## Rock

A naturally-occurring solid aggregate of minerals.
e.g., marble, granite, sandstone, limestone

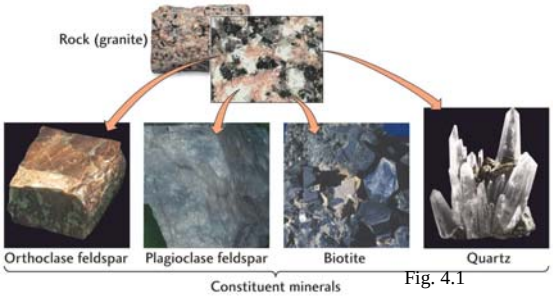



Fig. 4.1

## Three Types of Rocks

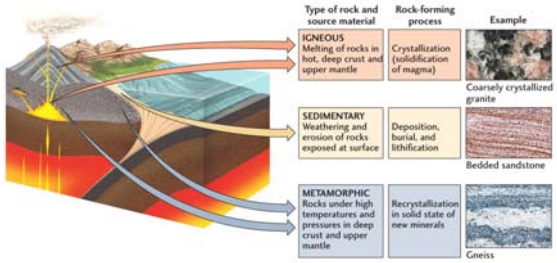



Fig. 4.2

## Igneous Rocks

**Rocks formed by the solidification of magma**

Fig. 4.3

## Igneous Rocks

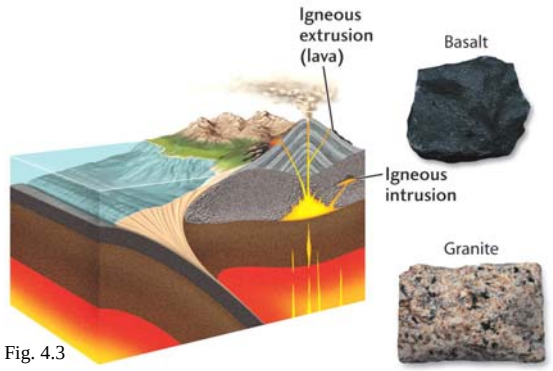
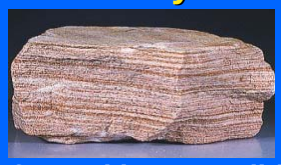



Fig. 4.3

## Sedimentary Rocks



- Rocks formed by consolidation of pieces of previously-existing rocks
- Chemical precipitation from solution

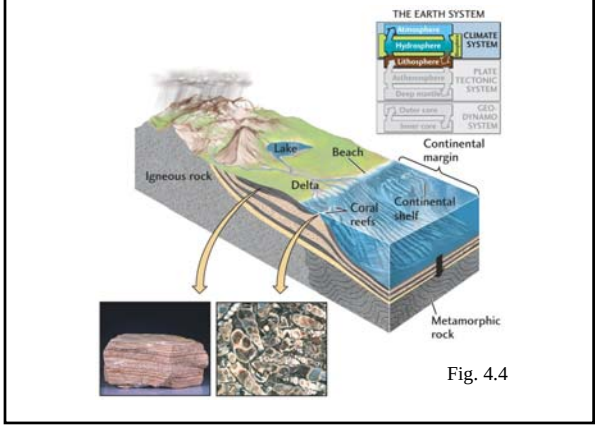



Fig. 4.4

## Metamorphic Rocks

**Rocks formed by the transformation of previously-existing rocks in the solid state due to increased temperature and pressure.**

