# Pre-Lab Information

**Purpose** To understand the methods of classification of rocks and minerals, as well as how rock formation affects classification

**Time** Approximately 45 minutes

**Question** How are minerals and rocks classified?

**Summary** In this virtual lab, you will identify mineral and rock samples by conducting tests and observing properties used to classify minerals and rocks. You will compare your recorded observations to an identification chart to identify the minerals, then use a flowchart to identify the rocks.

# Lab Procedure

1. **Prepare for the lab.**
2. Read through this guide before you begin, so you know the expectations for this lab.
3. If anything is not clear to you, be sure to ask your teacher for assistance.

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1. **Open the virtual lab.**

**Step 3: Conduct scratch tests.**

1. Read about minerals and scratch tests. Press the **Conduct scratch tests** button to determine the relative hardness of the mineral samples.
2. Click on gypsum (hardness = 2). Drag Mineral 1 to gypsum. Scratch Mineral 1 against gypsum. Observe what happens. If a scratch appears, this means that Mineral 1 is harder than gypsum.
3. Click on a mineral that is harder than gypsum: calcite (hardness = 3). Drag and scratch mineral 1 against calcite. Observe what happens.
4. Repeat this process (scratching Mineral 1 against the minerals with known hardness) until no scratch appears. The hardness of Mineral 1 is the same as the mineral with the lowest known hardness where no scratch appears. See example analysis below:

**Scratch Test for Mineral 1**

|  |  |  |  |
| --- | --- | --- | --- |
| **When scratched on****gypsum (hardness = 2)** | **When scratched on calcite (hardness = 3)** | **When scratched on fluorite (hardness = 4)** | **Conclusion** |
| A scratch appears. | No scratch appears. | No scratch appears. | Hardness of Mineral 1 = 3 |

1. Record the relative hardness value of Mineral 1 in **Table A** in the **Data** section of this guide.
2. Repeat Steps B–D to determine the relative hardness of the remaining mineral samples. Be sure to record the hardness of the mineral samples in **Table A**.
3. Move on to the next activity.

**Step 4: Conduct streak tests.**

1. Read about the streak test.
2. Press the **Conduct streak tests** button.
3. Drag Mineral 1 to the streak plate. Use the mineral to draw a line on the left side of the streak plate. Move the mineral sample up and down until you get a clear line (about 10 strokes).
4. Record the color of the line in **Table A**.
5. Repeat Steps C and D for the remaining mineral samples. Draw lines about an inch from each other.
6. Press the **Clear** button to clear all lines if you need to do the streak tests again.
7. Move on to the next activity.

**Step 5: Observe other properties of minerals.**

1. Read about the other properties that mineralogists use to classify and identify minerals.
2. Press the **Describe minerals** button.
3. Inspect the minerals based on these properties.
4. Color
5. How they break (cleavage or fracture)
6. Luster (shiny or dull)
7. Record your observations in **Table A**.
8. Use the **Grid** view to see all the minerals.
9. Use the **Enlarged** view to observe the minerals more closely. In this view, use the arrows to move from one mineral to another.
10. Move on to the next activity.

**Step 6: Identify the unknown minerals.**

1. Use the data you gathered in **Table A** and the **Mineral Identification Chart** below to identify the mineral samples.
2. Drag the stickers from the tools panel to the minerals to name the samples. Use the **Grid** or **Enlarged** view.
3. Press the **Check** button.
4. If an ***x*** mark appears, you have incorrectly named a mineral sample. Return the sticker to the Stickers panel. Compare your observations against the information in the **Mineral Identification Chart**. Drag the stickers to the remaining mineral samples until you have named all the mineral samples correctly.
5. When all the mineral samples have been correctly identified, write the name of the minerals in **Table A**.
6. Move on to the next activity.

**Step 7: Examine and identify rocks.**

1. Read about rocks. Press the **Identify Rocks** button to proceed.
2. Examine Rock 1. Use the **Rock Identification Flowchart** below to identify Rock 1. Use the **Grid** or **Enlarged** view of the rocks.
3. Drag the correct sticker to Rock 1.
4. Repeat Steps B and C for the remaining rock samples.
5. Press the **Check** button.
6. If an ***x*** mark appears, you have incorrectly named a rock sample. Return the sticker to the Stickers panel. Reexamine the rocks you named incorrectly and use the flowchart to correctly identify them. Drag the stickers to the remaining rock samples until you have named all the rock samples correctly.
7. When all the rock samples have been correctly identified, write the name of the rocks in **Table B** in the **Data** section of this guide.
8. Proceed to the next activity in the Virtual Classroom.

# Data

Record your data either in your lab notebook or in the space below.

**Table A. Properties and Identities of Mineral Samples**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mineral**  | **Relative hardness****(1–10)** | **Streak** | **Color** | **Cleavage or fracture** | **Luster****(shiny or dull)** | **Name of mineral** |
| **1** |  |  |  |  |  |  |
| **2** |  |  |  |  |  |  |
| **3** |  |  |  |  |  |  |
| **4** |  |  |  |  |  |  |
| **5** |  |  |  |  |  |  |
| **6** |  |  |  |  |  |  |

**Table B. Identities of Rock Samples**

|  |  |
| --- | --- |
| **Rock sample** | **Name of rock** |
| **1** |  |
| **2** |  |
| **3** |  |
| **4** |  |
| **5** |  |
| **6** |  |

# Mineral Identification Chart

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cleavage or fracture** | **Streak** | **Color** | **Relative hardness (1–10)** | **Luster****(shiny or dull)**  | **Name of mineral** |
| Cleavage | Yellow or brown | Yellow, brown, or black | 5 | Shiny or dull | Goethite |
| Cleavage | White, yellow, or brown | White, red, yellow, brown, green, or black | 4 | Dull | Sphalerite |
| Cleavage | White or gray | Dark green, dark brown, or black | 3 | Dull | Biotite |
| Cleavage | Black | Black, silver, or gray | 1 | Shiny, sometimes dull | Graphite |
| Fracture | Brown to black | Brassy yellow | 6 | Shiny | Pyrite |
| Fracture | Reddish brown | Red-brown, black, or silver | 6 | Shiny or dull | Hematite |
| Fracture | Black | Black or silver | 6 | Shiny or dull | Magnetite |
| Fracture | Black or dark gray | Brownish, reddish, bronze, or yellow | 4 | Shiny | Pyrrhotite |
| Fracture | Greenish black | Brassy yellow | 4 | Shiny | Chalcopyrite |
| Fracture | Dark gray or black | Black with iridescent colors | 3 | Shiny  | Bornite |

# Rock Identification Flowchart

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