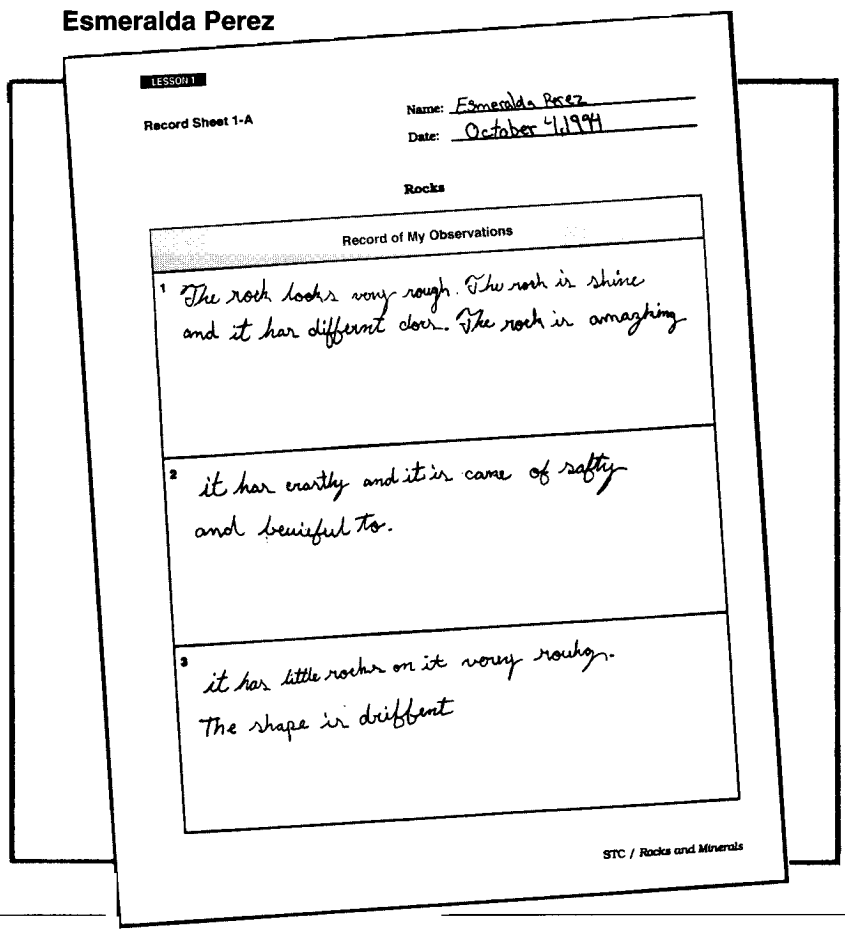


Figure 1-4

Third-graders' observations about rocks



Esmeralda Perez

LESSON 1

Record Sheet 1-A

Name: Esmeralda Perez

Date: October 4,1994

Rocks

Record of My Observations

1 The rock looks very rough. The rock is shine and it has different color. The rock is amazing

2 it has earthy and it is came of safty and beuiful to.

