Types of Rock

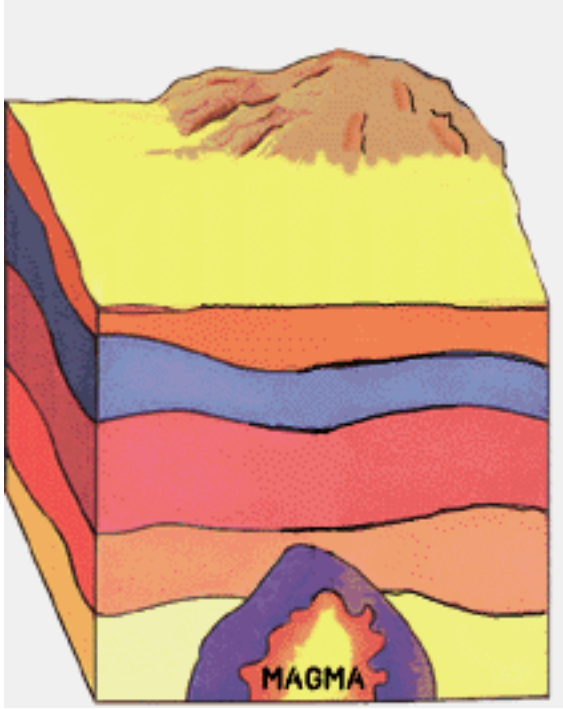
Liz LaRosa http://www.middleschoolscience.com 2010
Images from Geology.com unless otherwise noted

What are Rocks?

- A rock is a naturally occurring solid mixture of one or more minerals, or organic matter
- Rocks are classified by how they are formed, their composition, and texture
- Rocks change over time through the rock cycle

Igneous Rocks

- Igneous rock begins as magma.
- Magma can form:
  - When rock is heated
  - When pressure is released
  - When rock changes composition
- Magma is a mixture of many minerals



http://www.fi.edu/fellows/payton/rocks/create/igneous.htm

Igneous Rocks

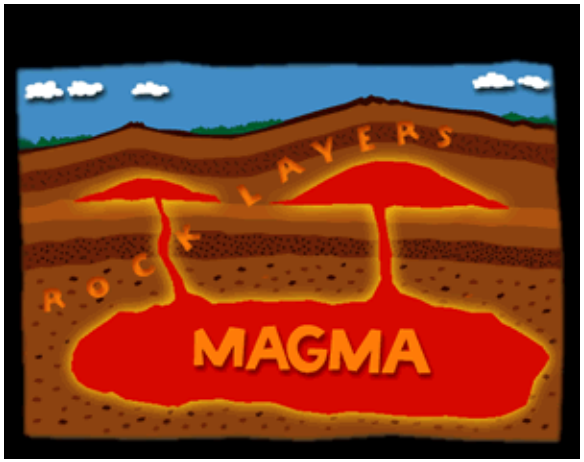
- Felsic: light colored rocks that are rich in elements such as aluminum, potassium, silicon, and sodium
- Mafic: dark colored rocks that are rich in calcium, iron, and magnesium, poor in silicon
- Coarse-grained: takes longer to cool, giving mineral crystals more time to grow
- Fine-grained: cools quickly with little to no crystals

Igneous Rocks

	Coarse-Grained	Fine-Grained
Felsic	 Granite	 Rhyolite
Mafic	 Gabbro	 Basalt

Igneous Rocks

- Intrusive Igneous Rocks: magma pushes into surrounding rock below the Earth's surface



- Extrusive Igneous Rocks: forms when magma erupts onto the Earth's surface (lava), cools quickly with very small or no crystals formed

http://www.windows.ucar.edu/tour/link=/earth/geology/ig_intrusive.html&edu=high&fr=t

Igneous Rocks

Obsidian is a dark-colored volcanic glass that forms from the very rapid cooling of molten rock material. It cools so rapidly that crystals do not form.

Is this rock Felsic or Mafic?

