Changes in Materials for *Rocks and Minerals*

Science & Technology STC® for Children®

Since publication of the *Rocks and Minerals* Teacher's Guide Second Edition and the Student Investigations book, availability of Iceland spar calcite has fluctuated. For that reason, we have replaced Iceland spar in the class set of mineral specimens with another type of calcite, labeled "D." So that students may observe the double-refractive properties unique to clear Iceland spar calcite, the unit's developers have added one specimen to Lesson 8 as a display. The changes in materials require revised instructions in the unit's printed materials, both for the teacher and the student.

This errata set includes the following for the **Teacher's Guide**:

- For the *Rocks and Minerals* Teacher's Guide Second Edition, Section 3: Materials Management and Safety— revised pages 5–7
- For the *Rocks and Minerals* Teacher's Guide Second Edition, Section 4: Unit Investigations and Blackline Masters— revised pages 57–58, 61, 85, and 99

This errata set includes the following for the **Student Investigations** book:

- For the *Rocks and Minerals* Student Investigations book — revised page 30

Photocopy and distribute these new instruction pages as needed.

If you have questions about these changes or about the module in general, call Carolina's product information staff at 800-227-1150 (8 am–5 pm ET, M–F), or email *stc@carolina.com*.

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Materials List

This Materials List chart is a cross-reference guide for the materials supplied in the *Rocks and Minerals* unit kit (Item Number 97-2001). It gives the description of each item as it is listed in the lessons of the Teacher's Guide, and provides the cross-reference description of the item as it appears on the kit's packing list, which you will find in the *Rocks and Minerals* unit kit box(es). Please note that the metric and English equivalent measurements in this unit are approximate. For additional information about the materials in this unit kit, please contact Carolina at 800-227-1150 or www.carolina.com.

Item Description in Teacher's Guide	Item Description on Packing List	Lesson Number (Quantity Used)
Black streak plate (unglazed porcelain tile)	Pack of 15 black porcelain streak plates	7 (15), 15 (15), Assessment 2 (15)
Cardboard tray	Pack of 15 paper trays	1 (15), 2 (15), 3 (15), 4 (15), 5 (15), 6 (15), 7 (15), 8 (15), 9 (15), 12 (15), 13 (15), 14 (15), 15 (15), 16 (15), Assessment 2 (15)
Class set of 19 mineral specimens	Class set of 19 mineral specimens	
Biotite specimens (labeled "R")	Pack of 16 biotite specimens (labeled "R")	15 (15), 16 (15)
Calcite specimens (labeled "D")	Pack of 16 calcite specimens (labeled "D")	5 (15), 6 (15), 7 (15), 8 (15), 9 (15), 10 (15), 11 (15), 12 (15), 13 (15), 14 (15), 15 (15), 16 (15)
Feldspar (plagioclase) specimens (labeled "A")	Pack of 16 feldspar (plagioclase) specimens (labeled "A")	4 (15), 5 (15), 6 (15), 7 (15), 8 (15), 9 (15), 10 (15), 11 (15), 12 (15), 13 (15), 14 (15), 15 (15), 16 (15)
Fluorite (blue crystal) specimens (labeled "E")	Pack of 16 fluorite (blue crystal) specimens (labeled "E")	5 (15), 6 (15), 7 (15), 8 (15), 9 (15), 10 (15), 11 (15), 12 (15), 13 (15), 14 (15), 15 (15), 16 (15)
Galena specimens (labeled "C")	Pack of 16 galena specimens (labeled "C")	4 (15), 5 (15), 6 (15), 7 (15), 8 (15), 9 (15), 10 (15), 11 (15), 12 (15), 13 (15), 14 (15), 15 (15), 16 (15)
Graphite specimens (labeled "F")	Pack of 16 graphite specimens (labeled "F")	5 (15), 6 (15), 7 (15), 8 (15), 9 (15), 10 (15), 11 (15), 12 (15), 13 (15), 14 (15), 15 (15), 16 (15)
Gypsum specimens (labeled "H")	Pack of 16 gypsum specimens (labeled "H")	5 (15), 6 (15), 7 (15), 8 (15), 9 (15), 10 (15), 11 (15), 12 (15), 13 (15), 14 (15), 15 (15), 16 (15)
Gypsum (satin spar) specimens (labeled "N")	Pack of 16 gypsum (satin spar) specimens (labeled "N")	12 (15), 16 (15), Assessment 2 (15)
Gypsum (selenite crystal) specimens (labeled "S")	Pack of 16 gypsum (selenite crystal) specimens (labeled "S")	12 (15), 16 (15), Assessment 2 (15)
Gypsum (selenite desert rose) specimens (labeled "O")	Pack of 16 gypsum (selenite desert rose) specimens (labeled "O")	12 (15), 16 (15), Assessment 2 (15)
Halite specimens (labeled "M")	Pack of 16 halite specimens (labeled "M")	12 (15), 16 (15), Assessment 2 (15)
Hematite specimens (labeled "G")	Pack of 16 hematite specimens (labeled "G")	5 (15), 6 (15), 7 (15), 8 (15), 9 (15), 10 (15), 11 (15), 12 (15), 13 (15), 14 (15), 15 (15), 16 (15)
Hematite (red) specimens (labeled "Q")	Pack of 16 hematite (red) specimens (labeled "Q")	15 (15), 16 (15)

