

Rocks Rock!

Objectives

Students will:

- 1) Identify the 3 major rock types: sedimentary, metamorphic, and igneous rocks.
- 2) Compare/contrast the characteristics of each

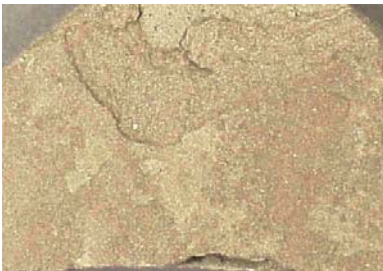
Background:

- Rocks are generally composed of either:
 - 1) grains that are cemented together or
 - 2) interlocking crystals.
- There are 3 main types of rocks: sedimentary, metamorphic and igneous. Details on the formation of each of these types are found below.
- The overall size of the particles that make up a rock determines its texture.
- Color in the same rock type can vary from sample to sample. Overall rock color depends on its mineral composition and texture.
- Some rocks have banding or layers. This is a result of their formation. In crystalline rocks, segregation of minerals in parallel bands is called foliation. Layering in sedimentary rocks is common, though not always observable in small samples.
- A few common rocks make up a large percentage of those found at the Earth's surface.
- Quartz, feldspar (white and red-pink), and the dark and light colored micas are important rock forming minerals.

How **SEDIMENTARY ROCK** is formed:

Most of the rocks found on the earth's surface are sedimentary rocks. For thousands, even millions of years, little pieces of our earth have been eroded--broken down and worn away by wind and water. The sediment is generally made up of small particles or pieces of pebbles, sand, silt or clay. Sediment can also be in the form of debris such as bone fragments and shells. These little bits of our earth are washed downstream where they settle to the bottom of the rivers, lakes, and oceans. Layer after layer of eroded earth is deposited on top of the first one. These layers are pressed down more and more through time, until the bottom layers slowly turn into rock.

Rocks labeled with a #3 are **SEDIMENTARY** rocks. These rocks formed after deeply buried rock was uplifted to the surface. Once exposed, forces of weathering, erosion, deposition, and cementation occur. Sample #3 is made of fine particles like sand and clay, and sometimes includes bigger pieces like pebbles. Fossils can be found in this type of rock.



How METAMORPHIC ROCK is formed:

Metamorphic rocks are rocks that have "morphed" into another kind of rock. These rocks were once igneous or sedimentary rocks. How do sedimentary and igneous rocks change? The rocks are under tons and tons of pressure, which fosters heat buildup, and this causes them to change. If you examine metamorphic rock samples closely, you'll discover how flattened and squished some of the grains appear.

Rocks labeled with a #2 are **METAMORPHIC** (meaning 'changes form') They were formed when igneous or sedimentary rock was still very deeply buried under the earth's surface, and was subjected to high heat and pressure. Metamorphic rock typically has visible crystals that become arranged in bands under the heat-and-pressure action. Note that the crystals appear oriented and layered.



How IGNEOUS ROCK is formed:

Igneous rocks are called fire rocks and are formed either deep underground or above ground. Underground, they are formed when the melted rock, called magma, deep within the earth becomes trapped in small pockets. As these pockets of magma slowly cool and harden underground, the magma becomes igneous rocks.

Igneous rocks are also formed when volcanoes erupt, causing the magma to rise above the earth's surface. When magma appears above the earth, it is called lava. Igneous rocks are formed as the lava cools above ground.

Rocks labeled with a #1 are **IGNEOUS**. They are made of large intergrown crystals of different minerals. This tells us that the rock was once molten and very deep in the ground. Big crystals formed and stuck together as it slowly cooled. Note the random arrangement of crystals (speckles) and rough texture.



Materials:

Rock samples – 3 boxes with examples of one type of rock in each
Magnifiers

Procedure:

- Lead a brief discussion/review (if students have already studied) of the 3 main types of rocks, and how each is formed
- Students will work in pairs. Each pair takes one sample from each box. Give them a moment to look/feel the rock samples on their own, then lead them in a discussion of similarities/differences that they notice in the rock samples. You might discuss each type one-by-one as a group, or you might choose to ask general questions and let students compare between all 3.

Sample questions/points for discussion:

- What are some of the things you notice about these rocks?
- Feel the texture of the rock - which is the smoothest or the roughest? What does this tell us about where the rock was formed?
- Note the size and color of the grains. How do they differ between the rock samples?.
- Notice how some rocks are made of more than one mineral, often giving the rock a 'speckled' look.

Let each pair of students share an observation about the rock samples.