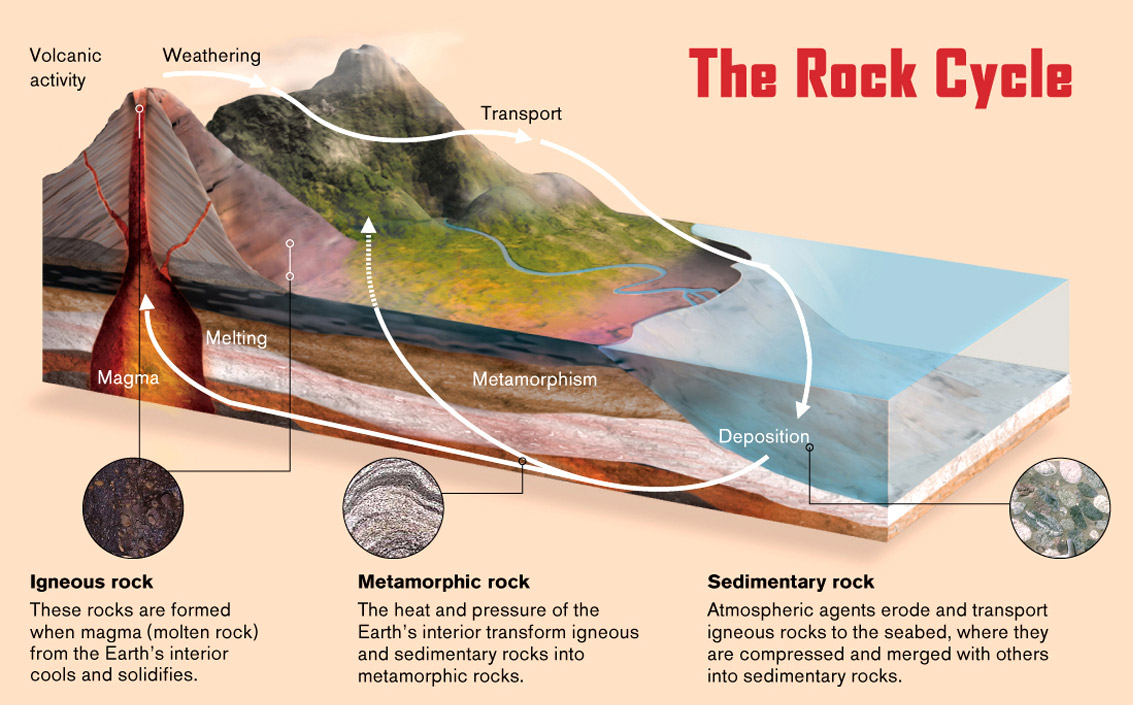
**Earth Science 11: Earth Materials, Sedimentary Rocks**

**Chapter 1, pages 56 to 66**

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| **2.4: Sedimentary Rocks** |

**Sedimentary Rock Formation**



* All sedimentary rocks form through **compaction** and **cementation of** layers of sediment.

**There are three different formation processes that produce different types of sedimentary rocks:**

***1) Clastic (or Detrital) Sedimentary Rocks***

* Clastic sedimentary rocks are formed from the **breakdown** of other rocks that can range in size from **boulders** to microscopic **clay**.

**There are 5 steps in the formation of clastic rocks:**

|  |  |
| --- | --- |
| **Weathering** | **All the processes that break down rocks in the environments near earth’s surface**  **Mechanical Weathering – processes that tear rocks apart by breaking them**  **Chemical Weathering – processes that break down rocks atom by atom through chemical reactions.** |
| **Transportation** | **Clay, sand and ions are carried away from their sources ie. landslides, glaciers, rivers etc. sand grains become more round the further they travel** |
| **Deposition** | **Sediment is dropped in a depositional environments such as a beach, lake or salt flat.**  **Areas with stronger currents will collect sand and wash away finer sediment** |
| **Burial** | **Gradual sinking of the environment and more deposition on top leads to burial of the sand. With time burial can reach 10 or more km** |
| **Lithification (Cementation)** | **Sediment is compacted as it is buried. Secondary minerals grow in the pores between grains to lithify it (cement it). This helps hold the sediment together** |

Which of the rocks below was transported the farthest from its source? How do you know?

**The first rock because it has smaller sediments which are carried further from their source due to their size**

Which of the rocks below was deposited deeper in an ocean or lake? How do you know?

**The first because only smaller sediments can be transported that far from the coastline**

***2) Chemical Sedimentary Rocks***

* These rocks form when minerals dissolved in water precipitate out of solution.

