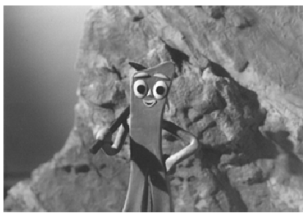
Rocks

Petrology

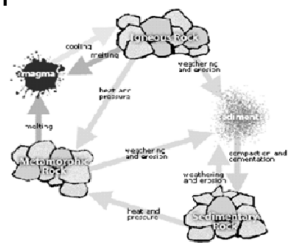
- the branch of science that studies rocks.



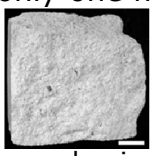
Rocks are classified on the basis of their formation / origin.

The three groups of rocks are:

1. Igneous
2. Sedimentary
3. Metamorphic

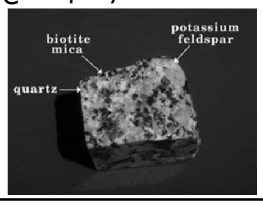


Some rocks are monomineralic – composed of only one mineral



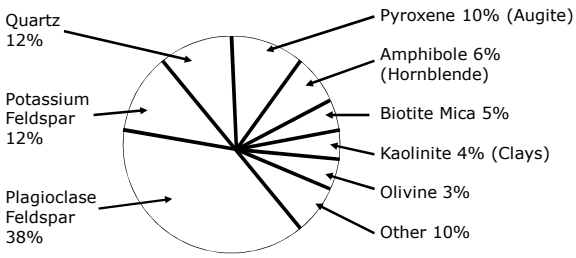
limestone

Most rocks are – polymineralic composed of two or more minerals



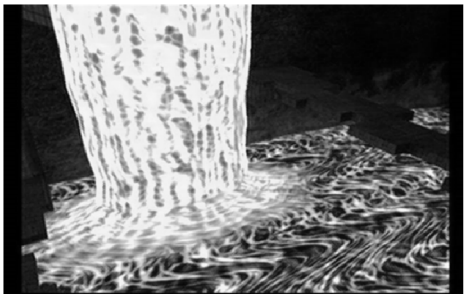
granite

There are over 3000 minerals, but only 8 of these minerals make-up 90% of the Earth's crust.



Igneous rocks -

form from cooling and solidification / crystallization of molten lava or magma



When molten lava or magma cools and solidifies, crystals form the rock.

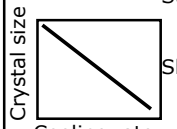
The rock contains a crystalline structure of intergrown crystals of different sizes, shapes , and compositions.

1. Extrusive / Volcanic
- *forms from lava*
- *cools on the surface*
- *small / no crystals*
- *fine / glassy texture*

2. Intrusive / Plutonic
- *forms from magma*
- *cools below the surface*
- *large / very large crystals*
- *coarse / very coarse texture*

Relationship between crystal size and rate of cooling.

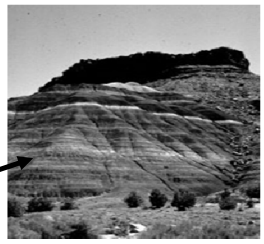
As the rate of cooling increases, crystal size decreases.



	Cooling Rate	Crystal Size
Surface –	very fast	none
Shallow –	fast	small
Moderate –	slow	large
Deep -	very slow	very large

Sedimentary Rocks-

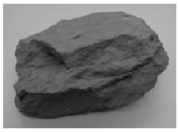
form in layers from sediments, organic matter, or chemical precipitates



stratified layers

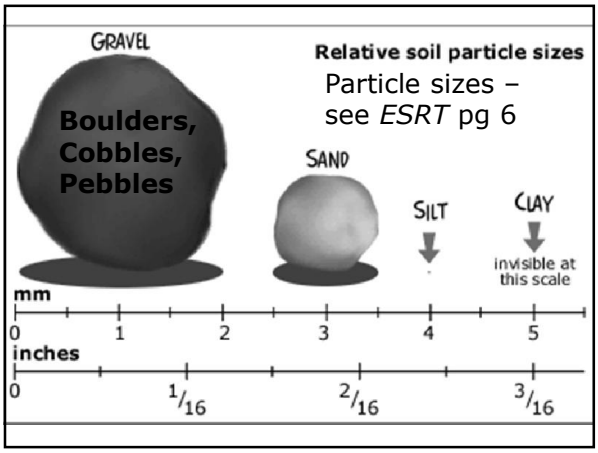
1. Clastic – form from sediments (rock particles) that are compacted and cemented together





