

Rocks

Geology: Slides 22-50

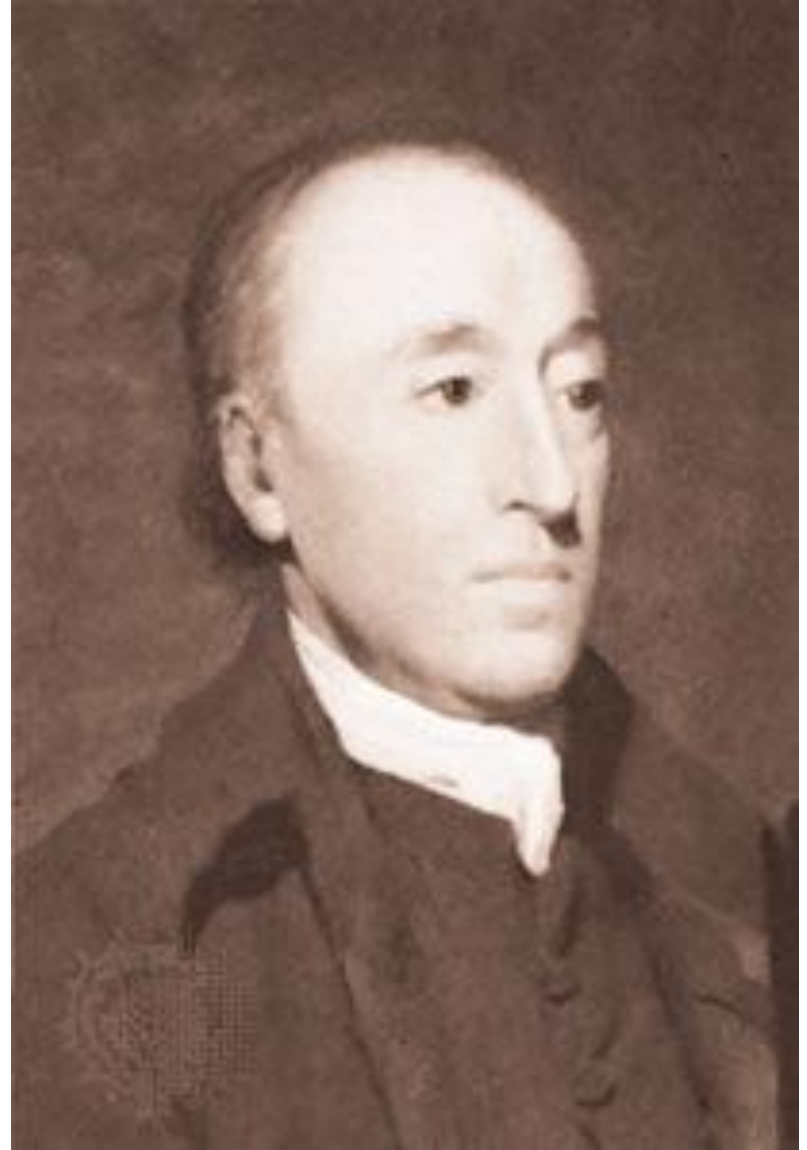
Rocks

- Catastrophism versus Uniformitarianism
- Catastrophism
 - The Earth's surface was created by fast drastic changes (called catastrophes) that occurred long ago and do not occur anymore.



Rocks

- Uniformitarianism
 - Developed by the father of modern Geology, James Hutton
 - Hutton said that the forces that made the Earth look the way it does are the still occurring today.
 - “The present is the key to the past”



What is a Rock?

- A group of minerals bound together in some way (How they are bound determines the type of rock that you get.)



What is a Rock?

- Hutton then used his idea of uniformitarianism to determine how rocks are created.
- He determined that rocks are made in one of three ways...