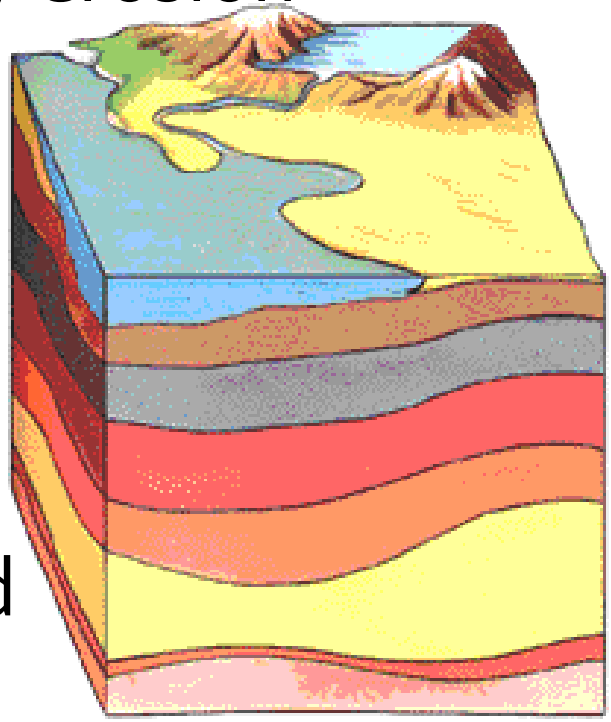
Is it fine-grained or coarse-grained?

Is this rock Intrusive or Extrusive?

Mafic, fine grained, extrusive

Sedimentary Rocks

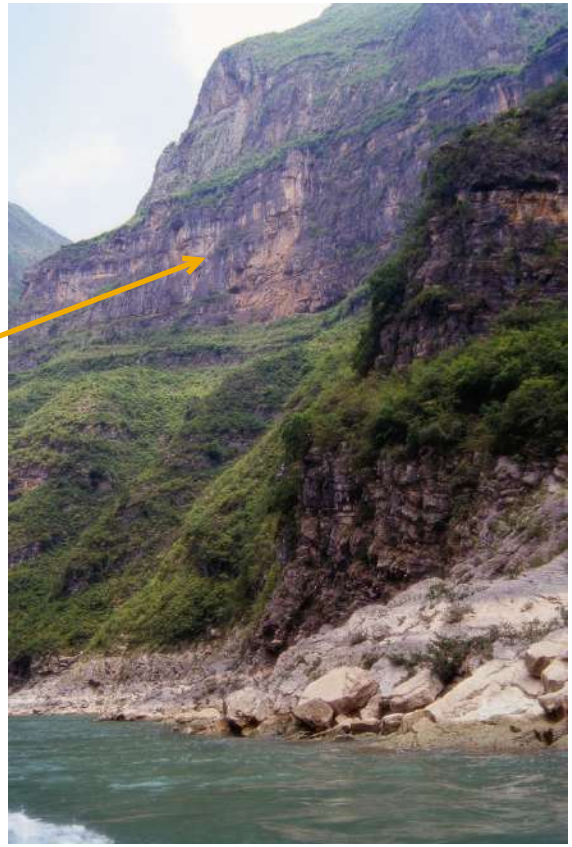
- Sedimentary rock is formed by erosion
- Sediments are moved from one place to another
- Sediments are deposited in layers, with the older ones on the bottom
- The layers become compacted and cemented together



http://www.fi.edu/fellows/payton/rocks/create/sediment.htm

Sedimentary Rock

- Sedimentary Rocks are formed at or near the Earth's surface
- No heat and pressure involved
- Strata – layers of rock
- Stratification – the process in which sedimentary rocks are arranged in layers



Sedimentary Rock

Clastic – made of fragments of rock cemented together with calcite or quartz

Breccia is a term most often used for clastic sedimentary rocks that are composed of large angular fragments (over two millimeters in diameter).

The spaces between the large angular fragments can be filled with a matrix of smaller particles or a mineral cement that binds the rock together.

Sedimentary Rock

Chemical sedimentary – minerals crystallize out of solution to become rock

Limestone is a sedimentary rock composed primarily of calcium carbonate ($CaCO_3$) in the form of the mineral calcite. It most commonly forms in clear, warm, shallow marine waters.

