Kit #15 Rocks and Minerals Blackline Masters

Rocks and Minerals ID Flow Charts	1-9
Rocks and Minerals ID Flow Chart Overview	
The Rock Cycle	11
Every American Born Will Need	
Mining	13
Dig a Little Deeper	14-17
Rocking Up and Down Crossword Puzzle	
End of Unit Assessment	19-24

OCM BOCES Science Center













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THE ROCK CYCLE





3.7 million pounds of minerals, metals, and fuels in his/her lifetime

Every year, more than 48,427 pounds of new minerals must be provided for every person in the United States to maintain our standard of living. This is a good reason for us to conserve our natural resources by recycling.



Mining has become a big business. Like many businesses it uses a great deal of energy.



Virtually every community in America has a mine or quarry nearby, one that provides, sand and gravel— minerals we use everyday.

Sand and gravel are used to build all our roads and are a critical part of the concrete that is used in our homes, schools, businesses and factories. For a special field trip, call to see about school tours (check your Yellow Pages).

The other necessary part of concrete is *cement*, made from **shale**, **clay**, **quartz**, **gypsum**, **iron**, **alumina**, **manganese**, andmost important, **limestone**.



Each year, more than 4,700 pounds of concrete is produced for every person in the United States.

For information about minerals in society, go to: Mineral Information Institute, <u>www.mii.org</u>

Dig A Little Deeper A Bright Smile

From Toothpaste and Minerals



Toothpaste cleans your teeth and keeps them healthy.

The cleaning is done with abrasives (from rocks) that rub the plaque away. Abrasives are minerals like **silica, limestone**, **aluminum** oxide (also used in sandpaper), and various **phosphate** minerals.

Fluoride, used to reduce cavities, comes from a mineral called fluorite. It is sometimes changed into stannous fluoride (**tin** fluoride).

Most toothpaste is made white with titanium dioxide which comes from minerals called rutile, ilmenite, and anatase. Titanium dioxide also is used to make white paint.

The sparkles in some toothpaste come from **mica**, a mineral common in many rocks.

The toothbrush and tube holding your toothpaste are both made of plastics that come from petroleum (petrochemicals) and other minerals.

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Bulb Soft glass is generally used, made from *silica, trona (soda ash), lime, coal, and salt.* Hard glass, made from the same minerals, is used for some lamps to withstand higher temperatures and for protection against breakage.

Filament Usually is made of *tungsten*. The filament may be a straight wire, a coil. or a coiled-coil.

Lead-in-wires Made of *copper* and *nickel* to carry the current to and from the filament.

Tie Wires

Molybdenum wires support lead-in wires.

Stem Press

The wires in the glass are made of a combination of *nickel-iron* alloy core and a *copper* sleeve.

Fuse '

Protects the lamp and circuit if the filament arcs. Made of nickel, manganese, copper and/or silicon alloys.

In the U.S., these are the sources of our fuels					
Coal	Nuclear	Hydro	Natural Gas	Oil	Other
52 %	20 %	7 %	16%	3%	2 %

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Dig A Little Deeper

How Many Minerals and Metals Does It Take to

Make A Light Bulb?

nitrogen and argon to

retard evaporation of

Usually a mixture of

the filament.

Gas



Support wires

Molybdenum wires support the filament.

Button & Button Rod

Glass, made from the same materials listed for the bulb (plus lead), is used to support and to hold the tie wires placed in it.

Heat Deflector

Used in higher wattage bulbs to reduce the circulation of hot gases into the neck of the bulb. It's made of *aluminum*.

Base

Made of *brass* (*copper and zinc*) or *aluminum*. One lead-in wire is soldered to the center contact and the other soldered to the base.

Don't forget the mineral fuels needed to generate the electricity to light up the bulb. In the U.S., these are the sources of our fuels

BC).



The word paper comes from "Papyrus," the writing material of ancient Egyptians (around 3500







The invention of paper is credited to a young Chinese official, who used bamboo stalks,

mulberry bark, and old silk garments in AD 105.

About 700 AD, an Arab army swept across Persia and learned the secret.



The process spread west and entered Europe through Spain (c 1150).

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In 1719 a French scientist first made paper from wood fibers.

The Gutenburg Bible, used the skins of 300 sheep.

Magazines are printed on paper that contains **trona**, **limestone**, **gypsum**, **ka**olin (clays), sulfur, magnesium, chlorine, sodium, titanium, carbon, calcium, and a few other special minerals.

World-wide, more than 250,000,000 tons of paper are produced every year.

In the U.S. and Canada, each of us consumes about 675 pounds of paper a year.



