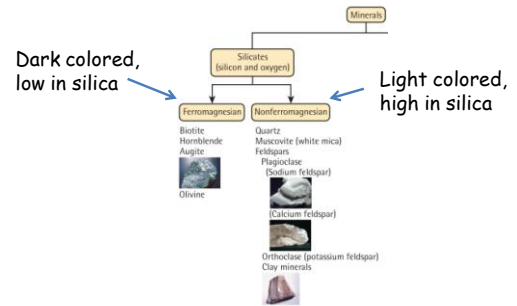


## Igneous Rocks and Magmas

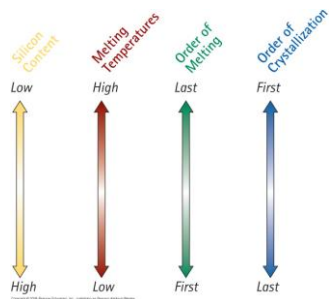
GS 106

## Silicate minerals crystallize from magmas



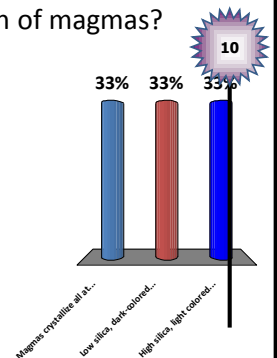
## Crystallization from a magma

Notice the relationship between silica and order of crystallization



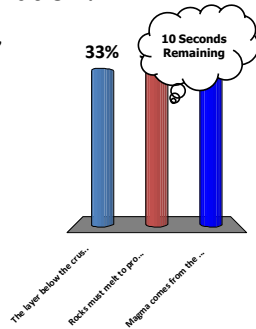
## Which of the following is TRUE regarding the crystallization of magmas?

1. Magmas crystallize all at once
- ✓ 2. Low silica, dark-colored minerals crystallize first
3. High silica, light colored minerals crystallize first



## Which of the following is correct about magma formation?

1. The layer below the crust, the mantle, is always molten and therefore always is magma
2. Rocks must melt to produce magma
3. Magma comes from the outer core and erupts on the surface



## Igneous rocks



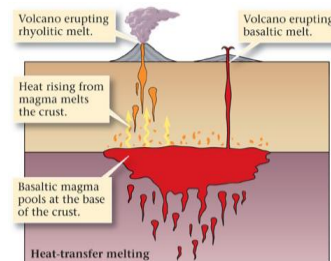
## Sources of internal heat

- Impact heating
- Differentiation
- Decay of radioactive minerals



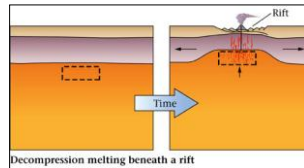
## How is magma produced?

### 1) Increasing heat



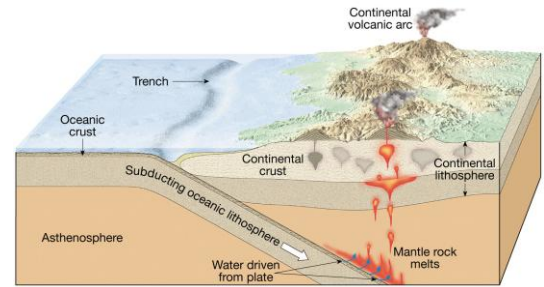
## How is magma produced?

### 2) Lowering pressure



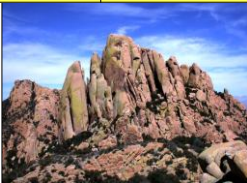
## How is magma produced?

### 3) Adding water



## Magma types

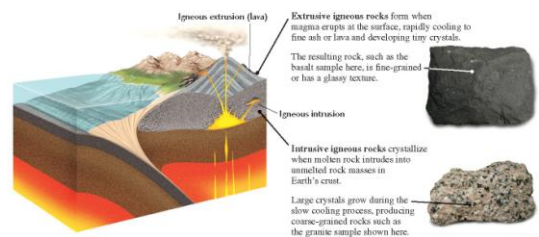
Type	Silica content	Viscosity
Felsic (granitic)	High	Very High: Explosive eruptions.
Intermediate (andesitic)	Intermediate	High: Explosive eruptions.
Mafic (basaltic)	Low	Low: thin, hot runny eruptions.



## IGNEOUS ROCKS: formed by the solidification of magma

-Extrusive: cool above ground (tiny crystals)

-Intrusive: cool below ground (large crystals)



## Porphyritic igneous rocks



Big minerals cool below

Microscopic minerals cool above

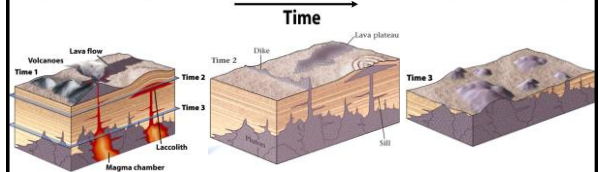
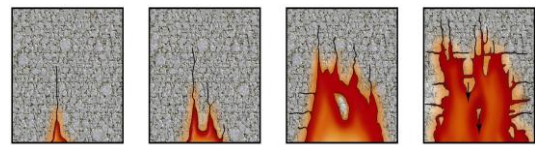
## Extrusive igneous settings



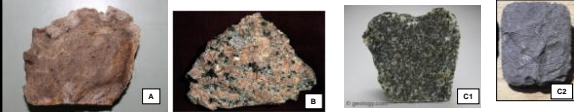
## Extrusive igneous settings



## Intrusive igneous settings



## Identifying igneous rocks



Type	Fine-grained	Coarse-grained
Felsic	Rhyolite <span>A</span>	Granite <span>B</span>
Intermediate	Andesite	Diorite
Mafic	Basalt <span>C2</span>	Gabbro <span>C1</span>

## Obsidian and pumice

Vesicles: cooled  
gas bubbles