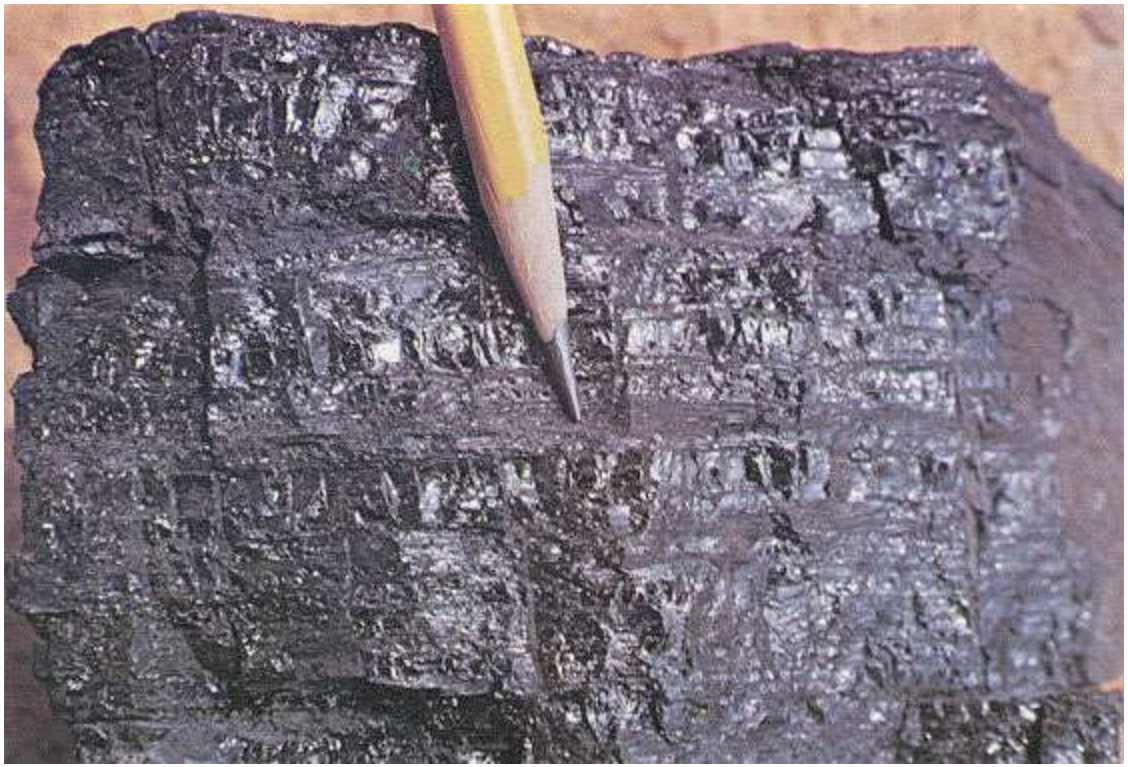
It is usually an organic sedimentary rock that forms from the accumulation of shell, coral, algal and fecal debris.

Sedimentary Rock

Organic sedimentary – remains of plants and animals

Coal is an organic sedimentary rock that forms from the accumulation and preservation of plant materials, usually in a swamp environment.

Coal is a combustible rock and along with oil and natural gas it is one of the three most important fossil fuels.