Item Description in Teacher's Guide	Item Description on Packing List	Lesson Number (Quantity Used)
Magnetite (lodestone) specimens (labeled "I")	Pack of 16 magnetite (lodestone) specimens (labeled "I")	5 (15), 6 (15), 7 (15), 8 (15), 9 (15), 10 (15), 11 (15), 12 (15), 13 (15), 14 (15), 15 (15), 16 (15)
Muscovite specimens (labeled "J")	Pack of 16 muscovite specimens (labeled "J")	5 (15), 6 (15), 7 (15), 8 (15), 9 (15), 10 (15), 11 (15), 12 (15), 13 (15), 14 (15), 15 (15), 16 (15)
Quartz (hexagonal crystal) specimens (labeled "B")	Pack of 16 quartz (hexagonal crystal) specimens (labeled "B")	4 (15), 5 (15), 6 (15), 7 (15), 8 (15), 9 (15), 10 (15), 11 (15), 12 (15), 13 (15), 14 (15), 15 (15), 16 (15)
Quartz (pink crystal) specimens (labeled "P")	Pack of 16 quartz (pink crystal) specimens (labeled "P")	15 (15), 16 (15)
Sulfur (crystal) specimens (labeled "K")	Pack of 16 sulfur (crystal) specimens (labeled "K")	5 (15), 6 (15), 7 (15), 8 (15), 9 (15), 10 (15), 11 (15), 12 (15), 13 (15), 14 (15), 15 (15), 16 (15)
Talc specimens (labeled "L")	Pack of 16 talc specimens (labeled "L")	5 (15), 6 (15), 7 (15), 8 (15), 9 (15), 10 (15), 11 (15), 12 (15), 13 (15), 14 (15), 15 (15), 16 (15)
Cup, 90 mL (3 oz)	Pack of 15 3½ plastic cups	6 (15), 15 (15)
Cup, 480 mL (16 oz) with lids	Pack of 35 16oz plastic cups with lids	1 (3), 2 (12), 4 (15), 5 (12)
Dropper	Pack of 15 plastic droppers	6 (15), 15 (15)
Hand lens	Pack of 30 hand lenses	1 (30), 2 (30), 3 (30), 4 (30), 5 (30), 6 (30), 10 (30), 12 (30), 13 (30), 14 (30), 15 (30), 16 (30), Assessment 2 (30)
Iceland spar calcite sample	Iceland spar calcite	8 (1)
Magnet	Pack of 15 magnets	11 (15), 15 (15), Assessment 2 (15)
Pair of disposable gloves	Pack of 100 disposable gloves	4 (30), 5 (30), 6 (30), 7 (30), 8 (30), 9 (30), 10 (30), 11 (30),12 (30), 13 (30), 14 (30), 15 (30), 16 (30), Assessment 2 (30)
Penlight	Penlight with 2 AAA Batteries	8 (15), 9 (15), 12 (15), 15 (15), Assessment 2 (15)
Set of 12 rock specimens	Set of 12 rock specimens	
Basalt specimens (labeled "8")	Pack of 16 basalt specimens (labeled "8")	2 (15), 3 (15), 4 (15), 16 (15)
Conglomerate specimens (labeled "3")	Pack of 16 conglomerate specimens (labeled "3")	1 (15), 2 (15), 3 (15), 4 (15), 16 (15)
Gneiss specimens (labeled "2")	Pack of 16 gneiss specimens (labeled "2")	1 (15), 2 (15), 3 (15), 4 (15), 16 (15)
Granite specimens (labeled "1")	Pack of 16 granite specimens (labeled "1")	1 (15), 2 (15), 3 (15), 4 (15), 16 (15)
Limestone specimens (labeled "4")	Pack of 16 limestone specimens (labeled "4")	2 (15), 3 (15), 4 (15), 16 (15)
Marble specimens (labeled "11")	Pack of 16 marble specimens (labeled "11")	2 (15), 3 (15), 4 (15), 16 (15)
Obsidian specimens (labeled "7")	Pack of 16 obsidian specimens (labeled "7")	2 (15), 3 (15), 4 (15), 16 (15)
Pumice specimens (labeled "9")	Pack of 16 pumice specimens (labeled "9")	2 (15), 3 (15), 4 (15), 16 (15)