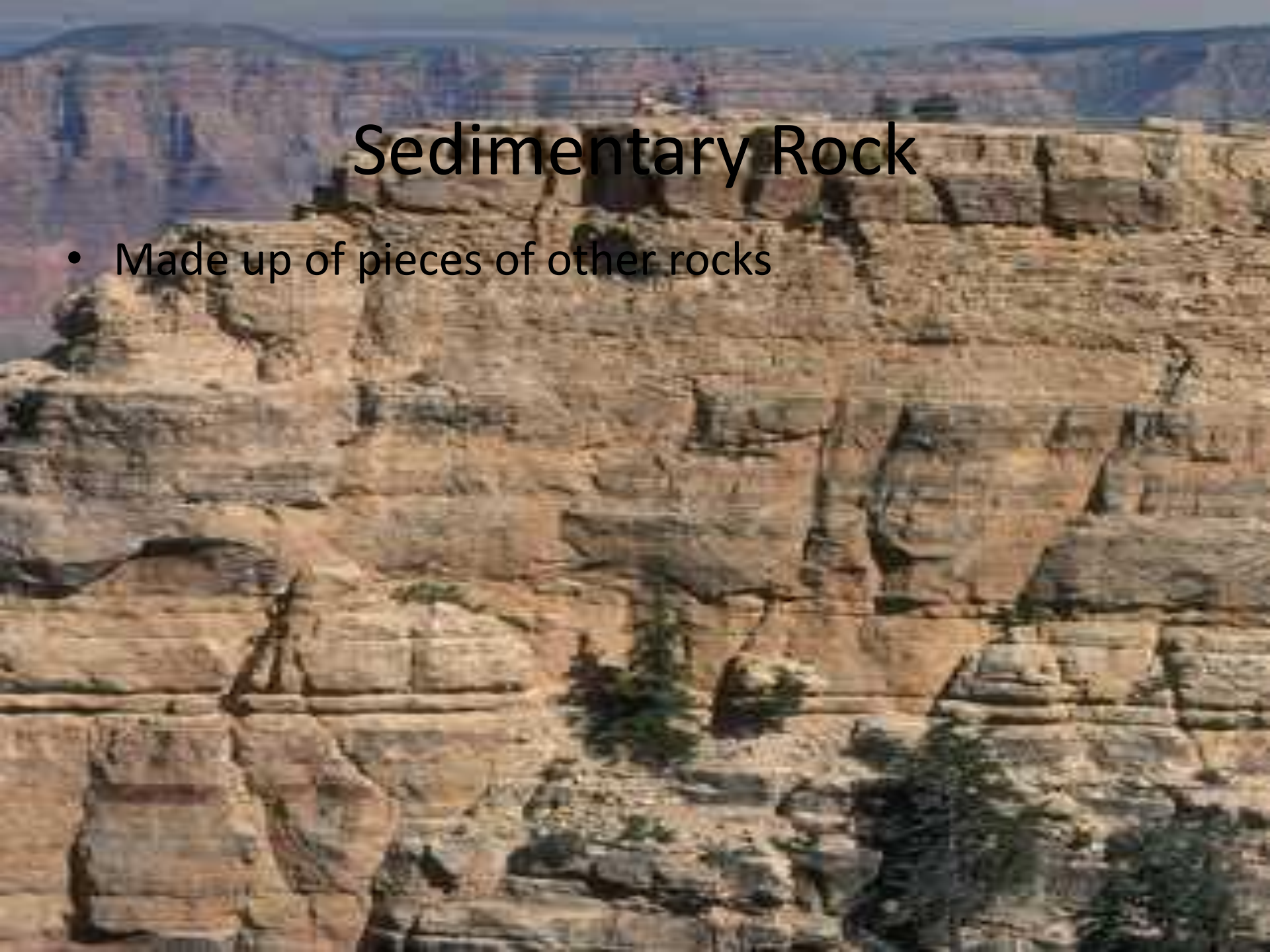
Igneous Rock

Made from molten (melted) rock



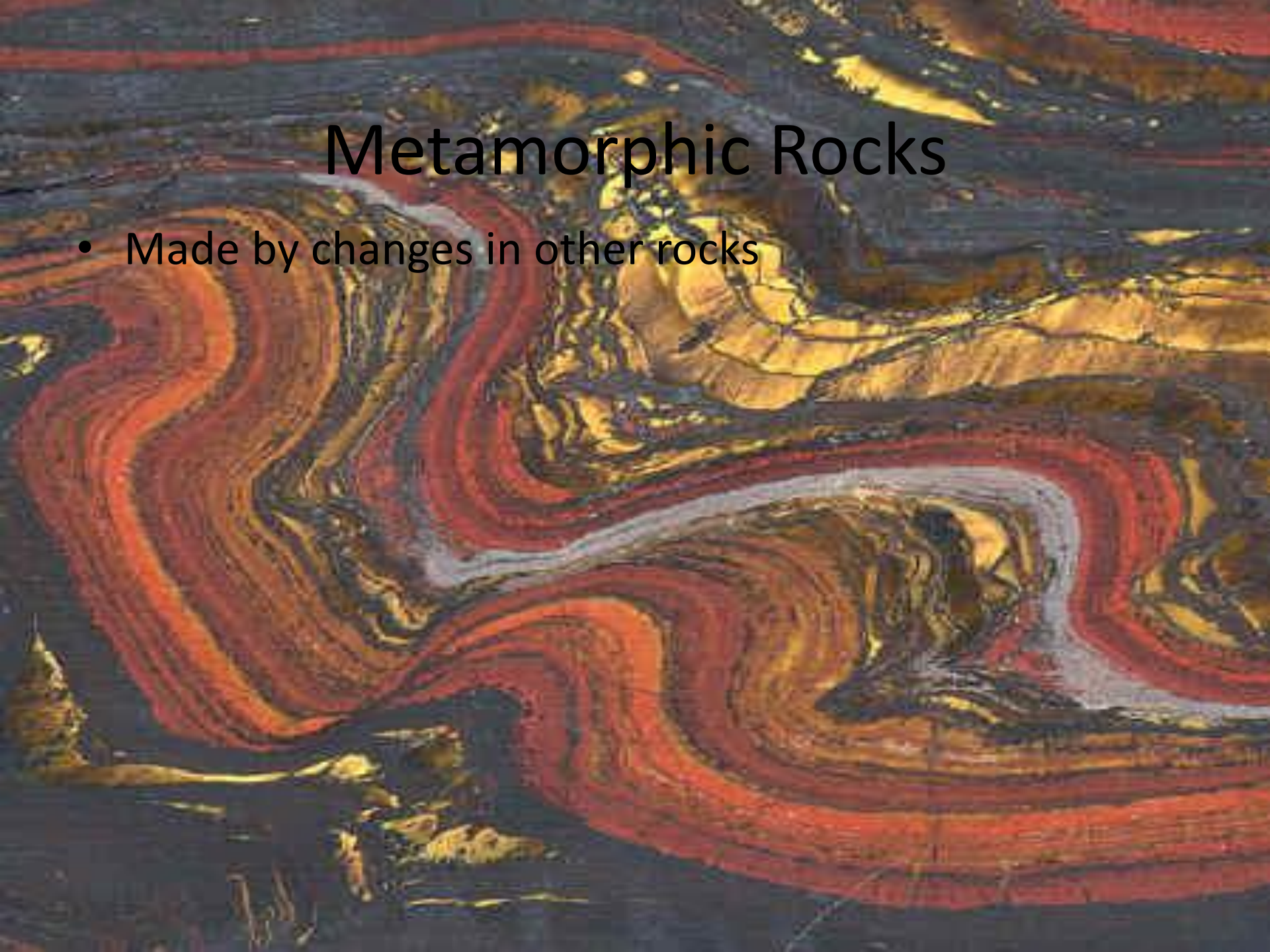
Sedimentary Rock

- Made up of pieces of other rocks



Metamorphic Rocks

- Made by changes in other rocks



All minerals are rocks, but not all rocks are minerals. Why?