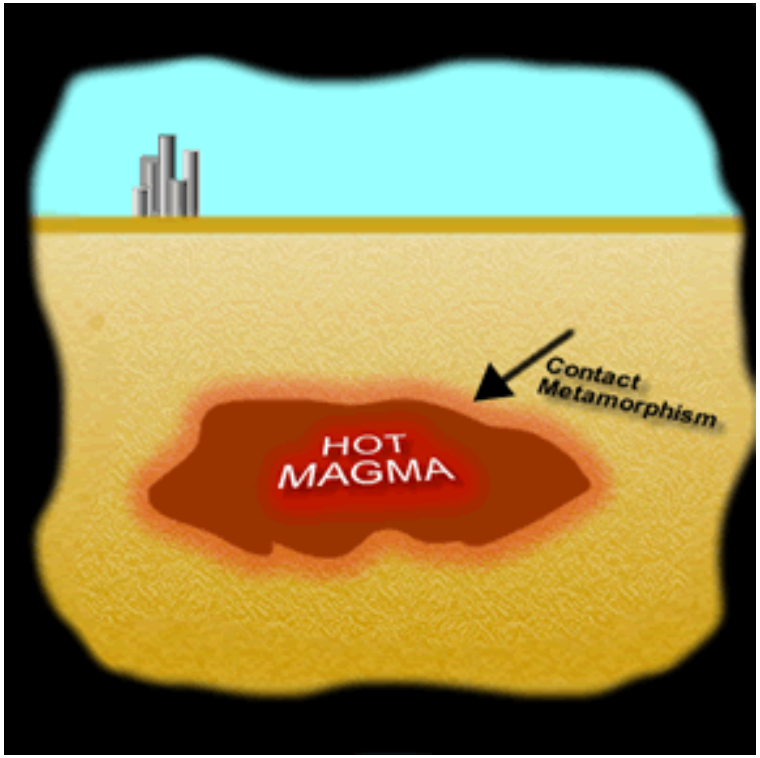
Metamorphic Rock

- Meaning to change shape
- Changes with temperature and pressure, but remains solid
- Usually takes place deep in the Earth

http://www.fi.edu/fellows/payton/rocks/create/metamorph.htm

Metamorphic Rocks

- Contact Metamorphism – heated by nearby magma
- Increased temperature changes the composition of the rock, minerals are changed into new minerals



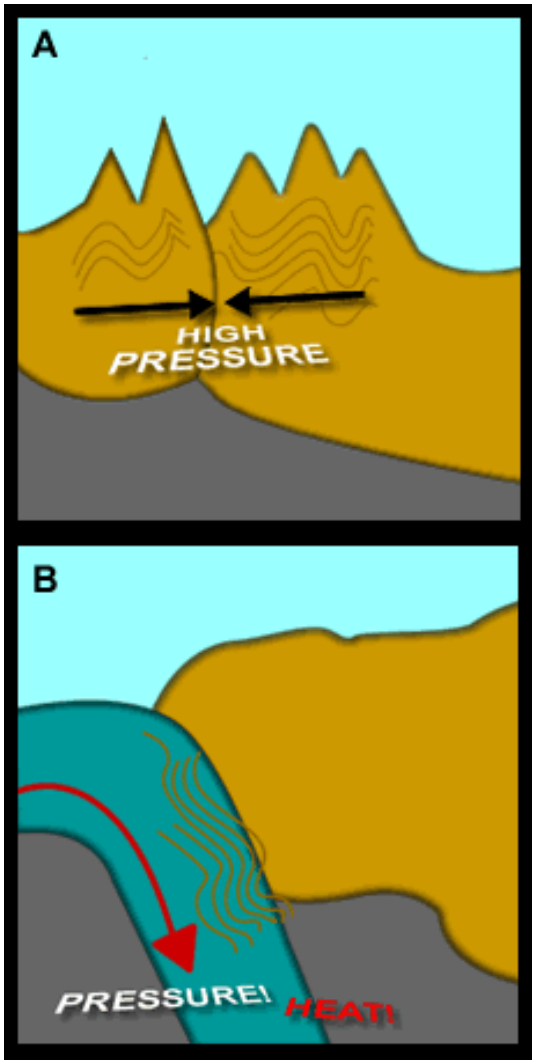
Hornfels is a fine-grained non-foliated metamorphic rock produced by contact metamorphism

http://www.windows.ucar.edu/tour/link=/earth/geology/meta_contact.html&edu=h igh&fr=t

Metamorphic Rocks

- Regional Metamorphism – pressure builds up in rocks that is deep within the Earth

- Large pieces of the Earth's crust collide and the rock is deformed and chemically changed by heat and pressure



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Metamorphic Rock

- Foliated - contain aligned grains of flat minerals

Gneiss is foliated metamorphic rock that has a banded appearance and is made up of granular mineral grains.

It typically contains abundant quartz or feldspar minerals.

Metamorphic Rock

- Non-Foliated – mineral grains are not arranged in plains or bands

Marble is a non-foliated metamorphic rock that is produced from the metamorphism of limestone.

It is composed primarily of calcium carbonate.

Metamorphic Rock

- Determine if the following rock samples are foliated or non-foliated:

Amphibolite

Quartzite

Phyllite

Foliated

End of Types of Rocks PPT

- Be sure to complete your "Types of Rocks" notes as you view this presentation.