

Sedimentary Rocks

4.4

- Origin of Sedimentary Rocks
 - a. Most of the rocks below Earth's surface are igneous rocks
 - b. Igneous rocks are the most common rocks on Earth
 - c. 75% of the rocks at Earth's surface are sedimentary rocks

A. Sedimentary Rocks

- a. Sedimentary rocks form when sediments become pressed or cemented together or when sediments precipitate out of solution

- b. Sediments are loose materials such as rock fragments, mineral grains and bits of plant and animal remains that have been moved by wind, water, ice or gravity
 - i. Sediments come from already existing rocks that are weathered and eroded
 - ii. Weathering is the process that breaks rocks into smaller pieces
 - iii. The movement of weathered material is called erosion

B. Compaction

- a. Erosion moves sediments to a new location where layer upon layer the sediment builds up
 - i. Compaction occurs when pressure from the upper layers pushes down on the lower layers and the pieces will stick together to form solid rock

C. Cementation

- a. Large sediments have to be cemented together
 - i. Cementation occurs when water soaks through soil and rock. As it moves it dissolves minerals in the rock such as calcite, hematite and limonite which are natural cements
 1. The solution of water and dissolved minerals moves through open spaces between sediments
 2. The natural cements are deposited around the pieces of sediment and they stick together
 3. A group of sediments cemented together in this way forms a sedimentary rock

D. Sedimentary Rock Layers

- a. Sedimentary rocks often form as layers with the older layers being on the bottom because they were deposited first
- b. Sometimes the layers of rocks are disturbed by forces within the Earth and the layers are overturned and the oldest are no longer on the bottom

II. Classification of Sedimentary Rocks

- a. Sedimentary rocks can be composed of eroded igneous, metamorphic and sedimentary rocks and also from the remains of plants and animals

- b. Sedimentary rocks are classified by their composition and by the way they formed
 - i. Sedimentary rocks are usually classified as detrital, chemical or organic

A. Detrital Sedimentary Rocks

- a. The word detrital means “to wear away”
- b. Detrital sedimentary rocks are made from the broken fragments of other rocks which are compacted and cemented together

B. Clastic Textures

- a. Detrital sedimentary rocks are often referred to as clastic rocks – meaning “broken” because of their texture

C. Shape and Size of Sediments

- a. Detrital rocks are named according to the shape and size of the sediments
 - i. If the sediments have been well rounded the rock is called "conglomerate"
 - ii. If the sediments are not rounded and have sharp angles, the rock is called "breccia"

D. Chemical Sedimentary Rocks

- a. Chemical sedimentary rocks form when minerals are precipitated from a solution or are left behind when a solution evaporates
- b. The deposits of minerals that precipitate out of solution or remain after evaporation form rocks

E. Limestone

- a. Calcium carbonate is carried in solution in ocean water. When it comes out of a solution as calcite and its many crystals grow together – limestone is formed
 - i. Limestone is at least 50% calcite

F. Rock Salt

- a. Halite mixed with a few other minerals forms rock salt
- b. Rock salt is used in the manufacturing of glass, paper, soap and dairy products
- c. The halite in rock salt is used as table salt

G. Organic Sedimentary Rocks

- a. When rocks form from remains of once-living things they are organic sedimentary rocks
 - i. Fossil-rich limestone made of calcite is one of most common

H. Useful Sedimentary Rocks

- a. Animals such as mussels, corals and snails make their shells from the mineral calcite
 - i. When they die their shells accumulate on the ocean's floor – deposition – they are deposited on the ocean floor
 - ii. They are compacted and cemented together to form fossil-rich limestone

- b. Chalk* is another organic sedimentary rock that is made of microscopic shells
- c. Coal* forms when pieces of dead plants are buried under other sediments in swamps

 - i. These plant materials are chemically changed by microorganisms and the resulting sediments are compacted over millions of years to form coal