

Name: _____
Mr. Willis
Conceptual Physics: _____
Date: _____

Unit X
Geophysics
Need extra help?
Check out <http://www.bayhicoach.com>

X

The Rock Cycle

Directions: Use the dichotomous key on the back to identify three rocks from the assortment. Indicate which rocks (number of rock) you were investigating and what type of rock you think it is. Next, read the following article and then, use a separate sheet of paper (unlined) to create a diagram of the rock cycle. Be sure to include all three types of rocks and as many of the means of change as you can find (ie. Erosion, melting, cooling, etc.) Use your textbook, Chapter 22 Section 3 for additional information.

A rock is defined as an aggregate of mineral grains, which means “a bunch of mineral grains all stuck together.” The mineral grains may be large enough to see with the naked eye (phaneritic) or microscopic (aphanitic). A granite specimen clearly shows its minerals: feldspar, quartz and often mica or hornblende. A basalt specimen is also composed of mineral grains, but these are too small to see. A rock may be an aggregate of grains of all the same mineral. Limestone is an example; it is made entirely from grains of the mineral calcite.

The three types of rocks are igneous, sedimentary and metamorphic. Igneous rocks form when molten rock, or magma, cools and hardens. Sedimentary rocks result from erosion of any rock type, followed by depositing the resulting sediment into a natural basin, and finally cementing the sediment into stone. Metamorphic rocks form when any rock is subjected to great heat and pressure, but not enough heat to melt the rock.

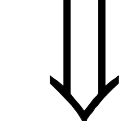
For example, when magma crystallizes, it may form the igneous rock, granite. If the granite is then eroded, it may become sand. Later, the sand may harden to form sandstone, a sedimentary rock. If the sandstone is heated and pressurized, it might turn into quartzite, a metamorphic rock. It is possible (although rare) for that quartzite to melt and then crystallize, turning it back into an igneous rock. This process can change any rock type into any other. It is called ***the Rock Cycle***.

Rocks at the surface of the earth are of many different ages. They range from over three billion years old to less than one million years old. We know that one of the laws of physics is that under ordinary circumstances matter can neither be created or destroyed. We can then ask the question, from what matter are new, younger rocks formed? The answer is--from older rocks. Older rocks are broken up, and their materials go to make younger rocks. These younger rocks may in turn be altered by various processes and their matter goes to make still younger rocks, and on and on. This process of forming younger rocks from older rocks is clearly cyclical. Older rocks are recycled to make younger rocks, just as old aluminum cans are recycled to make new aluminum cans or old newspapers are recycled to make new cardboard boxes. We call this the rock cycle, just as we could have a can cycle, or a paper cycle.

There are a number of processes by which rocks may be altered and reconstituted as new rocks. On the diagram to the right, the processes are all in small letters, the products or rocks formed by these processes are in capital letters. Weathering and erosion at the earth's surface can break down a rock into small bits. These can be deposited as sediments that become sedimentary rocks. Burial, with rising pressure and temperature, can alter any rock to form a metamorphic rock. Continued rise in temperature can eventually melt any rock until it is molten (called a magma). When the molten rock cools it forms an igneous rock. Metamorphic rocks can form from either sedimentary or igneous rocks. The sedimentary particles from which a sedimentary rock is formed can be derived from a metamorphic, an igneous, or another sedimentary rock. All three rock types can be melted to form magma. Thus, the cycle has continued over the ages, constantly forming new rocks, breaking those down in various ways, and forming still younger rocks.

Identifying Rocks Dichotomous Key

Start Here
Look at each rock



Do you see many crystals?



How are the crystals arranged?

Scattered

Layers

What color are the crystals?

Light

Dark

Does it fizz with vinegar?

Yes

No

Marble

Granite

Gabbro

Schist

Gneiss

Do you see sand grains or pebbles?



What size are the particles?

Grains

Pebbles

Sandstone

Conglomerate

What color are the holes?

Light

Dark

Tufa

Scoria

Pumice

Does it have holes or is it solid?

Holes

Solid

Does it fizz with vinegar?

Yes

No

Limestone

Does it have layers?

No

Yes

Does it have a glassy surface?

Yes

No

Obsidian

Rhyolite

Basalt

What type surface does it have?

Shiny

Dull

Slate

Shale

What rocks have you identified?

Rock 1 - # _____
Name: _____

Rock 2 - # _____
Name: _____

Rock 3 - # _____
Name: _____