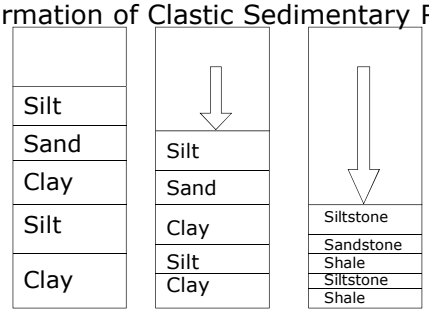
a. Compaction - squeezed by the weight of overlying rock

b. Cementation - glued by natural cement in water (usually calcite)



Particle sizes – see *ESRT* pg 6

Formation of Clastic Sedimentary Rocks



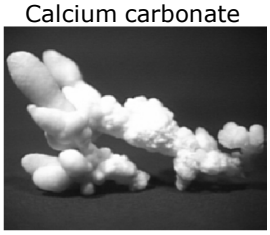
Layers of sediment deposited

Weight squeezes lower layers

Sediment compacted into rock

2. Chemical (crystalline) –
form by evaporation or precipitation of minerals in water

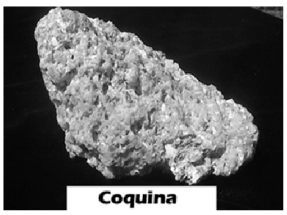
Calcium carbonate



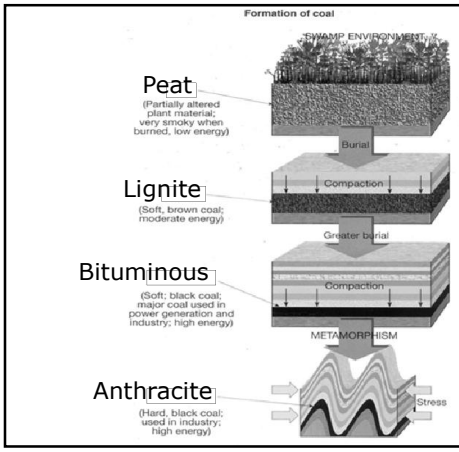
Rock salt

3. Organic (bioclastic) –
form from plant or animal matter

Coal

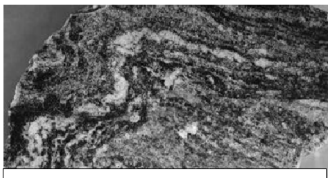


Coquina



Metamorphic Rocks –

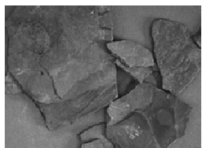
form from pre-existing rocks (igneous, sedimentary or metamorphic) changed by heat and / or pressure



gneiss

Conditions that cause rocks to undergo metamorphism include:

1. heat
2. pressure



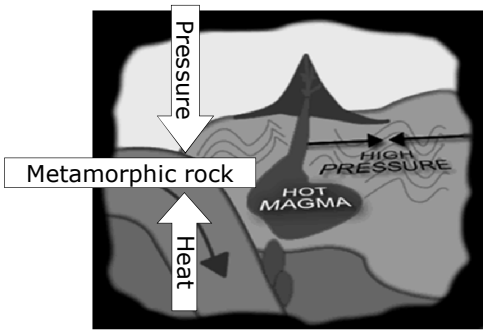
shale → slate

Types of metamorphic rocks:

1. Foliated – mineral crystals arranged in parallel alignment or "bands"

2. Nonfoliated – no alignment or banding; "massive"

Metamorphism (change form)



Metamorphic conditions are associated with deep burial and pressure that result from mountain formation.

Under conditions of high temp and pressure, metamorphic rocks form by recrystallization.

Recrystallization occurs without true melting.

Changes in a rock caused by metamorphism:

1. Increased density
2. Chemical change (new minerals)
3. Banding
4. Distorted structure