

It is possible to tell a lot about a rock by carefully studying it. You do not need complicated scientific equipment to make good observations to try and identify some properties of the rock.

In the field

If you can find the place where the rock comes from in the ground (scientists call this 'in-situ'), you may be able to see if there are any beds, or any other structures like folds in the rock. If the rock has bedding, it will be a sedimentary rock. Igneous rocks like granite have no bedding, but will have large interlocking crystals. Rocks like limestone have structures called joints, which look like long thin cracks.

By holding a piece of the rock in your hand, you might be able to tell if the rock is hard or crumbly ('friable') – if the rock is friable, examine the size and shape of any pieces that come off. Rocks like shale and mudstone are friable. If the rock breaks into flat pieces, it is said to be 'fissile'. Shale is one example of a rock which is fissile.

If you hold similar sized pieces of different rocks in your hand, it can also be possible to get an idea of the relative weight of the rocks. This might give you a clue about density. Some rocks like pumice or coal can feel very light. Some rocks, like ironstone can feel very heavy.

Examining the rock with a magnifying glass, we can see the grains. The shape, size and colour of the grains can help to tell you about the minerals in the rock, and how the rock formed. If the mineral crystals are large enough, you may be able to look at them individually. Limestone and mudstone can both have very fine grains. Sandstone has coarser gains, and igneous rocks like granite can have large crystals.

In a laboratory

In a laboratory with simple equipment, it is possible to perform further tests.

If you drop a small amount of water on the rock, watch to see if the water is absorbed into the rock, or if it stays on the surface. If it is absorbed, the rock is said to be 'permeable'. Permeable rocks like limestone and sandstone are quite common. Most igneous rocks like granite are not permeable.

An acid test will identify specific rocks. A small amount of weak acid dropped onto the surface of the rock will fizz and give off carbon dioxide gas if the rock is limestone, chalk or marble.

It is possible to measure the density of rocks using a container filled with water. By placing the rock into a container filled with water and measuring the displacement, this will tell you the volume of the rock.

Weighing the rock will give its mass. To get a mass density with units of Kg/m^3 , use this equation:

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

Some rocks, such as pumice are less dense than water, and will float when placed in a container of water.

In rocks where it is possible to examine individual minerals, tests such as hardness, streak and lustre can be used to identify those minerals.

In special geological laboratories, it is possible to examine thin sections of rocks under a microscope. When looking at rocks at this level, it is possible to closely examine the minerals in the rock. These microscopes may also allow scientists to look at the rocks using polarised light. Many minerals demonstrate a variety of properties under these conditions, and this is a vital tool for mineral identification and study for geologists.