

Inferring about Rocks

5th Grade

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Benchmark and SLC#

SLC 12: Students will observe and test rocks for hardness.

Objectives:

Students will learn that there are three classifications for rocks and that rocks in these different groups have several unique characteristics.

Materials:

- 3 rocks from each group type (metamorphic, sedimentary and igneous) for ~5 groups.
- *Inferring about rocks* worksheet

Initial Demonstration:

Break the class up into groups. Give each group several of each of the three different types of rocks and have them group them together as they see fit. Have each of the groups share how they grouped their rocks and write these groups on the board for later reference. Explain that scientists have a specific way of classifying rocks.

Target Observations:

- The rocks look different (color, size, shape, texture, material)
- Some rocks are made of large pieces and an irregular pattern, others are made of smaller pieces and a regular pattern.

Target Model:

-Rocks can be classified by several different characteristics: color, size, shape, texture, material, etc...

Procedure:

After each group has classified their rocks hand them the “inferring about rocks worksheet” and a rock chart. Using these two tools each student will be responsible for classifying their rock based on its characteristics. Students must justify their classification by describing the observations they made about their rock.

Target Revised Model:

- There are three classifications of rocks: metamorphic, sedimentary, and igneous.*
- Rocks are placed in these groups based on how they were formed.*
- You can use a rock chart to classify an unknown rock based upon its characteristics.*

Inferring about Rocks

Materials: rock, rock chart

Directions: Tell students that one way rocks are classified is according to how they were formed. Igneous rocks are formed from molten earth materials. Sedimentary rocks are formed from earth materials that are broken down and deposited as sediments. Metamorphic rocks are igneous, sedimentary, or metamorphic rocks that have changed due to heat and/or pressure. Have students observe their rock and compare it to the descriptions of metamorphic, sedimentary, and igneous rocks on the rock chart. Then ask them to infer what kind of rock they have.

Connecting Content: The longer it takes **igneous** rock to cool, the larger the crystals or grains in the rock. There are three main types of igneous rocks: *plutonic*, (coarse crystals), such as granite, which cool slowly in massive intrusions deep underground; *volcanic* (fine crystals), such as basalt, formed by lava spewed onto the surface of the Earth by volcanoes and cooled quickly; and *pyroclastic*, shot from volcanoes, such as obsidian and pumice.

Metamorphic rocks are tough and crystalline. There are two different types of metamorphism: *contact* and *regional*. *Contact* metamorphism occurs when rocks are remade by the heat of a volcanic intrusion. Sandstone changes to hard, close-grained metaquartzite; pure limestone becomes brilliant white marble; and mudstone and shale turn into dark hornfels close to the intrusion, while farther away they may become spotted rocks. *Regional* metamorphism occurs when rock is crushed beneath a range of mountains that develop between colliding continental plates. The enormous pressure gives rocks a distinctive foliated (banded) texture.

Sedimentary rocks can be clastic, or organic and chemical. The most common clastic rocks are conglomerate, sandstone, siltstone, and shale. Conglomerate is a solid mass of rounded pebbles. Sandstone is made from grains of quartz sand held together by silica or calcite. Siltstone is made of even finer grains; and shale is a smooth rock made from brittle flakes of compacted clay. The most common organic and chemical sedimentary rocks are limestones which are rich in calcium compounds. These include shell limestones, made from fragments of seashells, and chalk, made from the skeletons of microscopic sea creatures called coccoliths. Coal is made from the remains of swampy forests.