3 it has little rocks on it very roughy. The shape is driffent

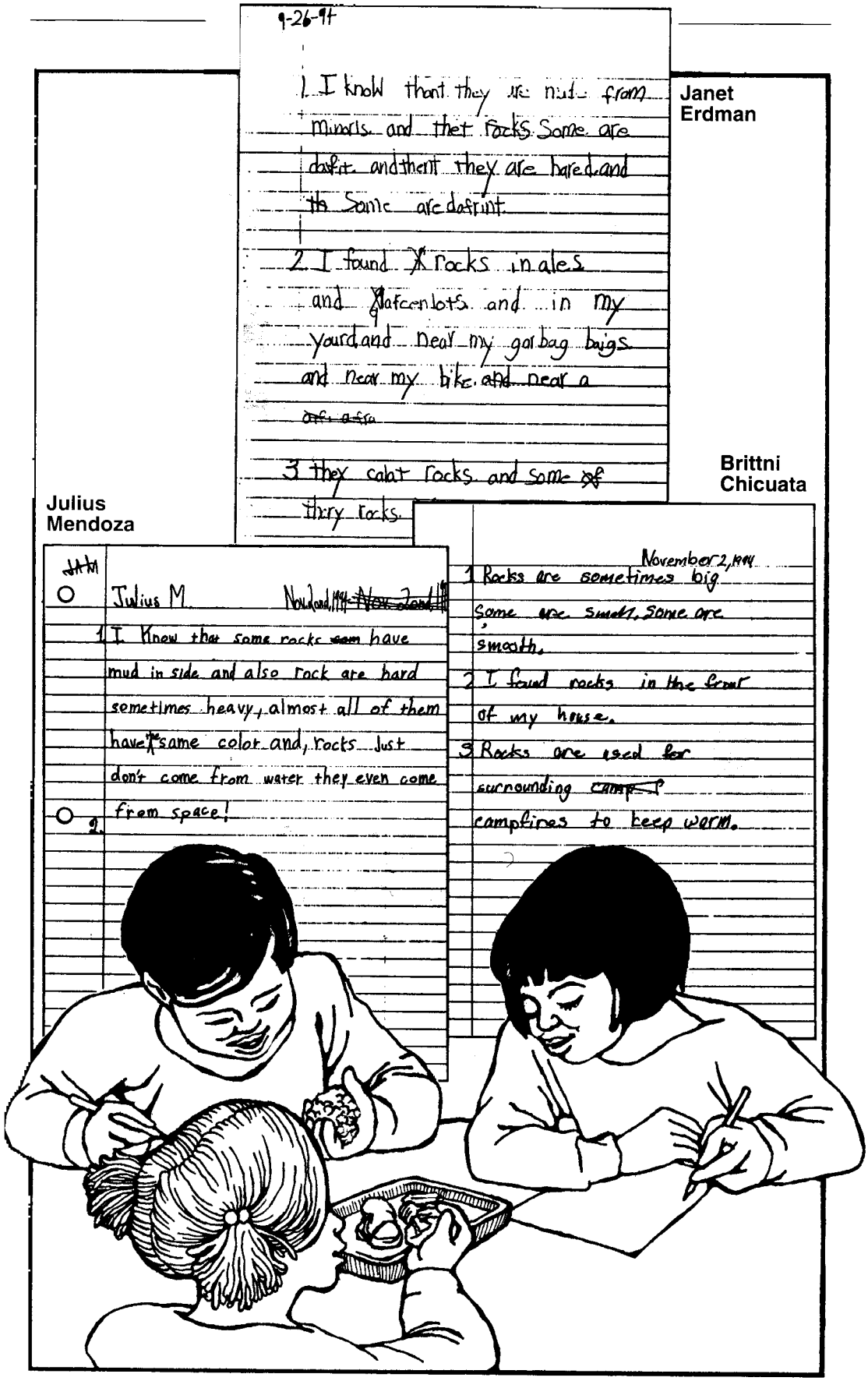
STC / Rocks and Minerals

10. Distribute a copy of **Record Sheet 1-A: Rocks—Record of My Observations** to each student. Ask students to record as many observations as possible for each rock. When they have finished, remind them to place the record sheet in the pocket of their notebooks. Figures 1-4 and 1-5 show some samples of third-grade students' observations about rocks.

11. Ask students to return the rocks, trays, and hand lenses to the materials center. Have them return each rock to the appropriately numbered plastic container.

Figure 1-5

Sample student notebook entries



Final Activities

1 Ask students to think about rock 1. Was it heavy or light? Bumpy or smooth? Let students know that words like these describe the rock's properties. Properties are the individual features of rocks. Now ask students to name some properties that they observed and recorded for rocks 2 and 3.

2. Help students summarize their observations with questions such as the following:
   - What properties are the same for all three rocks?
   - What properties are different for each of the three rocks?
3. Ask students to write in their science notebooks the words they used to describe the properties of rocks.

Extensions

SCIENCE

1 Create a rock learning center. Ask students to bring in rocks they have found. Encourage other students to examine the rocks with a hand lens.

LANGUAGE ARTS

2. Ask each student to describe what he or she has learned about rocks today to a friend or someone at home and then to request the listener to write down a question about rocks. Ask the student to bring the question to school and share it with the class. Create a class list of questions and place a check mark by each question as it is answered.

LANGUAGE ARTS

3. Create an adjective chart on which students can record words that describe rocks. Encourage students to add to the chart throughout the upcoming lessons.

Assessment

In the section Teaching *Rocks and Minerals* (pgs. 6–12), you will find a detailed discussion about the assessment of students' learning. The specific goals and related assessments for this unit are summarized in Figure T-1 on pgs. 9–10.

Students' writing in their science notebooks and the ideas they suggest during the class brainstorming session provide a baseline of their knowledge of rocks and their ideas about them. In Lesson 5, they will provide similar baseline information about minerals. You will ask students the questions from both lessons again as part of the post-unit assessment. By comparing responses from the pre- and post-unit assessments, you will be able to document both individual and class learning. Ideas to note today and at the end of the unit include:

- Are students aware that rocks and minerals are not the same?
- What information do students have about rocks?
- What do students know about how rocks are used?
- Have students studied rocks previously, either in school or elsewhere?
- Do students understand what a property is?

Observations that students have entered on **Record Sheet 1-A** will indicate their baseline skills in observing and describing. Specific skills to note today include:

- How detailed are students' oral descriptions of their observations?
- What properties, other than size, do students describe?
- What comparisons do students make?
- How detailed are students' written descriptions?

Record Sheet 1–A

Name: _____

Date:

Rocks

Record of My Observations
1
2
3