- Rocks can be organic, minerals can not.
- Coal and organic limestone are examples of organic rocks.

Igneous Rocks

- Rocks that are created as magma cools and hardens.



Igneous Rocks

- Two types of Igneous Rocks:
 - Intrusive – rocks cool underground
 - Extrusive – rocks cool above ground
- Grain Size
 - Intrusive rocks cool more slowly so their crystals grow larger.
 - Extrusive rocks cool more quickly so their crystals are smaller.



Intrusive Igneous Rock

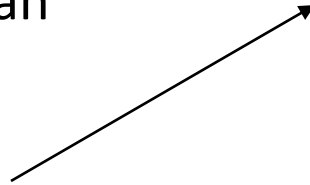


Extrusive Igneous Rock

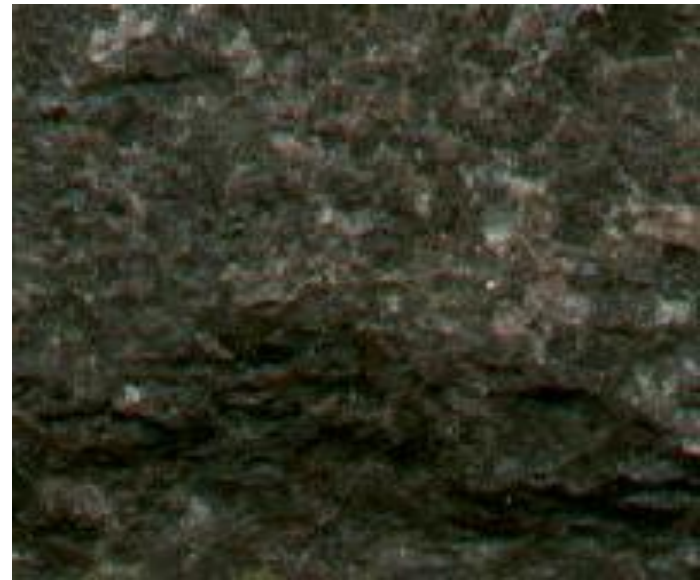
Igneous Rocks

- Magma or Lava Types

- Felsic – contains more than 50% silicate material (generally light colored rocks)



- Mafic – contains over 50% iron and magnesium (generally dark colored rocks)



Igneous Rocks

- Texture – based on grain size
 - Coarse Grained – made of large crystals Intrusive
←
 - Fine Grained – made up of small crystals
 - Glassy – no crystals Extrusive
←
 - Porphyritic – made up of both large and small crystals Both Int. and Ext.
←

Igneous Rocks

- Describe Igneous rocks using:
 - Where it cooled
 - Type of magma or lava
 - Texture of the rock



Forces that Shape the Earth

How are igneous
rocks formed ?

Sedimentary Rocks

- Rocks made from pieces of other rock that have become cemented together.



Sedimentary Rocks

- There are three types of sedimentary rocks based on the way they form.

Types of Sedimentary Rocks

- Clastic
 - Made by other rocks being eroded into sediments.
 - The sediments are then deposited and compacted.
 - Cement then works its way between the sediment particles and creates a rock.
 - Clastic rocks are described by their **sorting**.
 - **Well sorted** means all pieces of the rock are similar in size, **poorly sorted** means that the pieces that make up the rock are different sizes.

