



# Rocks & Minerals

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## *Mineral identification and the rock cycle*



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## Mineral ID Station #1: Color and Streak (Test #1)

The first thing we will notice is a mineral's apparent color. Although some minerals can be easily identified by color, usually color by itself is not enough to identify a mineral. In fact, sometimes apparent color makes us think a mineral is one thing when it is actually something else. Impurities can cause the color of the mineral to differ from its basic make-up. To find out the color of the mineral in its pure form, we need something else. That "something else" is called its streak. When a mineral is rubbed firmly across an unglazed porcelain tile, it will leave behind a powder. This is called the streak and remains the same, no matter if the mineral has impurities or not. So... let's try the streak test.



[After each streak test, set the mineral next to the appropriate color card. Students can also mark the correct box for each mineral on the Mineral Identification - Introduction to Mineral Tests Chart. After finishing the streak tests, flip the cards to find out what the name of each mineral is. Students can include the mineral name on their Mineral Identification - Introduction to Mineral Tests Charts.]

MINERAL IDENTIFICATION - INTRODUCTION TO MINERAL TESTS				
Directions	Specimen 1	Specimen 2	Specimen 3	Specimen 4
<b>Streak Test</b> Using an edge or corner of the mineral, move the mineral across the surface of the streak plate as if it were a pen. Examine plate to determine color of the powder left behind. This is the streak of the mineral. The streak test reveals the true color of the mineral in powder form.	<input type="checkbox"/> Black <input type="checkbox"/> White <input type="checkbox"/> Brownish <input type="checkbox"/> No Streak Mineral Name:	<input type="checkbox"/> Black <input type="checkbox"/> White <input type="checkbox"/> Brownish <input type="checkbox"/> No Streak Mineral Name:	<input type="checkbox"/> Black <input type="checkbox"/> White <input type="checkbox"/> Brownish <input type="checkbox"/> No Streak Mineral Name:	<input type="checkbox"/> Black <input type="checkbox"/> White <input type="checkbox"/> Brownish <input type="checkbox"/> No Streak Mineral Name:
<b>Luster Test</b> Observe each of the minerals to see how light is reflected and select their luster properly as follows: Metallic: Reflects like metal Nonmetallic: Reflects like glass Sub: Their reflective qualities, like unglazed porcelain, earthy Pearly: Reflects like a pearl, sometimes with iridescent hues	<input type="checkbox"/> Metallic <input type="checkbox"/> Glassy (Vitreous) <input type="checkbox"/> Earthy (Earthy) <input type="checkbox"/> Pearly Mineral Name:	<input type="checkbox"/> Metallic <input type="checkbox"/> Glassy (Vitreous) <input type="checkbox"/> Earthy (Earthy) <input type="checkbox"/> Pearly Mineral Name:	<input type="checkbox"/> Metallic <input type="checkbox"/> Glassy (Vitreous) <input type="checkbox"/> Earthy (Earthy) <input type="checkbox"/> Pearly Mineral Name:	<input type="checkbox"/> Metallic <input type="checkbox"/> Glassy (Vitreous) <input type="checkbox"/> Earthy (Earthy) <input type="checkbox"/> Pearly Mineral Name:
<b>Transparency Test</b> Turn flashlight on and place mineral specimen to determine if light passes through and classify as follows: Opaque: Allows no light to pass through (like a wall) Translucent: Allows some light to pass through, but not enough for object to be seen on other side (like a frosted window) Transparent: Allows light to pass through so that object may be seen on other side (like a window)	<input type="checkbox"/> Opaque <input type="checkbox"/> Translucent <input type="checkbox"/> Transparent Mineral Name:	<input type="checkbox"/> Opaque <input type="checkbox"/> Translucent <input type="checkbox"/> Transparent Mineral Name:	<input type="checkbox"/> Opaque <input type="checkbox"/> Translucent <input type="checkbox"/> Transparent Mineral Name:	<input type="checkbox"/> Opaque <input type="checkbox"/> Translucent <input type="checkbox"/> Transparent Mineral Name:
<b>Hardness Test</b> Approximate: Using an edge or corner of mineral, move it across the surface of penny/glass. Examine penny/glass for scratch. If no scratch is left, repeat with a different specimen to confirm. Fingernail: Use fingernail or nail to attempt to scratch surface of mineral.	<input type="checkbox"/> Scratches penny (1-2) <input type="checkbox"/> Scratches glass (3-5) <input type="checkbox"/> Scratches penny (1-2) <input type="checkbox"/> Scratches glass (3-5) Mineral Name:	<input type="checkbox"/> Scratches penny (1-2) <input type="checkbox"/> Scratches glass (3-5) <input type="checkbox"/> Scratches penny (1-2) <input type="checkbox"/> Scratches glass (3-5) Mineral Name:	<input type="checkbox"/> Scratches penny (1-2) <input type="checkbox"/> Scratches glass (3-5) <input type="checkbox"/> Scratches penny (1-2) <input type="checkbox"/> Scratches glass (3-5) Mineral Name:	<input type="checkbox"/> Scratches penny (1-2) <input type="checkbox"/> Scratches glass (3-5) <input type="checkbox"/> Scratches penny (1-2) <input type="checkbox"/> Scratches glass (3-5) Mineral Name:

