

MINERAL AND ROCK MATCH

STANDARDS

See summary of National Science Education Standards.

Original: <http://books.nap.edu/readingroom/books/nses/>

Standard Concept	General Standard	Specific Standard	General Standard	Specific Standard	General Standard	Specific Standard
Grade Level		K-4		5-8		9-12
Physical Science (B)	Properties of ... materials	B.1.4.2	Properties ... of matter	B.1.8.3		
Earth and Space Science (D)	Properties of Earth Materials	D.1.4.1				
Science and Technology (E)	Distinguish between natural and human-made objects	E.3.4.1				
		E.3.4.2				
Science in ... social perspective (F)	Types of resources	F.3.4.1			Natural resources	F.3.12.1
		F.3.4.2				



MINERAL AND ROCK MATCH

INTRODUCTION

Minerals are made up of elements, and rocks are made up of minerals. Knowledge about this information makes it possible for the mineral to be refined so the elements become available for use, and makes it possible to gain information about the rock such as its origin and its use. Rocks are divided into three categories depending upon how they were formed. Sub-categories are used for some rock types.

PURPOSE

Students need to have a basic introduction to rocks and minerals as well as some knowledge of the periodic table before doing this activity because elements are the simple building blocks of the earth and minerals are simply made up of one or more elements.

This activity is to help students learn the Periodic Table of Elements and how some minerals are actually combinations of several elements. It will also help increase their knowledge of the three types of rocks and some identifying features of both selective minerals and rocks.

MATERIALS

- Cards with minerals or rock names
- Cards with identifying information
- Cards with element(s) symbol
- Cards with products (optional)

PROCEDURE

- 1) Divide the students up into three groups.
- 2) Each student in a particular group will have one type of card
 - a) For example, one group will each get a set of cards with mineral names.
 - b) The other two groups will each have one of the other two groups of cards for the mineral card set: 1) element symbols, or 2) identifying information.
- 3) Students will be given a set amount of time (5 to 10 minutes) to find the other two cards that match the one they have.
- 4) Once all cards are matched, have different students read their cards and explain how they arrived at their matches.
 - a) Be sure to allow time for questions and further explanation of identification possibilities.
 - b) If desired, students could study the rock cycle and mineral identification before this activity to increase their knowledge of both rocks and minerals.
- 5) Repeat the process for the rock name, rock type, and rock description cards.



OPTIONS

- 1) Have a student with an element card hold the card up and wait for the other students with matching description cards to hold theirs up.
- 2) Reverse the order or exchange cards until the students are comfortable with their understanding of minerals and rocks.
- 3) Introduce alloys and compounds into the game with the teacher calling out the name of a mixture and the students with the correct cards can stand.
- 4) Add other mineral and rock cards as desired.



CARDS FOR MINERALS: MINERAL NAME, CHEMICAL FORMULA, DESCRIPTION

MINERAL NAME	CHEMICAL FORMULA	MINERAL DESCRIPTION
BARITE	BaSO ₄	A grey colored, hardness of 3 to 3.5, streaks white, glassy or pearly luster and 4.5 specific gravity.
FLUORITE	CaF ₂	White, pink to pale green, streaks white with a glassy luster, 4.0 hardness and a 3.1 to 3.3 specific gravity.
DIATOMITE	SiO ₂ · nH ₂ O	White, with a white streak, chalky luster, no hardness and no specific gravity.
GOLD ORE (ROCK)	Au (PRODUCT)	Yellow, metallic luster, streaks yellow, a 3.0 hardness and 15.3 to 19.3 specific gravity.
QUARTZ	SiO ₂	White, pinks, browns & blacks with a glassy luster, streaks white, has a 7.0 hardness and a 2.6 specific gravity.
COPPER ORE (ROCK)	Cu (PRODUCT)	Grey, with a silky to satiny luster, streaks green, a 3.5 to 4.0 hardness and a 4.0 specific gravity.
GYPSUM	CaSO ₄ · 2H ₂ O	Clear to white, streaks white, glassy to chalky luster, a 1.5 to 2.0 hardness and a 2.3 specific gravity.
MAGNETITE	Fe ₃ O ₄	Black with a reddish brown streak, metallic luster, 6.0 hardness and a 5.0 specific gravity.
SILVER ORE (ROCK)	Ag (PRODUCT)	Grey-white with a silver streak, bright metallic, 2.5 to 3.0 hardness and a 10.0 to 12.0 specific gravity.