- a scientist that studies rocks, minerals and how they are formed 3.
- a rock type formed from melted rock material 6.
- the outer solid layer of the earth, the crust 8.
- 10. a rock type formed by changing rocks through heat and pressure
- 12. the process of breaking up of rocks by wind, water and ice
- 13. the thick rock layer found below the surface rocks and soil
- 14. hot liquid rock found below the surface
- 15. small pieces of rock that are larger than those found in silt
- 16. the movement of rock material by wind, water and gravity
- 17. melted rock found on the ground or surface

Down

- 1. the prints of very old plants and animals found in rocks
- a naturally formed solid made up of minerals 2.
- matter found on the earth's surface made up of pieces of rock, organic matter, air and water 4.
- a property of being shiny or dull 5.
- a rock type formed by cementing sediments together using natural cements or pressure 7.
- the property of leaving a mark on a ceramic plate 9.
- 11. a property of resisting scratching
- 14. a natural occurring rock forming material

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End of Unit Assessment

Important Teacher Note:

Because this unit is aligned to both the NYS Elementary and Intermediate Level Science Core Curriculums, the <u>first</u> <u>three</u> pages apply to <u>fourth</u> grade students, whereas <u>all</u> pages apply to <u>fifth</u> grade students.

(Each student should be provided with a rock sample)

You are a rock hound and have found some interesting rocks in a nearby stream. You are going to make some observations and do some tests on the rock to find out more about it. Answer the following questions as they relate to your study of this rock.



1. This is a list of observations you are going to make about your rock. Next to each item, write the name of the sense that you would use to make the observation. You can write down more than one sense for a test but not more than two.

Observation	Sense used for observation
Hardness	
Streak	
Magnetic	
Reacts with acid	
Texture	

- 2. Look at the rock sample. Write four words that would describe four different properties of your rock sample.
- 3. One of your rocks is attracted to a magnet. Why is this rock attracted to a magnet?
 - a. It is strong.
 - b. It is made of material attracted to magnets.
 - c. It came from the north.
 - d. Its property is shiny.
- 4. One of your rock samples allowed electricity to flow through it. As part of an electrical circuit, it allowed a light bulb to light. Why did this rock do this?
 - a. It is not an electrical conductor.
 - b. The rock had holes in it.
 - c. It is made of material that allows electricity to flow.
 - d. It was once melted.
- 5. The scientific name for the earth's crust is the _____

6. The three boxes below state the properties of three different rock samples. Your task is to sort the three rocks into two groups by using the rocks' properties. Make sure at least one rock is in each group.

First, write the property that you will use to sort the rocks.

<u>Next</u>, write a question about that property for you to sort on. (The question should have a yes or no answer.)

Lastly, sort the rocks by placing the letters in the correct box.

	Rock A rough glittery white streak not magnetic	Rock B rough dull brown streak magnetic	Rock C rough shiny no streak not magnetic
Prope	erty:		
Ques Sort:	tion:		
	YES	NO	

- 7. Which piece of information about your rock samples will give you the most information about them?
 - a. The size of the rock.
 - b. The weight of the rock.
 - c. The temperature of the rock.
 - d. The minerals in the rock.
- 8. The three classes of rocks are listed below. Choose two items from the list that best describe how each type of rock is formed. Write the letters of your choices in the box next to the rock class. Use each letter once.

	ŀ	٩	formed from rock pieces
Ignoods	E	3	changed by pressure
Sedimentary	()	formed from magma
	0)	changed by heat
Metamorphic	E		cemented together
	F	-	cooled

9. The diagram below shows a mountain where rock pieces have been moved from the top of the mountain to the bottom of the mountain. The numbers 1, 2 and 3 show the materials that were moved.

Write a paragraph about what is happening in the diagram. Use the words from the word box in your description.

model, weathering, erosion, deposition, water, gravity, natural cycle



Complete the sentences by filling in the blanks.

- 10. As people, we depend on rocks and minerals _____
- 11. By mining rocks and minerals, humans ______ their environment.
- 12. Refer to the diagram below to answer questions a-e.



- a. Write a title for the natural cycle that the diagram is showing.
- b. Label the three rock types that are part of the cycle.
- c. On the diagram draw boxes around the four forces at work in the cycle.
- d. List four different changes that are occurring in the cycle.
- e. In the "Time" box above write an estimate of how long this cycle takes to happen. You may choose to write: five, ten, a hundred, or a thousand.
- 13. List four uses of rocks or minerals in your everyday environment.

- 14. As humans we can conserve our natural mineral resources by:
 - a. digging more mines
 - b. recycling products
 - c. making more products to buy
 - d. using man-made products