Another test we can do with our sense of sight is the luster test, so let's hike over to that station.

[Move to Luster station.]

## Mineral ID Station #2: Luster (Test #2)

Luster is the way a mineral reflects light. The two major groups of luster are metallic and non-metallic. There are several types of non-metallic luster, including (but not limited to) vitreous or glassy, dull or earthy, pearly, waxy, greasy, and silky. Now, let's try the luster test.



# Using a Mineral Identification Flowchart Lesson & Script

Now it's time to identify minerals using the identification tests we've learned! On the table, we have a set of mystery minerals we want to classify. Geologists often use a Mineral ID chart to identify a mineral they have found. The Mineral ID chart is an organized list of mineral properties for each mineral.

MINERAL	CLEAVAGE FRACTURE	LUSTER	TRANSPARENCY	STREAK	CRYSTAL HABIT	HARDNESS	APPARENT COLOR AND OTHER NOTES
MAGNETITE	x	metallic	opaque	black	isometric (cubic)	5.5 - 6.5	black to silver attracted to magnet
PYRITE	x	metallic	opaque	greenish to brownish black	isometric (cubic)	6.5	brassy yellow
HEMATITE	x	metallic (sometimes dull)	opaque	brownish red	hexagonal	5 - 6	metallic silver to earthy red
GRAPHITE	x	dull (sometimes metallic)	opaque	black	hexagonal	1 - 2	silver to gray; greasy feel
TALC	x	dull to pearly or greasy	opaque to translucent	white	monoclinic	1	white to green or gray; greasy feel
GYPSUM (SELENITE)	x	glassy	transparent to translucent	white	monoclinic	2	white to pink or gray
MUSCOVITE MICA	x	glassy or pearly	transparent to translucent	white	monoclinic	2 - 2.5	colorless to yellow; platy flexible in thin sheets
BOTITE MICA	x	glassy or pearly	opaque	gray to white	monoclinic	2.5 - 3	black to dark brown; platy flexible in thin sheets
CALCITE	x	glassy to dull	transparent to translucent	white	hexagonal	3	white, colorless or w/ light shades of other colors; rhombohedral cleavage; reacts to acid
FLUORITE	x	glassy	transparent to translucent	white	isometric (cubic)	4	colorless or variable; cubic crystals; cleaves in 4 directions
FELDSPAR	x	glassy (dull if weathered)	usually opaque	white	monoclinic or triclinic	6	white to pink; prismatic, tabular, or rectangular; cleaves in 2 directions at 90°
QUARTZ	x	glassy	transparent to translucent	white or no streak	hexagonal	7	colorless, white, or variable: cloudy (milky), purple (Amethyst), pink (Rose), gray or brown to black (Smoky); hexagonal crystals

