Igneous Rocks

What You Need to Learn

- How magma melts and crystallizes to form igneous rocks
- How igneous rocks are classified
- How igneous rocks are used

What are Igneous Rocks?

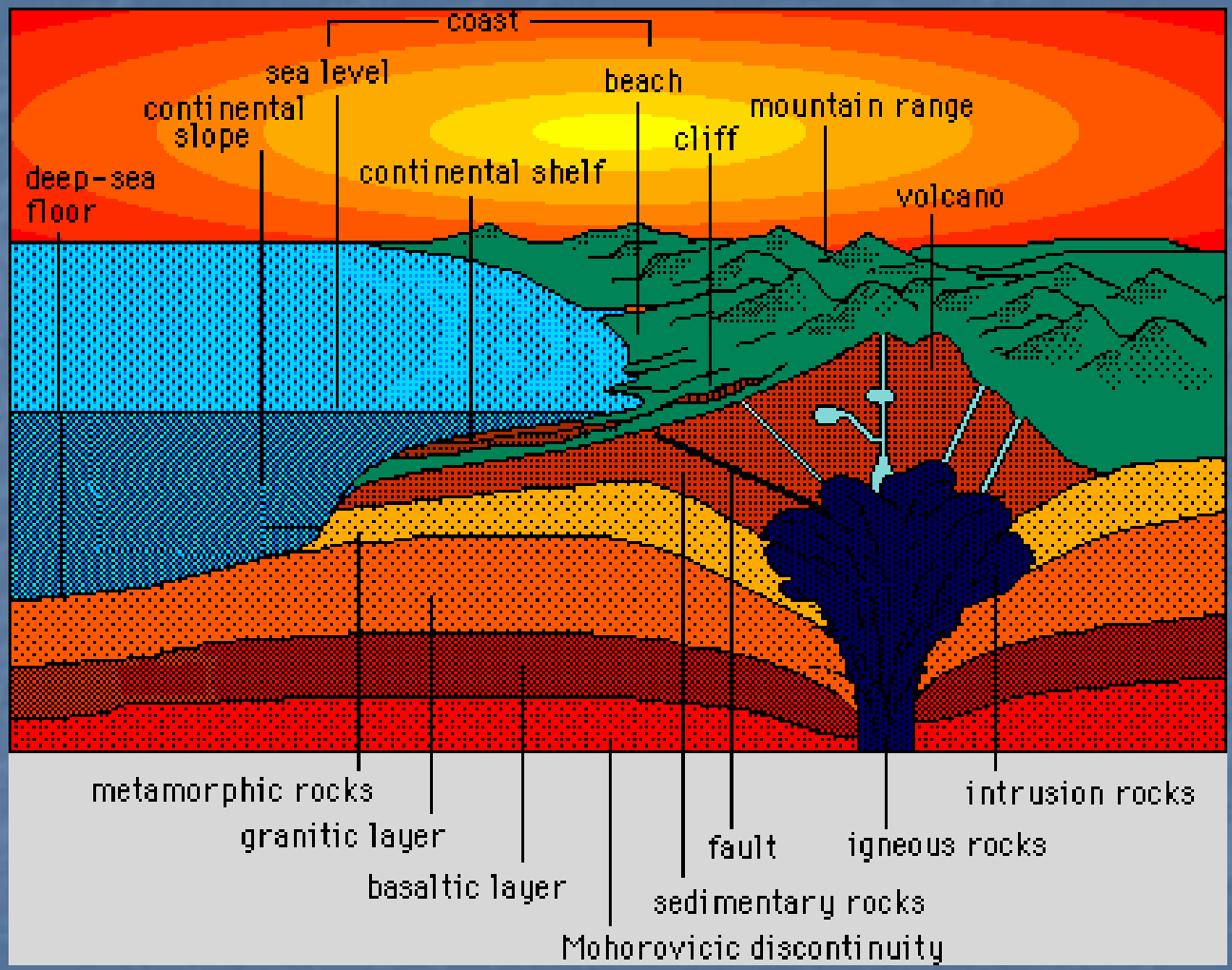
- Formed from crystallization of magma
- Latin for "fire"
- Types:
  - Extrusive: formed when magma flows to the Earth's surface and cools quickly
    - Fine grained
  - Intrusive: formed from slowly cooled magma in the Earth's crust
    - Coarse grained

Magma

- Slushy mix of molten rock, gases, and mineral crystals
- 3 basic types: Rhyolitic, Andesitic, Basaltic
- Formed in the upper mantle and lower crust @ temperatures of 800-1200°C
- Magma temperature, pressure, water content, and mineral composition effect formation

How Do Rocks Melt?

- Partial melting: minerals have different melting points, therefore melt at different temperatures
- Fractional Crystallization: magma crystallizes in the reverse order of partial melting

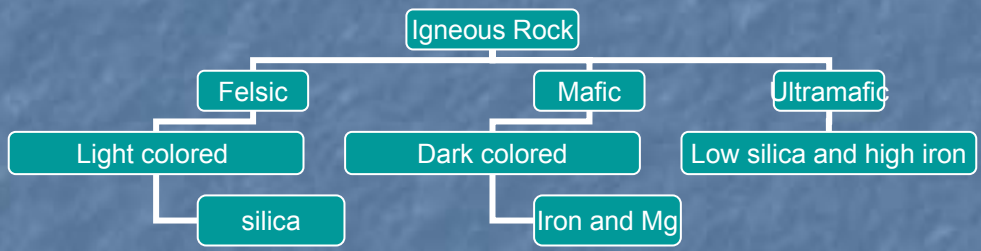

coast
sea level
beach
continental slope
mountain range
cliff
deep-sea floor
continental shelf
volcano
metamorphic rocks
granitic layer
basaltic layer
Mohorovicic discontinuity
sedimentary rocks
fault
igneous rocks
intrusion rocks

Bowen's Reaction Series

- Minerals form in predictable patterns
- Fledspar minerals: as cooling occurs minerals go from calcium rich to sodium rich
- Iron-Rich minerals: abrupt mineral transitions occur; olivine converts to pyroxene

Classification

Mineral Composition



Other classification differences: grain size and texture

Igneous Rocks as Resources

- Building materials
  - Strong
  - Resistant to weathering
  - Durable
- Gold, silver, lead, and copper are often found in veins in igneous rock
- Pegmatites that contain lithium and beryllium
- Kimberlites that contain diamonds