

Mineral Properties

Materials: Station 1

Consumable

none

Nonconsumable

1 mineral sample: calcite

1 mineral sample: talc

1 hand lens

1 metric ruler

Materials: Station 2

Consumable

none

Nonconsumable

1 rock sample: quartz

1 rock sample: granite

1 hand lens

1 metric ruler

Materials: Station 3

Consumable

none

Nonconsumable

1 mineral sample: calcite

1 mineral sample: talc

1 mineral sample: quartz

1 rock sample: granite

1 steel nail

Additional materials to set up the Stations

none

How to Set Up

Station 1

Materials

- 1 calcite sample
- 1 talc sample
- hand lens
- metric ruler

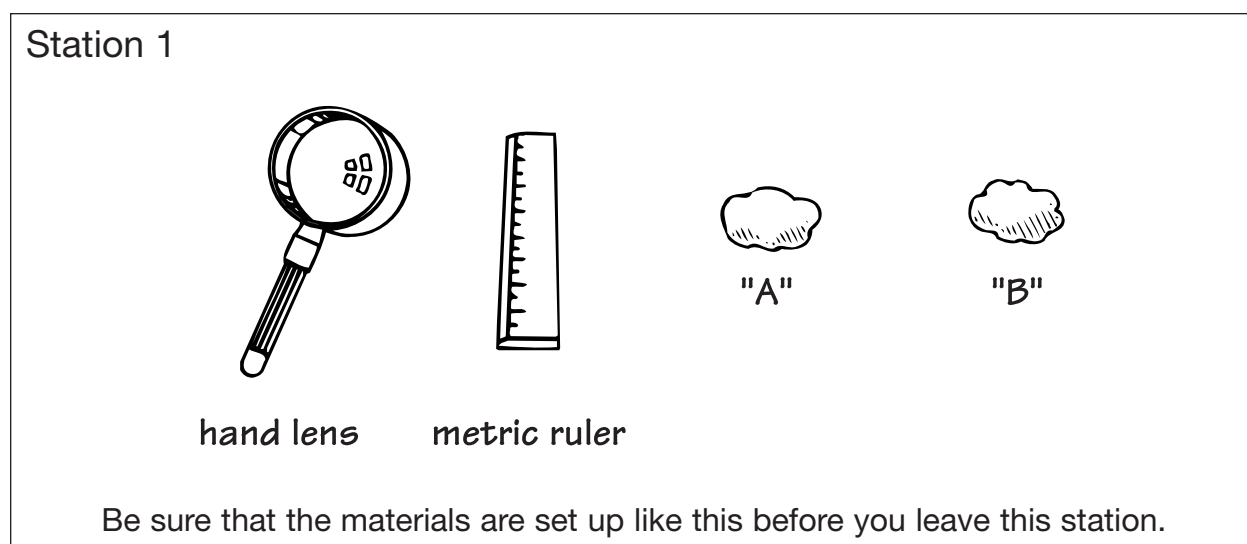
Preparation

1. Label calcite sample "A" and talc sample "B."
2. Students will use a metric ruler and a hand lens to compare the color, luster, and breakage pattern of calcite and talc.
3. You may need to break the sample with a hammer so students can observe breakage pattern.

Helpful Information

- The color of calcite and talc varies from one sample to another because of impurities in the minerals.
- Students should be able to identify the greasy luster of talc (also called soapstone) and the glassy luster of calcite.
- Talc breaks in sheets or layers. Calcite breaks result in small rectangular pieces.

Setup



How to Set Up

Station 2

Materials

- 1 quartz sample
- 1 granite sample
- hand lens
- metric ruler

Preparation

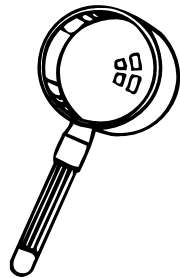
1. Label quartz sample “C” and granite sample “D.”
2. Students will use a metric ruler and a hand lens to compare the color, luster, and breakage pattern of quartz and granite.
3. You may need to break the sample with a hammer so students can observe breakage pattern.

Helpful Information

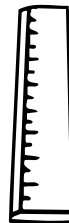
- Quartz is a one-mineral sample. Granite is composed of a number of minerals—mostly quartz, feldspar, and biotite.
- Quartz has a glassy luster. Students may be able to identify the quartz crystals in granite.
- Quartz breaks into circular patterns.

Setup

Station 2



hand lens



metric ruler



Be sure that the materials are set up like this before you leave this station.

