Igneous rock forms when magma or lava cools and hardens. Magma is melted rock found below the surface of the earth. Lava is melted rock on or near the surface of the earth.

Igneous rocks have different types of crystals. They also have different size crystals. Igneous rocks are made up of different types of substances. Different substances make crystals of different shapes and colors.

The size of the crystal depends on how quickly the melted rock cools. Melted rock that cools slowly form large crystals. Melted rock that cools quickly forms smaller crystals. Sometimes, the melted rock cool so quickly that crystals do not have a chance to form at all.

Geologists further classify igneous rocks according to whether the rocks formed above or beneath the Earth’s surface.

**Rocks from Lava**

Extrusive igneous rocks from when melted rock cools quickly on Earth’s surface. Liquid rock that reaches Earth’s surface is called lava. Lava cools quickly before large crystals have time to form. That’s why extrusive igneous rocks usually have a smooth, sometimes glassy appearance.

Extrusive igneous rocks can form in two ways. In one way, volcanoes erupt and shoot out lava and ash. Also, large cracks in Earth’s crust, called fissures, can open up. When they do, the lava oozes out onto the ground or into water. Oozing lava from a fissure or a volcano is called a lava flow. Lava flows quickly expose melted rock to air or water. The fastest cooling lava forms no grains at all. This is how obsidian, a type of volcanic glass, forms. Basalt on the ocean floor is another example of an extrusive igneous rock. Lava trapping large amounts of gas can cool to form igneous rocks containing many holes such as pumice or scoria.
Rocks from Magma

Some melted rock never reaches the surface. Such underground melted rock is called magma. **Intrusive igneous rocks are produced when magma cools slowly below the surface of Earth.**

Intrusive igneous rocks form when a huge glob of magma from inside Earth rises toward the surface but never reaches it. It’s similar to when a helium balloon rises and gets stopped by the ceiling. This hot mass of rock sits under the surface and cools slowly over millions of years until it is solid. The cooling is so slow the minerals in the magma have time to form large crystals. One common intrusive rock is granite. If you look at granite, you can see the crystals inside the rock.

The size of the mineral crystals is the main difference between intrusive and extrusive igneous rocks. Intrusive igneous rocks have large crystals that are easy to see. Extrusive igneous rocks do not have large crystals that you can easily see.

**Reading Check**

How do intrusive and extrusive rocks appear different?

This intrusive rock is granite. Like gabbro, it cooled slowly inside Earth, forming large mineral crystals.

The extrusive rock rhyolite has a similar composition to granite, but the lava it formed from cooled quickly. It has few visible mineral crystals.

Figure 14

Extrusive igneous rocks form at Earth’s surface. Intrusive igneous rocks form inside Earth. Wind and water can erode rocks to expose features such as dikes, sills, and volcanic necks.

Basalt is the most common extrusive igneous rock. Most of the mineral crystals in basalt are not visible to the unaided eye. Sometimes basalt has holes in it.

This gabbro is an intrusive igneous rock with large mineral crystals that show it cooled slowly.