**The Rock Cycle**

There are three types of rocks: igneous, sedimentary and metamorphic. Each of these types is part of the rock cycle. Through changes in conditions one rock type can become another rock type. Or it can become a different rock of the same type.

**What Are Rocks?**

A rock is a naturally formed, non-living earth material. Rocks are made of collections of mineral grains that are held together in a firm, solid mass.

How is a rock different from a mineral? Rocks are made of minerals. The mineral grains in a rock may be so tiny that you can only see them with a microscope, or they may be as big as your fingernail or even your finger.

Rocks are identified primarily by the minerals they contain and by their texture. Each type of rock has a distinctive set of minerals. A rock may be made of grains of all one mineral type, such as quartzite. Much more commonly, rocks are made of a mixture of different minerals. Texture is a description of the size, shape, and arrangement of mineral grains.

**Three Main Categories of Rocks**

Rocks are classified into three major groups according to how they form. Rocks can be studied in hand samples that can be moved from their original location. Rocks can also be studied in **outcrop**, exposed rock formations that are attached to the ground, at the location where they are found.

**Igneous Rocks**

**Igneous rocks** form from cooling magma. Magma that erupts onto Earth’s surface is lava. The chemical composition of the magma and the rate at which it cools determine what rock forms as the minerals cool and crystallize.

**Sedimentary Rocks**

**Sedimentary rocks** form by the compaction and cementing together of **sediments**, broken pieces of rock-like gravel, sand, silt, or clay. Those sediments can be formed from the weathering and erosion of preexisting rocks. Sedimentary rocks also include chemical **precipitates**, the solid materials left behind after a liquid evaporates.

**Metamorphic Rocks**

**Metamorphic rocks** form when the minerals in an existing rock are changed by heat or pressure within the Earth.

**The Rock Cycle**

Rocks change as a result of natural processes that are taking place all the time. Most changes happen very slowly; many take place below the Earth’s surface, so we may not even notice the changes. Although we may not see the changes, the physical and chemical properties of rocks are constantly changing in a natural, never-ending cycle called the **rock cycle**.

The concept of the rock cycle was first developed by James Hutton, an eighteenth century scientist often called the “Father of Geology.” Hutton recognized that geologic processes have “no sign of a beginning, and no prospect of an end.” The processes involved in the rock cycle often take place over millions of years. So on the scale of a human lifetime, rocks appear to be “rock solid” and unchanging, but in the longer term, change is always taking place.

In the rock cycle, the three main rock types—igneous, sedimentary, and metamorphic—are shown. Arrows connecting the three rock types show the processes that change one rock type into another. The cycle has no beginning and no end. Rocks deep within the Earth are right now becoming other types of rocks. Rocks at the surface are lying in place before they are next exposed to a process that will change them.

**Processes of the Rock Cycle**

Several processes can turn one type of rock into another type of rock. The key processes of the rock cycle are crystallization, erosion and sedimentation, and metamorphism.

**Crystallization**

Magma cools either underground or on the surface and hardens into an igneous rock. As the magma cools, different crystals form at different temperatures, undergoing **crystallization**. For example, the mineral olivine crystallizes out of magma at much higher temperatures than quartz. The rate of cooling determines how much time the crystals will have to form. Slow cooling produces larger crystals.

**Erosion and Sedimentation**

**Weathering** wears rocks at the Earth’s surface down into smaller pieces. The small fragments are called sediments. Running water, ice, and gravity all transport these sediments from one place to another by **erosion**. During **sedimentation**, the sediments are laid down or deposited. In order to form a sedimentary rock, the accumulated sediment must become compacted and cemented together.

**Metamorphism**

When a rock is exposed to extreme heat and pressure within the Earth but does not melt, the rock becomes metamorphosed. **Metamorphism** may change the mineral composition and the texture of the rock. For that reason, a metamorphic rock may have a new mineral composition and/or texture.

**Assignment**

6 words, 6 questions, 6 answers, 6-sentence summary

**Also** answer the following:

* Why is the rock cycle considered endless?
* How can a sedimentary rock become igneous?
* Explain why water is the most common cause of weathering/erosion.
* Describe how the rock cycle influences the living things around the world.