**Precipitation can occur in two ways:**

i) **evaporation of water leaving behind the mineral ie. Rock Salt**

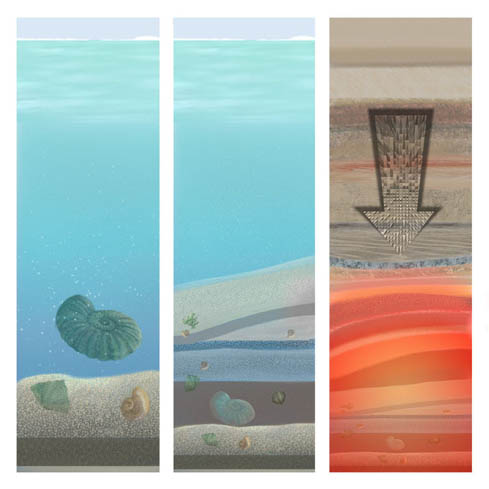
 ii) **organisms extract dissolved material to form shells and after the organisms die their skeletons accumulate on the floor**

-These processes produce: Rock salt (Halite), Rock Gypsum and some Limestones.

***3) Organic Sedimentary Rocks***

* Forms from sediments consisting of **plant** and a**nimal** remains.

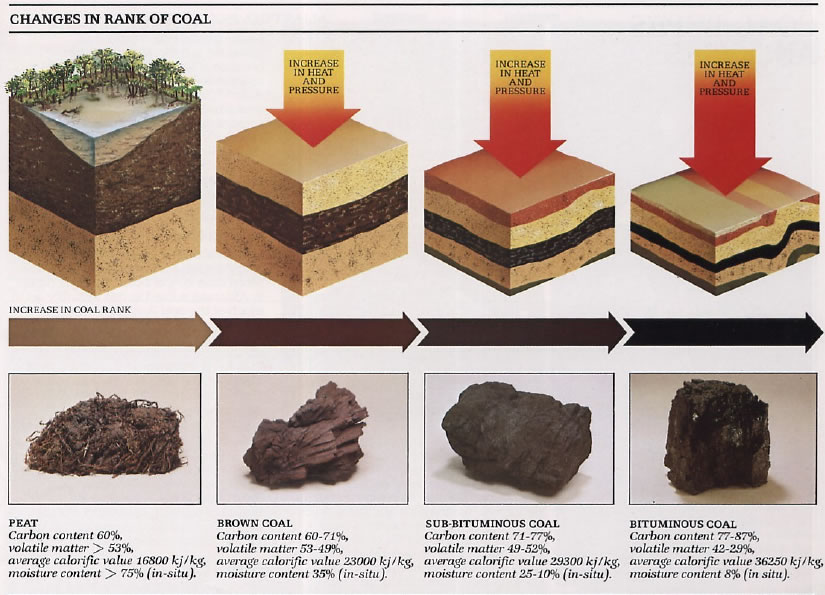
**Two types of organic sedimentary rocks you may be familiar with are:**

a) Limestone

* Seashells are rich in **calcite**, a key component of limestone.
* When shelled marine organisms die their calcite-rich remains collect on the ocean floor, are buried and undergo cementation to become limestone.

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b) Coal



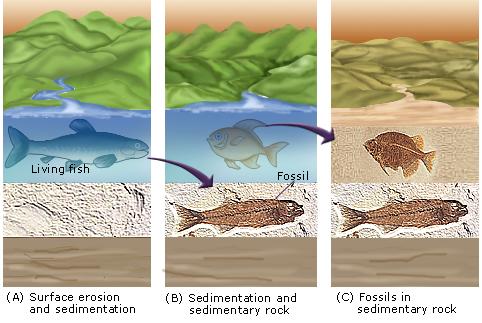


**Sedimentary Rock Features**

*Stratification*

* A result of a change in the type of sediment being deposited in one area. This creates distinct layers (called strata) piled on top of one another.
* The line between layers can reveal important information about the environment that existed between strata depositions.

*Fossils*

* Fossils are the remains, impression or any other evidence of life preserved in rock.
* Fossils can be useful in determining what life and environmental conditions existed at particular times in the past.

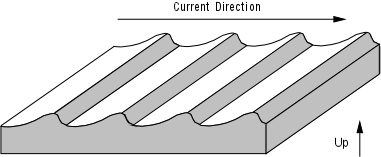
**Why do fossils only form in sedimentary rocks?**

**made layer by layer so the fossil is preserved**

**The other two types of rock involve high heat or pressure which would destroy the fossil.**

*Ripple Marks and Mud Cracks*

* Like fossils, impressions of past environmental conditions can be preserved in sedimentary rocks.
* Ripple marks are sand patterns formed by the action of water and wind.
* Mud Cracks are formed when water evaporates from an area and the clay sediments dry and contract.



*Nodules, Concretation and Geodes*

\*Take your own notes on this section.



**Nodules – small irregularly, rounded knot, mass or lump of a mineral or mineral aggregate that typically has a contrasting composition such as a pyrite nodule in coal**

**Concretation – a hard compact mass of matter formed by the precipitation of mineral cememnt within spaces between particles. Oviod or sperical in shape usually**

**Geodes – secondary structures which occur in certain sedimentary rocks. Formed by chemical precipitation. Hollow vaguely spheroid masses of minneral matter**

* **Form by filling of vesicles (gas bubbles) in volcanic rocks by mineral depositied from hydrothermal fluids**
* **dissolution of sedimentary nodules or concretions partial filling by the same or other minerals precipitated by hydrothermal fluids or grounds water**

*\* Complete Activity 2.5 and 2.6 pg. 35 – 38 in your workbook*