

# Mineral Detectives

**Essential Question:** What are important properties for identifying minerals?

**Time:** 30 minutes

**Overview:** Students will be introduced to mineralogy through a hands-on lab in which they will observe and test different mineral properties using a mineral test kit.

**Assessment: Can student:**

- Describe a mineral by its specific properties?
- Explain why some properties are better than others for identifying minerals correctly?
- Explain what the Mohs Scale of Hardness is and how to use it?

## Vocabulary

Dichotomous key  
Rock  
Mineral  
Hardness  
Luster  
Streak

## TEACHER INFORMATION AND PROCEDURE

**Prior Knowledge for Students:** None

**Source:** Adapted from previous AMEREF Curriculum (Graphics from Depositphotos.com)

**Materials Needed:**

- 6 mineral specimens: fluorite, calcite, copper, sulfur, graphite, and talc
- Mineral detectives worksheet OR dichotomous key
- Mineral detectives answer key
- Mineral test kit
- Paper towel or wet wipe for streak plate

**What to do in Advance:** Set up mineral testing stations with minerals and a mineral test kit. There should be enough stations to allow for no more than 4 students per station.


## TEACHING THE LESSON

**Gear-up:** This activity pairs well with Alaska Resource Education's Jelly Belly Geology and Rock ID lessons, in which dichotomous keys and rock properties are introduced. Ask students: what are properties of rocks that help scientists identify what rock it is? Can just one property (like color) help us figure out what a rock or a mineral is, or do we need to know multiple properties of a rock or mineral specimen before we can properly identify it?

**Explore:** Introduce students to properties of minerals they have likely not heard of: luster, streak, and hardness.

- Luster refers to the way light interacts with the surface of a crystal, rock, or mineral. There are several terms to describe luster including: metallic, earthy, dull, glass-like, and greasy.
- Streak refers to the color of the residue left behind by a mineral specimen when scratching on the surface of a streak plate. The mineral kit has two ceramic plates for the streak test: a black and a white (depending on the color of the mineral).
- Hardness refers to the resistance of a mineral to scratching. To perform a hardness test, you need objects of a known hardness to scratch the mineral specimens with: a fingernail, a copper penny, a steel nail, and a glass plate (all in the test kit). Using the Mohs Scale of Hardness, you will determine the relative hardness of a mineral by scratching it with the various items in order from least hard (fingernail) to most hard (glass plate). If the mineral is not scratched by the object, that means the mineral is harder than the object and you must move on to the next hardest object for testing. Once you test with an object that does scratch the mineral, stop your testing and refer to Mohs scale to determine the hardness range of the mineral.

Students will work in groups to perform the various mineral tests for each of the 6 specimens and fill out the Mineral Detectives data sheet. Student groups will each have one mineral test kit and rotate around to the 6 mineral stations (or, students stay put and the mineral specimens are moved around). After performing a streak test, the ceramic plate will have



to be wiped. After filling out the sheet for all 6 specimens, present the students with the answer key. Students are to compare their data to the answer key data in order to correctly identify each mineral specimen.

**Generalize: Ask students:**

- Which tests were easier to perform than others? Which did you have a hard time with?
- Which mineral was the softest? The hardest?
- Why do you think it's important to identify a variety of properties of a mineral in order to correctly identify it?
- Why might color be a poor way to identify a mineral?
- Can you think of other properties we didn't look at today that might further help us identify the minerals?
- Beyond identifying the mineral specimen, why else might we care about the different properties of minerals?

**Extensions:**

- An alternative to the activity above would be to use the mineral dichotomous key to have students identify the minerals. The stations would be set up the same, and students would rotate in groups to each specimen moving through the dichotomous key in a similar fashion to the Rock ID lesson. This activity has them scratching the mineral with their fingernail, but not performing the full hardness test. As an extension, students could perform the hardness test on each of the 6 specimens after completing the dichotomous key.

# Mineral Testing Data Sheets

Mineral	Color	Streak	Luster	Texture	Hardness test	Mineral Identification
What number mineral is it?	What colors are on the mineral?	What color is the powder on the streak plate?	Is it metallic or non-metallic? Shiny or dull? Glass-like?	Is it smooth, rough, bumpy, pointed, rounded, etc.	Use the tools below to see which one scratches the mineral. Going in order, circle the tool that scratches it first and then STOP. Use the scale on the back to figure out the mineral's hardness.	Can you figure out which mineral you have using the answer key?
					1. Fingernail 2. Penny 3. Nail 4. Glass	
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## MOHS SCALE OF HARDNESS

MOHS SCALE NUMBER	COMMON TESTS
1	SCRATCHED BY FINGERNAIL
2	
3	SCRATCHED BY COPPER PENNY
4	
5	SCRATCHED BY STEEL NAIL
6	
7	
8	SCRATCHES GLASS
9	
10	SCRATCHES ALL COMMON MATERIALS

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# MINERAL KEY

Names: \_\_\_\_\_