Item Description in Teacher's Guide	Item Description on Packing List	Lesson Number (Quantity Used)
Sandstone specimens (labeled "6")	Pack of 16 sandstone specimens (labeled "6")	2 (15), 3 (15), 4 (15), 16 (15)
Schist specimens (labeled "12")	Pack of 16 schist specimens (labeled "12")	2 (15), 3 (15), 4 (15), 16 (15)
Shale specimens (labeled "5")	Pack of 16 shale specimens (labeled "5")	2 (15), 3 (15), 4 (15), 16 (15)
Slate specimens (labeled "10")	Pack of 16 slate specimens (labeled "10")	2 (15), 3 (15), 4 (15), 16 (15)
Square of transparent film, 75 × 75 mm (3 × 3 in)	Pack of 3 transparent film sheets	8 (30)
Steel nail	Pack of 15 D nails	10 (15), 15 (15), Assessment 2 (15)
Waxed paper, 75 × 75 mm (3 × 3 in)	75ft roll of waxed paper	8 (15)
White streak plate (unglazed porcelain tile)	Pack of 15 white porcelain streak plates	7 (15), 15 (15), Assessment 2 (15)

LESSON 8

Shining a Light on the Minerals

Overview and Objectives

In this lesson, students are introduced to a new property of minerals—their ability to transmit light. As students shine a penlight on each mineral, they observe that some minerals are transparent, some are translucent, and others are opaque. The class discussion of how to describe and record this property expands students' vocabulary and reinforces their awareness that people may use different words to describe the same observation. Students will again test their minerals with light in Lesson 9, where they are introduced to another property, luster.

- Students test how much light shines through each of their minerals.
- Students compare and discuss each mineral's ability to transmit light.
- Students sort the minerals according to their ability to transmit light.
- Students record the results of the light test.

Background

Although the concept that students explore in this lesson is quite simple, the term used to describe it, "light transmissivity," is not. This term has been shortened to "Light" on the mineral profile sheets.

Most students will be able to decide quickly whether they can see light through each mineral, but they may not have the vocabulary to describe their observations. During the first part of this lesson, you will have to give students time to suggest their own words to describe what they see and to develop a shared understanding of the meaning of the words they use to describe their observations.

The three descriptors that geologists use to describe a mineral's light transmissivity are opaque, translucent, and transparent. Many minerals are **opaque;** they transmit no light. Others are **translucent;** they transmit varying degrees of light. Some minerals are **transparent;** they transmit virtually all the light that is shined at them.

After students have tested each of their minerals with a penlight and recorded and discussed their results, they will read about calcite and muscovite, both of which display unique properties of light transmissivity.

Materials

For the teacher

1 piece of Iceland spar calcite

For each student

1 science notebook
1 set of 12 **Mineral Profile Sheets** (from Lesson 6)
1 pair of disposable gloves

For every two students

1 set of 12 minerals in an egg carton
1 cardboard tray
1 square of transparent film, 75 × 75 mm (3 × 3 in)
1 square of waxed paper, 75 × 75 mm (3 × 3 in)
1 square of cardboard, 75 × 75 mm (3 × 3 in)
1 penlight

Preparation

1. Cut out 75-mm (3-in) squares of transparent film, waxed paper, and cardboard. Every pair of students will need one square of each of the different materials.
2. Review the **Student Instructions for Performing the Light Test** in this lesson of this guide (pg. 29 of the Student Investigations book). Following these procedures (and wearing gloves), test your set of 12 minerals to determine whether each mineral is opaque, translucent, or transparent.
3. Test the penlights. Replace batteries if necessary.
4. Read the information about calcite and muscovite in this guide.
5. Put the sample of Iceland spar calcite on display with some text so that students may observe the double refraction that causes a double image.

