

Rocks

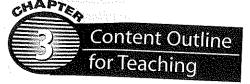
Underlined words and phrases are to be filled in by students on the Note-taking Worksheet.

Section 1 The Rock Cycle

- A. <u>Rock</u>—mixture of minerals, volcanic glass, organic matter, or other material
- B. Rock cycle—model showing processes that create and change rock
 - 1. <u>Sedimentary</u> rock can be changed by heat and pressure into metamorphic rock.
 - 2. Metamorphic rock can melt and cool to form igneous rock.
 - 3. <u>Igneous</u> rock can be broken into fragments that may later form sedimentary rock.
- C. Conservation of <u>matter</u>—rock cycle never destroys elements of rocks but merely redistributes them
- D. <u>James Hutton</u> recognized the rock cycle in 1788 by observing Siccar Point, Scotland.

Discussion Question

What primary processes are involved in the rock cycle? Pressure, temperature, and fragmentation



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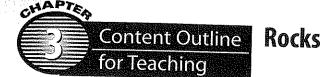
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Section 2 Igneous Rock

- A. <u>Igneous rocks</u> form from magma found deep under Earth's surface.
 - 1. Magma reaching the surface flows from a volcano as <u>lava</u>.
 - 2. Magma trapped below the surface forms large-grained <u>intrusive</u> igneous rock when it cools.
 - 3. Magma cooling at or near Earth's surface forms small-grained <u>extrusive</u> igneous rock.
 - 4. Basaltic igneous rocks are dark-colored and dense.
 - a. Contain iron and magnesium but very little silica
 - **b.** Basaltic lava flows <u>freely</u> from a volcano.
 - 5. Granitic igneous rocks are lower density and lighter color.
 - a. Contain more silica and less iron and magnesium
 - b. Granitic magma is thick and stiff.
 - **6.** <u>Andesitic</u> rocks have a more balanced composition of minerals and density than basaltic or granitic rocks.
 - 7. Crystal <u>size</u>, large or small, can help identify an igneous rock as intrusive or extrusive.
- 8. Volcanic glass rocks cool so quickly that few crystals form.
- 9. Some rocks have holes formed around once-trapped air and other gases.
- B. Igneous rocks are classified in two ways.
 - 1. Where they formed—<u>intrusive</u> (under the Earth's surface) or <u>extrusive</u> (at or near the Earth's surface)
 - 2. Magma type—basaltic, granitic, or andesitic

Discussion Question.

What does mineral crystal size tell about how rock formed? Large crystals—magma cooled slowly; tiny crystals—magma cooled more rapidly; very few crystals—magma cooled very quickly



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Section 3 Metamorphic Rocks

- A. Metamorphic rocks—changed by temperature, pressure, and hot fluids
 - 1. Heat and pressure result from one layer of rock on top of another layer.
 - **a.** Sometimes temperature and pressure are great enough to <u>melt</u> rock, forming magma.
 - b. Sometimes pressure flattens mineral grains in rocks without melting them.
 - **c.** As pressure and temperature continue to increase over time, one type of rock can change into <u>several different</u> metamorphic rocks.
 - 2. Hot, water-rich <u>fluids</u> can move through rock, chemically changing it.
- B. Classification of metamorphic rocks—by composition and texture
 - 1. Foliated texture—mineral grains flatten and line up in parallel layers or bands
 - 2. Nonfoliated texture—mineral grains grow and rearrange but do not form layers

Discussion Question,

What are three factors that can change rocks? Heat, pressure, and hot, waterrich liquids

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Section 4 Sedimentary Rocks

- A. Sedimentary rocks—mostly found on the exposed surface of Earth
 - 1. Rock fragments, mineral grains, and bits of plants and animal remains moved by wind, water, ice or gravity are called sediments.
 - 2. Sedimentary rocks form in layers.
- B. Sedimentary rocks—<u>classified</u> by what they were made of and how they were formed
- C. <u>Detrital</u> sedimentary rocks—made from broken fragments of other rocks
 - 1. When layers of small sediments stick together because of pressure, compaction occurs.
 - 2. When water and other minerals move through open spaces between larger sediments, gluing them together, cementation occurs.
 - 3. Detrital rocks often have a granular texture.
 - 4. Rocks are named according to size and shape of sediments.
 - a. Sediment size can be large like gravel or small like clay.
 - b. Sediments can be well-rounded or have sharp angles.
- D. Chemical sedimentary rocks—non-clastic rocks formed when dissolved minerals came out of solution
 - 1. Limestone forms from calcite, which was calcium carbonate in solution.
 - 2. Rock salt forms from halite, which was salt in solution.
- E. Organic sedimentary rocks—made from remains of once-living plants or animals
 - 1. Chalk—made of microscopic calcite-shell remains of animals
 - 2. Coal—made of plant remains, chemically changed by microorganisms and compacted over millions of years
- F. Rock cycle—a continuous and dynamic process

Discussion Ouestion

How do detrital, chemical, and organic sedimentary rocks differ? Detrital is formed from sediment fragments compacted or cemented together; chemical is formed from formerly dissolved minerals; organic is formed from once-living things.

END