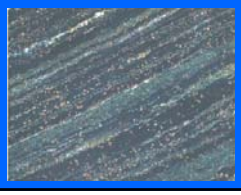


Fig. 4.6

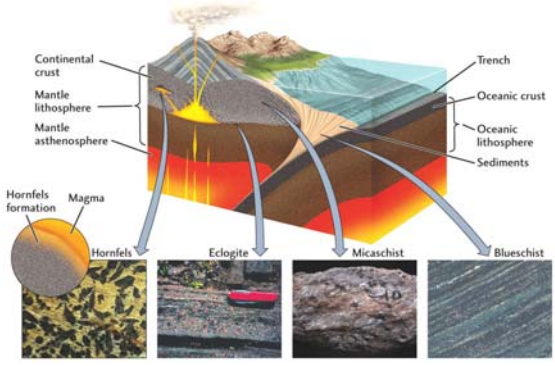



Fig. 4.6

## Proportions of the Rock Types

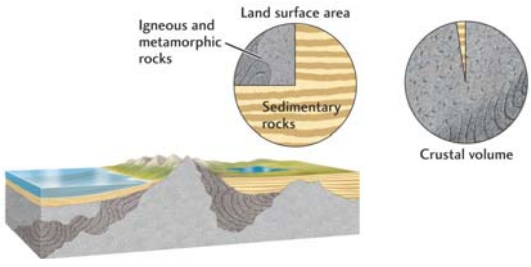



Fig. 4.5

**Table 4-1 Some Common Minerals of Igneous, Sedimentary, and Metamorphic Rocks**

| Igneous Rocks | Sedimentary Rocks | Metamorphic Rocks |
|---|---|---|
| Quartz* | Quartz* | Quartz* |
| Feldspar* | Clay minerals* | Feldspar* |
| Mica* | Feldspar* | Mica* |
| Pyroxene* | Calcite | Garnet* |
| Amphibole* | Dolomite | Pyroxene* |
| Olivine* | Gypsum | Staurolite* |
| | Halite | Kyanite* |

An asterisk indicates that a mineral is a silicate.