Procedure

1. Give every pair of students one square each of transparent film, waxed paper, and cardboard. Ask them to place each square over a different part of the first page of Lesson 8 of their Student Investigations books. Are they able to see through all the squares and read the passage to their partners?

Figure 8-1

Exploring with the squares

Reading Selections

Calcite

Have you ever been in a cave and seen the formations that look like icicles? They are called stalactites and stalagmites.

These are rocks that contain a lot of calcite. Calcite is one of the most important minerals found in rocks formed under water. Calcite is also found in clam shells. Sometimes calcite is white. Sometimes it is so clear that you can see through it. Most often calcite is white or another light color.

One kind of clear calcite is called Iceland spar. It has an unusual property. If you placed it on these words, you would see a double image! Because of this property, calcite is used in some kinds of prisms and microscopes. Your teacher has a sample of this on display for you to see.

Which mineral do you think is calcite?

Muscovite

Muscovite is a shiny, silvery-white mineral that has many thin sheets, like the pages in a book. Before glass was easily available, many people in Russia used pieces of muscovite to make windows. The name "Moscow," the capital city of Russia, comes from the Russian word for "glass." Did you know that people from Moscow are called "Muscovites"?

Which mineral do you think is muscovite?

LESSON 12

Describing the Shape of Minerals

Overview and Objectives

In this final lesson on the properties of minerals, students complete their profile sheets by recording the shape of each of the minerals. As students observe and describe four new mineral samples, they learn that some mineral samples have a distinctive shape and others do not. They are also confronted with the idea that a single mineral can display distinctly different shapes. These explorations of shape provide an intuitive introduction to the concept of crystalline structure in minerals. In the next lesson, students will further explore shape and other properties, as they compare and contrast several samples of the same minerals.

- Students observe and describe the shapes of four new mineral samples.
- Students compare the shapes of the 12 minerals in their set and the new samples.
- Students sort the 12 minerals on the basis of shape.
- Students discuss and record the shapes of their 12 minerals.

Background

The shape and size of a mineral are the result of its chemical composition, the length of time it took to cool and solidify, and the space available during its formation. Some mineral samples show a definite shape, or crystal form. Other samples are amorphous; in other words, they lack a crystal form.

Almost all minerals, regardless of their outward shape, have a regular internal geometric pattern, or crystalline structure. Six different crystal systems, or families, have been identified in minerals. All samples of the same mineral have the same internal crystalline structure even though the visible shape of a mineral and the size of its crystals may vary from sample to sample.

The crystalline structure of a mineral determines how it breaks or splits. Some minerals always break into the same distinctive shape. Halite breaks into cubes; micas, such as biotite and muscovite, break into very thin layers. The process of breaking into distinct shapes is called **cleavage.** The flat surfaces visible on some of the specimens, such as feldspar, or inside the clear ones, such as halite, are cleavage planes along which the specimen broke or would break further if struck with enough force. Some minerals, including talc, hematite, and quartz, break into nondistinct shapes. The absence of cleavage is called **fracture.** The characteristics of cleavage and fracture are important in the identification of minerals.

Each of the four new mineral samples that students will examine in this lesson has a different shape. The halite, mineral M, is clear and has a cubelike shape.

CALCITE

Feel: Rough and smooth
Color: Mostly white and other light colors
Streak: White
Hardness: Soft to medium; scratched by penny (also scratches penny)
Light: Light shines through
Luster: Glassy
Shape: Some flat sides, can be a cube or a slanted cube

FELDSPAR

Feel: Rough
Color: Milky white, pinkish brown, or light greenish gray
Streak: White
Hardness: Medium to hard; barely scratched by nail (may also scratch nail)
Light: No light shines through
Luster: Glassy
Shape: No special shape, flat sides

FLUORITE

Feel: Smooth
Color: Blue, green, yellow, purple
Streak: White or pale
Hardness: Medium; scratched by nail
Light: A little light shines through
Luster: Glassy
Shape: Cube

GALENA

Feel: Smooth
Color: Gray, silver
Streak: Gray
Hardness: Soft; scratched by penny
Light: No light shines through
Luster: Metallic
Shape: Cube

Reading Selections

Calcite

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These are rocks that contain a lot of calcite. Calcite is one of the most important minerals found in rocks formed under water. Calcite is also found in clam shells. Sometimes calcite is white. Sometimes it is so clear that you can see through it. Most often calcite is white or another light color.

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