GALENA	PbS	Dark grey metallic ore of lead, dark streak, 2.5 hardness, heaviest of the common metals.
SULFUR	S	Yellow, resinous to glassy luster, streaks pale yellow, 2.0 hardness and a 2.0 specific gravity.
CALCITE	CaCO ₃	White, clear, yellow, pink or blue, with a white streak, glassy luster, 3.0 to 4.0 hardness and a 2.7 specific gravity.



CARDS FOR ROCKS: NAME, ROCK TYPE, ROCK DESCRIPTION

ROCK NAME	ROCK TYPE	ROCK DESCRIPTION
SHALE	SEDIMENTARY	Fine grained, formed by compressing clay, silt or mud and breaks easily into thin layers.
CONGLOMERATE	SEDIMENTARY	Coarse grained, with fine grained matrix cemented by calcite, silica or iron oxide.
PUMICE	IGNEOUS, EXTRUSIVE	Light and frothy. Gas bubbles are trapped in the rock during rapid cooling.
GRANITE	IGNEOUS, INTRUSIVE	Coarse grained, light colored with up to 50% quartz.
SCHIST	METAMORPHIC	Has parallel layers of flaky minerals such as mica in which the individual grains are distinctly visible.
GNEISS	METAMORPHIC	Coarse grained with bands of granular material having a flaky or elongated prismatic appearance.
SANDSTONE	SEDIMENTARY	Fine to medium grained, composed of abundant rounded or angular fragments set in fine-grained matrix.
LIMESTONE	SEDIMENTARY	Fine to coarse grained with 50% or more calcium carbonate.
BASALT	IGNEOUS EXTRUSIVE	Dark, fine grained rich in iron and magnesium.
DIORITE	IGNEOUS INTRUSIVE	Medium to coarse-grained composed of plagioclase feldspar and dark-colored minerals.
QUARTZITE	METAMORPHIC	Mainly quartz formed by recrystallization of sandstone or chert.



MARBLE	METAMORPHIC	Fine to coarse grained that is recrystallized calcite and/or dolomite.



SUGGESTIONS FOR PRODUCTS FOR MINERAL MATCH CARDS

MINERAL OR ROCK	PRODUCT OR USE
Barite	Vinyl, carpet, paints
Fluorite	Aluminum, plastics, toothpaste
Diatomite	Flat paints, kitty litter, crayons bond paper, cleansers
Pyrite	Used for sulfuric acid – same uses as for sulfur soil additives, synthetic materials, plastics, rubber, matches, paper, photography
Silver Ore, Silver	Photographic film, polyester, coinage, mirrors, wood glues, dentistry
Gypsum	Wallboard, cake mixes, breads, soil additive, brown paper bags
Calcite	Vinyl, chalk, glass, fiberglass, toothpaste, ceramics
Magnetite	Nails, polishing pads, staples, stainless steel
Copper Ores, Copper	Electrical wiring, plumbing, alloys, coinage
Gold Ore	Electronics, space technology, jewelry, medicine and medical technology
Quartz	Building materials, glass, computer chips, fiberglass, vinyl's, ceramics, toothpaste, shaving cream
Sulfur	Soil additives, synthetic materials, plastics, rubber, matches, paper, photography
Galena, Lead	Fishing sinkers, x-ray shields, batteries
Shale	Construction industry, bricks, cement, concrete
Conglomerate	Construction industry, concrete, asphalt



Sandstone	Construction industry, brownstones, abrasives, sandpaper, sand-blasting, emery boards
Granite	Dimension stone, construction, countertops, asphalt shingles
Pumice	Abrasives, cleansers, emery boards
Diorite	Railroad ballast, aggregate, Black granite decorative rock
Basalt	Road base, railroad track beds, aggregates, asphalt
Schist	Construction industry, (usually contains graphite, used for pencil lead (carbon, C))
Quartzite	Same as for sandstone, Construction industry, brownstones, abrasives, sandpaper, sand-blasting, emery boards
Marble	Anti-acids, dimension stone, headstones, statues
Gneiss	Building stone, construction industry, concrete
Coal	Plastics, aspirin, dyes, flavors
Limestone	Lime, sugar refining, cement, paper, gum

