

This package is a small digital kit of specimens representing some of the common rock types referred to in S283. You should use it in conjunction with reading the section on rocks and minerals in Background Science.

Common terms used:

intrusive: describes igneous rocks formed by the cooling and crystallization of magma beneath the Earth's surface.

Extrusive: describes igneous rocks that are the result of volcanic eruption at the Earth's surface.

felsic minerals: minerals such as quartz, feldspar and muscovite mica, which are rich in Si and Al but poor in Fe and Mg.

mafic minerals: minerals that are rich in Fe and Mg, such as olivine, pyroxene, amphibole and biotite mica.

- Move through this package by clicking on the next/previous buttons in Acrobat's toolbar or by selecting next page/previous page in the document menu.
- You can load 3-D movies of the specimens by clicking on the images. Click and drag in the image window to rotate the specimen.

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What is a rock?

A rock is a granular or interlocking aggregate of one or more types of crystals or grains. Rocks can contain different minerals, and even in rocks containing the same few minerals the relative proportions of these minerals may vary, so that there is a huge variety of rock types. Rocks may be divided into three groups according to the way in which they are formed. Rocks that have crystallized from molten material or magma, either at the Earth's surface, when erupted as volcanic lava, or beneath it, are known as igneous rocks. Weathering and erosion of pre-existing rocks at the Earth's surface yield a vast amount of rock and mineral particles or sediment that is subsequently deposited onto the surrounding land surface or into the oceans. Upon burial beneath further piles of sediment, these deposits become consolidated to give another important group known as the sedimentary rocks. The final group, known as the metamorphic rocks, are rocks that have been altered and recrystallized by heat and/or pressure at depth within the Earth. Under extreme conditions, metamorphic rocks can begin to melt and so produce new magmas.

Basalt

A fine-grained, mafic, igneous rock with a chemical composition similar to that of dolerite and gabbro. Usually formed by cooling of lava erupted at the Earth's surface, but may also be found in minor intrusions, such as sills and dykes, if cooled very quickly. On cooling, may develop characteristic polygonal joint patterns. Basalt flows cover about 70% of the Earth's surface and huge areas of the terrestrial planets, and are therefore arguably the most important of all crustal rocks. They are formed by partial melting of mantle peridotite.

Dolerite

A medium-grained, mafic, intrusive, igneous rock with a chemical composition similar to that of basalt and gabbro. Dolerites are commonly found in shallow level intrusions such as dykes, sills, or plugs.

Grain Size

Coarse-grained	>2 mm	Easily seen with naked eye
Medium-grained	0.25-2 mm	Easily seen with a hand lens
Fine-grained	<0.25 mm	Scarcely distinguishable, or indistinguishable, with a hand lens

Gabbro

A coarse-grained, mafic, intrusive, igneous rock with a chemical composition similar to that of basalt and dolerite; formed as the result of slow cooling at depth beneath the Earth's surface. Gabbros are commonly found intruded as ring complexes (e.g. Ardnamurchan and Skye in Scotland).

Peridotite

A dense, coarse-grained, ultramafic rock with a crystalline texture, characteristic of the lower oceanic crust and the principal rock type forming the Earth's mantle. Peridotite is composed largely of olivine and pyroxene. Their chemistry and presence in rocks derived from the Earth's mantle suggest that much of the Earth's mantle, and therefore of the mass of the Earth, is peridotite. Meteorites are also composed largely of peridotite, suggesting that peridotites are probably the commonest rock in the solar system.

Granite

A light-coloured, coarse-grained, igneous rock, consisting mainly of quartz (at least 20%), feldspar and mica with smaller amounts of other minerals.

Gneiss

A medium- or coarse-grained metamorphic rock, composed of alternating bands of felsic and mafic minerals, formed at very high pressures and temperatures during regional metamorphism.

Andesite

A fine-grained, intermediate, volcanic rock with a chemical composition similar to that of microdiorite and diorite.

Characteristic of Andean-type (ocean/continent) destructive plate margins.