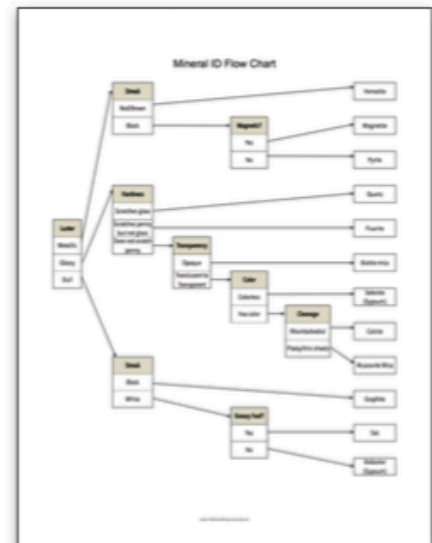
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[Show students a Mineral ID Chart to briefly explain how to reference a mineral ID chart to identify minerals.]

To identify our mystery minerals, we will use a Mineral ID Flowchart along with the mineral identification tests we learned previously.

[Pass out the Mineral ID Flowchart Key.]

This flowchart is a simple format of working through the Mineral ID chart for the minerals we will be identifying. [As a review, ask the students what they remember about the streak, luster, transparency, and hardness tests. Reference the previous lesson as needed.]



## Minerals in Metamorphic Rock

- Gneiss is composed of mica, feldspar, and quartz in distinct bands that often bend and fold.
- Schist is mostly made up of mica minerals, which line up in parallel layers that seem to overlap. (Silvery gray or sparkling schist normally contains muscovite mica. Brown or black schist is made up mostly of biotite mica.)
- Marble is composed mostly of the mineral calcite.
- What mineral do you think you would find in quartzite?

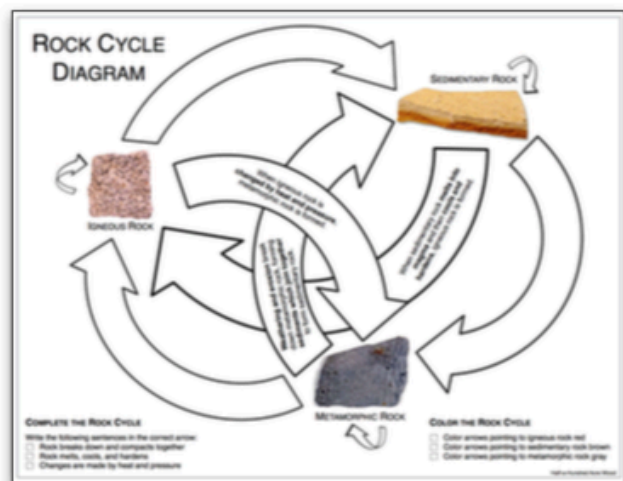
## Practical Application: Metamorphic Rock

- Slate is used for roofing material and decorative stones, and it was used as a writing board (or writing slate) in the classroom.
- Marble was used in Michelangelo's statues. Around 22,000 tons of marble were used to build the Parthenon in Ancient Greece. Marble is still used in sculptures and building materials today.

[After the rocks are returned, teach the following body movements to represent each type of rock.]

## Rock Motions (with optional key phrases)

- Igneous Rock (was "Smokin' Hot Rock!"): Start with hands together in front of your body and bring your arms upwards to act out an erupting volcano as you shout, "Igneous!"
- Sedimentary Rock (has "Weathered the Weather!"): Use both hands to model layering by stacking hands on top of each other as you say "sedimentary."
- Metamorphic Rock (is "the Master of Change!"): Form two fists stacked on top of each other. Repeatedly say "heat and pressure" as you flatten the hand underneath.



Play Rock Cycle Game and/or complete Rock Cycle Diagram (in the appendix) as a class, in groups, or individually.