

# *Igneous Rocks*

4.2



# Review the Rock Cycle

- In order for Igneous Rock to become a sedimentary rock it must go through compaction and cementation
- In order for a Sedimentary rock to become a metamorphic rock it must have heat and pressure
- In order for a metamorphic rock to become an Igneous rock it must melt and then cool

# I. Formation of Igneous Rocks

- When hot magma cools and hardens, it forms - Igneous Rocks

# A. Magma

- Molten rock material, called *magma*, flows when it is hot and becomes solid when it cools
- Temperatures of magma range from about 650° C to 1,200° C (482° F – 2,192 ° F)
- Magma is less dense than surrounding solid rock so it rises towards the surface
  - When it reaches Earth's surface and flows from a volcano it is called lava

## B. Intrusive Rocks

- Rocks that form from magma below the surface are called intrusive igneous rock
  - Intrusive = Inside Earth
- Found at Earth's surface after layers of dirt have been eroded away
- They cool slowly, allowing for large mineral grains to be observed

Granite is an example of an intrusive rock.



# C. Extrusive Rocks

- Extrusive igneous rocks are formed as lava cools on or near the surface of Earth
  - *Ex*trusive = *Ex*it or outside Earth's crust
- When lava flows on the surface it cools quickly creating fine grained rocks

Basalt is an example of an Extrusive Rock  
Basalt is the most common extrusive rock





## D. Volcanic Glass

- Volcanic glass is formed when the lava cools so quickly that few or no visible mineral grains are formed
- Pumice and scoria have holes in them where pockets of gas were trapped and then escaped

Obsidian is an example of an Extrusive Rock and Volcanic Glass



Pumice is an example of an extrusive rock  
and volcanic glass





## II. Classifying Igneous Rocks

- A way to further classify Igneous rocks is by the type of magma that they were formed from

- Basaltic
- Andesitic
- Granitic



# A. Basaltic Rocks

- Basaltic Igneous Rocks are dense, dark-colored rocks
- They form from magma that is rich in iron and magnesium and poor in silica

## B. Granitic Rocks

- Granitic Igneous Rocks are light-colored rocks of a lower density than basaltic rocks
- Granitic magma is thick and stiff and contains lots of silica
- Granitic magma can build up a great deal of gas pressure – therefore these volcanic eruptions are usually very violent

# Mt. Rushmore

- The rock of Mt. Rushmore consists of outcroppings of fine-grained granite (a hard, light-colored, igneous rock - volcanic rock that has cooled) and some darker layers of mica schist

• Mt. Rushmore is the northeastern edge of the Harney Peak Granite Batholith (a batholith is a huge body of igneous rock that solidified under the earth).





## C. Andesitic Rocks

- *Andesitic igneous rocks* have mineral composition in between granitic and basaltic rocks
- These volcanoes have the potential to erupt violently