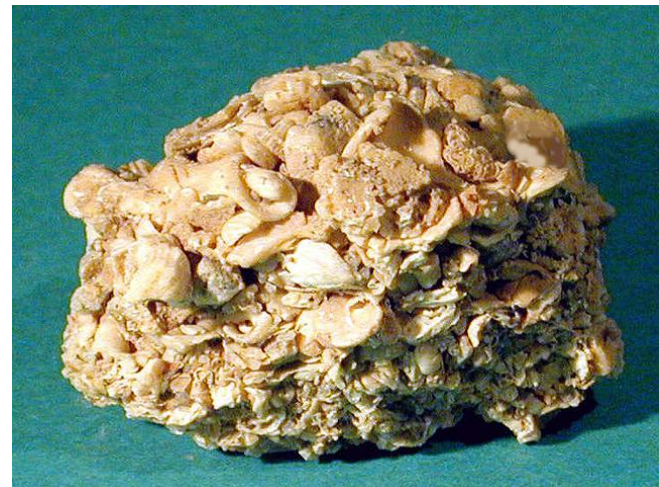
Types of Sedimentary Rocks

- Chemical
 - Made as mineral rich water evaporates and the minerals are left behind.



Types of Sedimentary Rocks

- Organic
 - A rock made from the remains of a dead plant or animal.
 - Coal (plants) and organic limestone (animal) are two examples of organic rocks.



Sedimentary Features

- Stratification
 - Made as different types of sediment are layered on top of one another.
 - The different rock types create layers in the rocks.
 - It is only found in clastic sedimentary rocks.



Sedimentary Features

- Fossils
 - Made from the imprint of the hard parts of plants or animals.
 - They are only found in clastic sedimentary rocks.



Sedimentary Features

- Ripple Marks and Mud Cracks
 - Can show what the climate of an area was like during the time of the rock's creation.
 - Ripple Marks are found in rocks that form near water.
 - Mud Cracks form in rocks from very dry, arid regions (deserts)



Sedimentary Features

- Geodes
 - Forms when a rock is hollowed by mineral-rich water and then the water evaporates.
 - As the water evaporates it leaves the minerals behind in the form of mineral crystals within the rock.
 - Eventually the rocks can completely fill with mineral crystals.



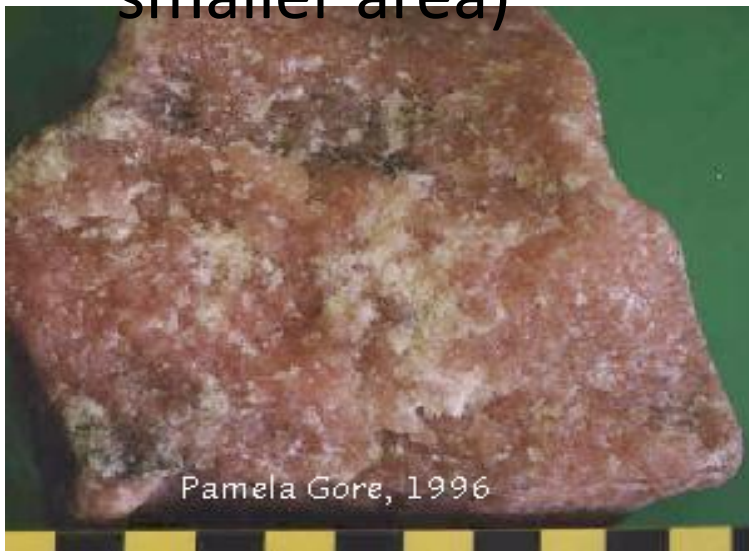
Metamorphic Rocks

- Rocks that are created by changes in the rock brought about by heat, pressure or chemical reactions.



Types of Metamorphism

- Contact Metamorphism
 - Created as lava or magma “bakes” a rock (occurs over a smaller area)



- Regional Metamorphism
 - Created as pressure crushes a rock (occurs over a large area)



Metamorphic Features

- Foliation
 - Layers within a rock created by pressure.



Changes in Rocks caused by Metamorphism

- The growth of new minerals.
- The deformation of mineral crystals.
- The re-crystallization of mineral crystals as larger mineral crystals.

“Texture”

- Foliated

- Rock with layers (formed by regional metamorphism)



- Non-Foliated

- No layers in the rock (formed by contact metamorphism)

