

Important Facts About the Making Appearance of Rocks by Nature

Igneous Rocks

1. When magma stays inside the volcano, it goes through long, slow cooling causing them to sparkle.
2. These sparkles are the crystallization of minerals.
3. The more sparkles there are, the longer magma has gone through slow cooling.
4. When there is long cooling, minerals can be seen because minerals like to gather together as they go through slow cooling. The longer the magma takes to cool the larger the minerals will become.
5. If minerals can be seen, the rock has gone through at least 10,000 years of cooling.
6. When lava flows to the outside of the volcano, it turns into lava rocks and goes through faster cooling. The closer it is to the outside air, the faster it will cool.
7. Lava cooling and turning into rocks can have sparkles in it but minerals can't be seen. The slower the lava cools the more sparkles it will have. The faster the lava cools the less sparkles it will have.
8. Rocks that have holes are lava rocks. It is caused by gases trapped in the lava while it is cooling.
9. The matter in lava is made up of different particles of different weights. As the lava comes out the volcano the particles that are heavy will flow down, the particles that are light in weight will flow up, and the medium with particles will flow to the middle.
10. Lava that has cools super-fast will not have sparkles in it but will look glasslike and have a sheen or a shine to it. It cools quickly because it flows on the surface of the volcano and flows into water.

Sedimentary Rocks

1. Mountains are made of huge rocks. However, rocks on mountains can break down rocks into pebbles and sediments by weathering: cold, heat, running water, ice, plants, animals, and gravity.
2. Running water from rain and/or melting snow brings down these pebbles and smaller sediments down the mountain side.
3. Running water has different levels of energy depending on the slope of the mountain. A steep slope makes water flow down the mountain really fast while a shallow slope makes water flow down the mountain very slow.
4. It takes different water flows of energy to move the pebbles, sand, silt, and clay to move down the mountain side since they all weigh differently.
5. Heavy particles such as pebbles take a lot of water energy to move down the mountain slope. Sand particles takes less water energy to move than pebbles. Small particles such as silt and clay take very little water energy than sand to move them down the mountain slope. As the water energy of the slope gets less and less, each of the sediments will drop off by their weight.
6. A steep slope is the only energy that can move pebbles. If the slope gets less, the pebbles will stop moving and deposit. The other sediments will keep moving.
7. A moderate slope has enough energy to move sand sediments. As the slope get less, the sand will stop moving and deposit. The clay and silt will keep moving
8. The clay and the silt being light in weight will drop off last in the middle of the lake or ocean.
9. Water pressure will pack the sediments together.
10. When these sediments are exposed to the sun, they turn into sedimentary rocks.

Metamorphic Rocks

1. Metamorphic rocks are rocks that have changed from one type of rock to a new type of rock. The structure of the rock has changed inside.
2. For a rock to change into another type of rock it has to be heated.
3. Many times, a dormant volcano can become an active volcano. The magma starts flowing through the shafts of the volcano.
4. As the magma is flowing through the shafts, the existing rocks next to the shafts begin to heat up.
5. When these rocks are heated up they will turn into new rocks.
6. Metamorphic rocks most likely crystalize and will sparkle because of slow cooling.

The Science Behind Rocks

I. **Igneous Rocks**

Igneous rocks all start from inside the earth under the earth's crust. When massive rocks rub against each other in the earth, it becomes hot and melts called magma. This creates a lot of pressure and the magma finds its way to the surface of the earth and creates a volcano. Any magma that comes out of the volcano is called lava. If it stays in the volcano, it remains magma. This magma and lava when they cool create different types of rocks as you can read about below.

- a. Granite: Can see the minerals—feldspar, mica, and quartz; minerals form through crystallization because the magma stays hot for 10,000 years. This gives the minerals time to gather together. The longer it stays hot the bigger the minerals will become. When minerals form, they crystalize and sparkle like snowflakes.
- b. Basalt: Found on the outside of the volcano at the bottom; it is made of heavy iron particles; when it comes out of the volcano, the heavy particles sink to the base; can see some sparkles (crystallization of minerals) in it because of some long-term cooling; it has holes in it from gases that are in it when it comes out of the volcano.
- c. Pumice: Found on the outside of the volcano at the top; it has very rough texture that is glass-like; it is made up of very light weight particles that rise to the top of the volcano; cannot see any sparkles (no crystallization of minerals) in it because it cooled so quickly; it has holes in it from gases that are in it when it comes out of the volcano.
- d. Scoria: Found on the outside of the volcano in the middle; it has a medium weight particles that when it comes out of the volcano, it forms between the basalt and the pumice; can see a few sparkles (crystallization of minerals) because of some longer cooling; it has holes in it from the gases that are in it when it comes out of the volcano.
- e. Obsidian: Found on the outside of the volcano and flowed into water; it cooled very fast causing it to have a glasslike and sharp quality; it is a shiny rock without sparkles (no crystallization of minerals); no holes because it contracted in the cold water pushing the gases out.

