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### Competitive Exams: Identification of Igneous Rocks

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Grain Size	Usual Color
Other	Composition
Rock Type	fine
dark	glassy appearance
lava glass	Obsidian
fine	light
many small bubbles	lava froth from sticky lava
Pumice	fine
dark	many large bubbles
lava froth from fluid lava	Scoria
fine or mixed	light
contains quartz	high-silica lava
Felsite	fine or mixed
medium	between felsite and basalt
medium-silica lava	Andesite
fine or mixed	dark
has no quartz	low-silica lava
Basalt	mixed
any color	large grains in fine-grained matrix
large grains of feldspar, quartz, pyroxene or olivine	Porphyry
coarse	light

wide range of color and grain size	feldspar and quartz with minor mica, amphibole or pyroxene
Granite	coarse
light	like granite but without quartz
feldspar with minor mica, amphibole or pyroxene	Syenite
coarse	medium to dark
little or no quartz	low-calcium plagioclase and dark minerals
Diorite	coarse
medium to dark	no quartz; may have olivine
high-calcium plagioclase and dark minerals	Gabbro
coarse	dark
dense; always has olivine	olivine with amphibole and/or pyroxene
Peridotite	coarse
dark	dense
mostly pyroxene with olivine and amphibole	Pyroxenite
coarse	green
dense	at least 90 % olivine
Dunite	very coarse
any color	usually in small intrusive bodies
typically granitic	Pegmatite

## Chemical Sedimentary Rocks

These same ancient shallow seas sometimes allowed large areas to become isolated and begin drying up. In that setting, as the seawater grows more concentrated, minerals begin to come out of solution (precipitate), starting with calcite, then gypsum, then halite. The resulting rocks are certain limestones or dolomites, gypsum rock, and rock salt respectively. These rocks, called the evaporite sequence, are also part of the sedimentary clan. In some cases chert can also form by precipitation. This usually

happens below the sediment surface, where different fluids can circulate and interact chemically.

## **Diagenesis: Underground Changes**

All kinds of sedimentary rocks are subject to further changes during their stay underground. Fluids may penetrate them and change their chemistry; low temperatures and moderate pressures may change some of the minerals into other minerals. These processes, which are gentle and do not deform the rocks, are called diagenesis as opposed to metamorphism (although there is no well-defined boundary between the two) .

The most important types of diagenesis involve the formation of dolomite mineralization in limestones, the formation of petroleum and of higher grades of coal and the formation of many types of ore bodies. The industrially important zeolite minerals also form by diagenetic processes.

## **Sedimentary Rocks Are Stories**

The beauty of sedimentary rocks is that their strata are full of clues to what the past world was like. Those clues might be fossils, marks left by water currents, mudcracks or more subtle features seen under the microscope or in the lab.

From these clues we know that most sedimentary rocks are of marine origin, usually forming in shallow seas. But some sedimentary rocks formed on land: Clastic rocks made on the bottoms of large freshwater lakes or as accumulations of desert sand, organic rocks in peat bogs or lake beds, and evaporites in playas. These are called continental or terrigenous (land-formed) sedimentary rocks.

Sedimentary rocks are rich in geologic history of a special kind. While igneous and metamorphic rocks also have stories, they involve the deep Earth and require intensive work to decipher. But in sedimentary rocks you can recognize, in very direct ways, what the world was like in the geologic past.

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