

Identification of Selected Igneous Rocks

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Introduction

Igneous rocks are those rocks that have cooled from magma either deep within the Earth or near or on Earth's surface. The depth at which a magma cools will have a number of effects on the resulting rock. If magma cools deep within the Earth, or **intrusively**, the surrounding material will insulate the magma, much like a comforter insulates a person on a bed. This will cause the magma to cool at a much slower rate and allow individual mineral crystals to grow larger and larger. If, on the other hand, a magma cools on or nearer to the surface, or **extrusively**, there will be less insulating material and therefore the magma will cool more rapidly. This will result in smaller mineral crystals.

The result of either extrusive or intrusive cooling is evident in the final texture of the igneous rock. The **texture** of an igneous rock is a measure of crystal size within the rock. Igneous textures are described by a number of terms. The **phaneritic texture** describes coarse grains or rocks that contain mostly large crystals. A rock with an **aphanitic texture** has a fine grain; it contains mostly small crystals. Observationally, a rock that exhibits a phaneritic texture would have visible crystals, as seen below. The **porphyritic texture** describes a rock that exhibits both phaneritic and aphanitic textures.



Other igneous textures that are typical of surface formation are associated with volcanic activity. These textures are pyroclastic, vesicular, or glassy textures. **Pyroclastic textures** result from the compaction of volcanic ash and explosive debris. The resulting rock is formed when the ash and debris is welded together by the immense heat contained in the debris. As a result this texture typically has a gritty feel, and the rock contains tiny bits of fragmented material.

A **vesicular texture** is caused when dissolved gases and other volatile components of a magma erupt from the liquid portion due to a decrease in pressure. This causes the magma to foam up, much like what would occur when the cap is removed from a shaken soda bottle. The rock that results from the cooling frothed magma would be riddled with hole-like structures called **vesicles**.

Identifying Igneous Rocks

Using the following table which relates common igneous rocks to properties of their texture and color, along with visual observations of the rocks supplied by your instructor, fill in the table below.

<u>Texture</u>	<u>Color Index</u>			
	Felsic	Intermediate	Mafic	Ultramafic
Pegmatitic	Granite-pegmatite	Diorite-pegmatite	Gabbro-pegmatite	
Phaneritic	Granite	Diorite	Gabbro	Rarely seen (Komatiite)
Aphanitic	Rhyolite	Andesite	Basalt	
Porphyritic	Porphyritic Rhyolite or Porphyritic Granite	Porphyritic Andesite or Porphyritic Diorite		
Glassy	Obsidian			
Vesicular	Pumice		Scoria	
Pyroclastic	Tuff			