II. Sedimentary Rocks

Sedimentary rocks begin at the top of mountains. Mountains are made of huge rocks. However, the cold, heat, ice, gravity, rain, snow, animals, and other forces can break down rocks by weathering and turn into sediments such as pebbles, sand, silt, and clay.

These sediments get carried down the mountains in streams by snowmelt and rain. When these sediments in the water are going down the mountain, the slope of the mountain is very steep having a lot of running water energy to carry all the sediments down the mountain. However, the slope of the mountain gets less and the running water energy to carry these particles down the mountain gets less. However, depending on the weight of the particles, they will deposit themselves automatically at different places along the way in the lakes and oceans.

As the water in the streams enters the lakes and oceans, they are deposited on the sides and bottoms of the lakes and oceans. Each year, these different sediments—pebbles, sand, silt, and clay—are piling on each other in their own places and build up larger and larger.

After thousand or even millions of years of this, the deposits of these particles are huge. Eventually, there is uplift that displaces the oceans and lakes and the sediments are exposed to the sun. The sun heats them and makes them hard. However, each of these rocks are still quite soft being formed just by pressure. They can easily be broken and they turn back into the particles they started out as. There are four basic rocks that are formed that you can read about below.

- a. Conglomerate: these rocks are made of small pebbles; these pebbles being very heavy to move and rocks are the first sediments that drop off as the slope of the mountain gets less; there just isn't enough energy in the running water to carry the rocks down into the lakes or oceans; these pebbles, when exposed to the sun when the ocean or lakes are gone or displaced, are heated by the sun and turn into conglomerate rocks.

- b. Sandstone: these rocks are made of small particles of sand; sand being quite heavy to move are the second sediments that drop off as the slope of the mountain gets less; there isn't enough energy in the running water to carry them farther down into the lakes or oceans; these sediments, when exposed to the sun when the oceans or lakes are gone or displaced, are heated by the sun and turn into sandstone rocks.

- c. Shale: these rocks are made of small particles of silt and clay; silt and clay being quite light in weight are easily moved; are carried down to the bottom of the oceans and lakes; it is the squishy stuff that you feel between your toes when you wade into a lake; these sediments when exposed to the sun when the ocean and lakes are displaced, are heated by the sun and turn into shale rocks.

- d. Limestone: these rocks are made of small particles of silt and clay; silt and clay being quite light in weight are easily moved; are carried down to the bottom of the oceans and lakes; when the plants that live at the bottom of lakes die and bones and shells of ocean animals get mixed in with the silt or clay, they change the mixture and become pasty looking in color; these sediments when exposed to the sun when the ocean and lakes are displaced, are heated by the sun and turn into shale rocks.

III. Metamorphic Rocks

Metamorphic means “change in form”. Metamorphic rocks are rocks that have physically changed from one type of rock to another type of rock. They change because they become very hot, and the mixture of the particles move around and change.

Sedimentary and igneous rocks can get pushed down deep into the earth where there is a lot of pressure and being near magma under the earth’s surface. Being exposed to this heat and pressure for thousands of years, these conditions will “morph” the rock into a new rock.

Metamorphic rocks sparkle because they have heated up and gone through slow cooling. When there is slow cooling, there is crystallization and minerals begin to form. Because minerals are crystalized particles, they sparkle like snowflakes.

- a. Metaconglomerate: These rocks start out as conglomerates; when they are exposed to heat under the earth’s surface, they turn into metaconglomerate rocks; they have some sparkle to them because of slow cooling after they are heated.
- b. Quartzite: These rocks start out as sandstone; when they are exposed to heat under the earth’s surface, they turn into quartzite rocks; they have a lot of sparkles because of slow cooling after they are heated.
- c. Slate: These rocks start out as shale; when they are exposed to heat under the earth’s surface, they turn into slate rocks; they don’t have sparkles, but they have a slight sheen to them because of slow cooling after they are heated.
- d. Schist: These rocks start out as slate; when they are exposed to more excessive heat under the earth’s surface, they turn into schist rocks; they have a lot of sparkles and shine, because of slow cooling after they are heated.
- e. Marble: These rocks start out as limestone; when they are exposed to heat under the earth’s surface, they turn into marble rocks; they have huge sparkles because of slow cooling after they are heated.