How to Set Up

Station 3

Materials

- 1 calcite sample
- 1 talc sample
- 1 quartz sample
- 1 granite sample
- 1 steel nail

Preparation

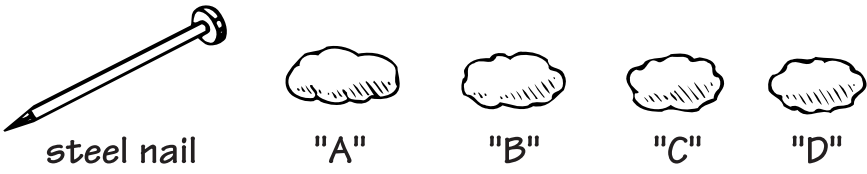
1. Students will use their fingernails (hardness: 2) and a steel nail (hardness: 5) to determine the relative hardness of talc, calcite, and quartz.
2. Label the samples.

Helpful Information

- On the Moh's scale of hardness, the minerals are talc (hardness: 1), calcite (hardness: 3), quartz (hardness: 7). Students do not need to test granite.
- A fingernail can scratch talc; the steel nail can scratch both talc and calcite. Students should show that the minerals from softest to hardest are talc (B), calcite (A), and quartz (C).

Setup

Station 1 5C3



The diagram illustrates the setup for the station. On the left is a steel nail. To its right are four mineral samples, each represented by a small, irregularly shaped rock with diagonal hatching. The samples are labeled "A", "B", "C", and "D" from left to right.

Be sure that the materials are set up like this before you leave this station.

Evaluation Guide

Station 1

Purpose

To evaluate a student's ability to compare talc and calcite with respect to color, luster, and breakage pattern.

Criteria

3 points = Student recorded comparisons of all three of the properties listed.

2 points = Student recorded comparisons of one of the properties listed.

1 point = Student recorded no observations.

Station 2

Purpose

To evaluate a student's ability to compare quartz and granite with respect to color, luster, and breakage pattern.

Criteria

3 points = Student recorded comparisons of all three of the properties listed.

2 points = Student recorded comparisons of one of the properties listed.

1 point = Student recorded no observations.

Station 3

Purpose

To evaluate a student's ability to determine the relative hardness of three minerals.

Criteria

3 points = Student recorded ten or more correct answers.

2 points = Student recorded five or more correct answers.

1 point = Student recorded no correct answers.

	A	B	C	D
One mineral in the sample?	yes	yes	yes	no
Scratched by fingernail?	no	yes	no	n/a
Scratched by steel nail?	yes	yes	no	n/a
Arrange the three single minerals from softest (1) to hardest (3).	2	1	3	

Data Analysis

Purpose

To evaluate a student's ability to identify desirable properties for construction materials, such as a material's hardness, sparkle, luster, breakage pattern, and so on.

Criteria

3 points = Student made a selection supported by two or more desirable properties.

2 points = Student made a suggestion supported by one desirable property.

1 point = Student did not make a suggestion or made a suggestion but provided no supporting properties.

Performance Activity Scoring Guide

Points	% equivalent	Points	% equivalent
12	100	6	50
11	92	5	42
10	83	4	33
9	75	3	25
8	67	2	16
7	58	1	8

Suppose that you are an apprentice in an architecture office. The head architect asks you to select the best material for the outside of a new building. The material will be used for the entrance, front walkway, and front stairs of a public building. Consider the properties of samples A, B, C, and D as you make a recommendation for the material.

My Data Collection

Station 1

Use the card at the station to correctly set up the equipment.

Material Test 1

Look closely at the samples labeled A and B. Use the ruler and the hand lens to observe the samples and compare their color, luster, and breakage pattern.

- Record your observations.

Station 2

Use the card at the station to correctly set up the equipment.

Material Test 1

Look closely at the samples labeled C and D. Use the ruler and the hand lens to observe the samples and compare their color, luster, and breakage pattern.

- Record your observations.

Station 3

Use the card at the station to correctly set up the equipment.

Exhibit 3

Decide which sample is made up of more than one mineral. Use your fingernail and a steel nail to test the hardness of samples that are made up of only one mineral.

Use your observations to complete the table. Answer *yes* or *no*.

	A	B	C	D
One mineral in the sample?				
Scratched by fingernail?				
Scratched by steel nail?				
Arrange the three single minerals from softest (1) to hardest (3).				

My Data Analysis

Now you have completed the materials tests. Use the data you've collected and what you know about rocks, minerals, and physical weathering to make a suggestion for materials to use in a building.

Select the sample you would suggest to use for the entrance way, front walkway, and stairs of a public building. Explain your choice.