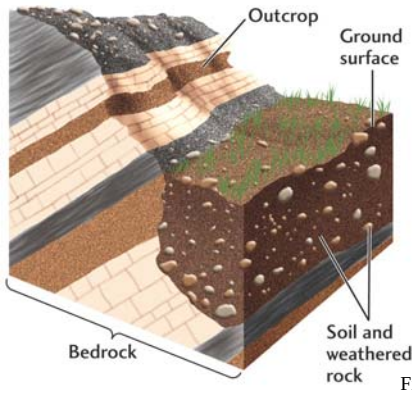



Fig. 4.7

**D** Shawangunk Mountains

Fig. 4.8

**E** Florida Keys

Fig. 4.8

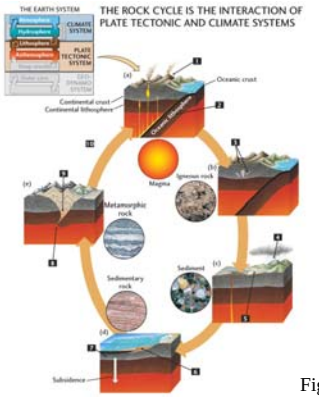



Fig. 4.9

Rock Cycle and the Earth System

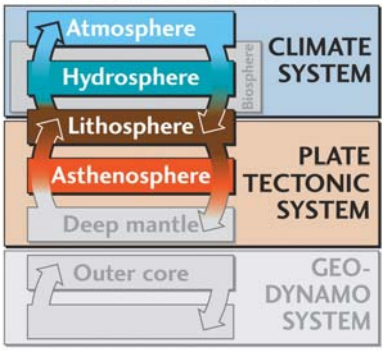



Fig. 4.9

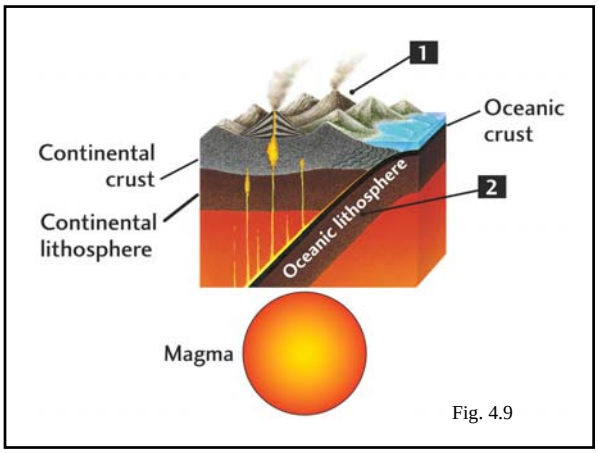


Fig. 4.9

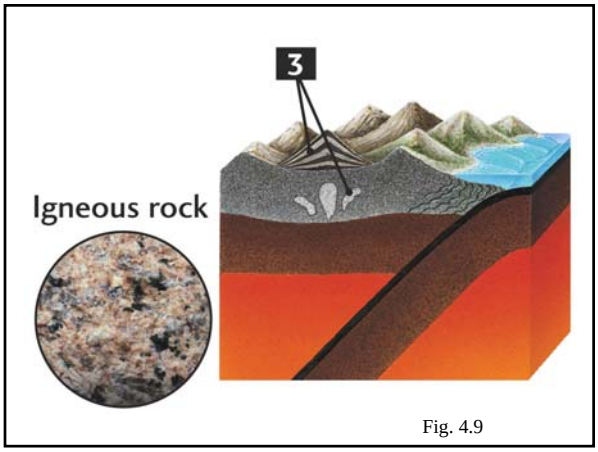


Fig. 4.9

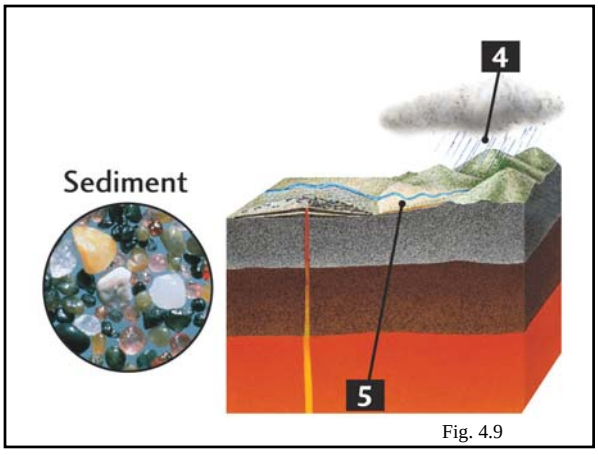
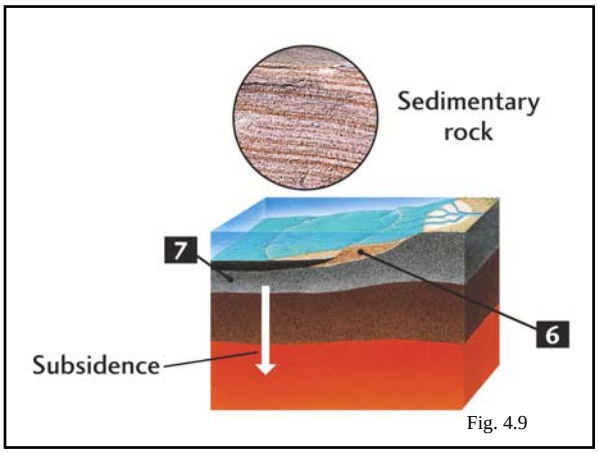
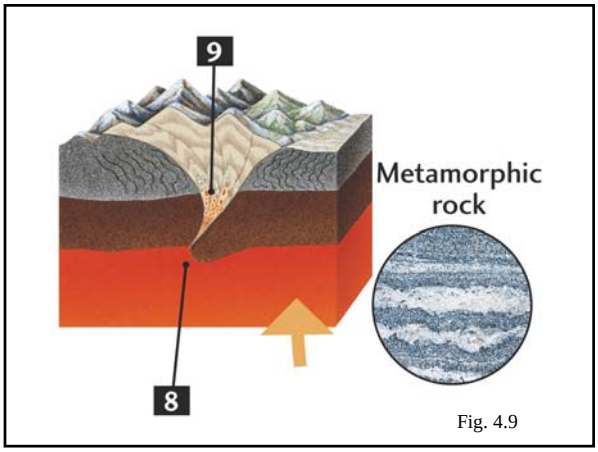
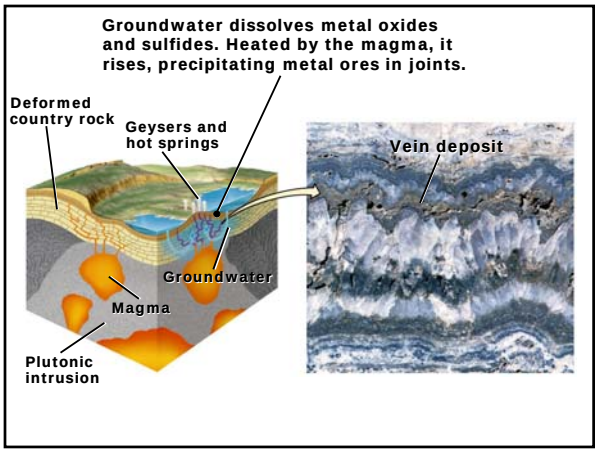


Fig. 4.9


Sedimentary rock
7
6
Subsidence
Fig. 4.9


9
Metamorphic rock
8
Fig. 4.9


Groundwater dissolves metal oxides and sulfides. Heated by the magma, it rises, precipitating metal ores in joints.
Deformed country rock
Geysers and hot springs
Vein deposit
Groundwater
Magma
Plutonic intrusion