

# Igneous Rocks

How do we classify igneous rocks?



Phenomenon: Igneous Rocks

# Igneous Rocks

- ♦ Igneous Rocks - rock type that forms when molten material solidifies
  - ♦ Methods to classify igneous rocks:

# Igneous Rocks

1. Environment of Formation -  
the location where liquid rock  
solidifies into solid rock



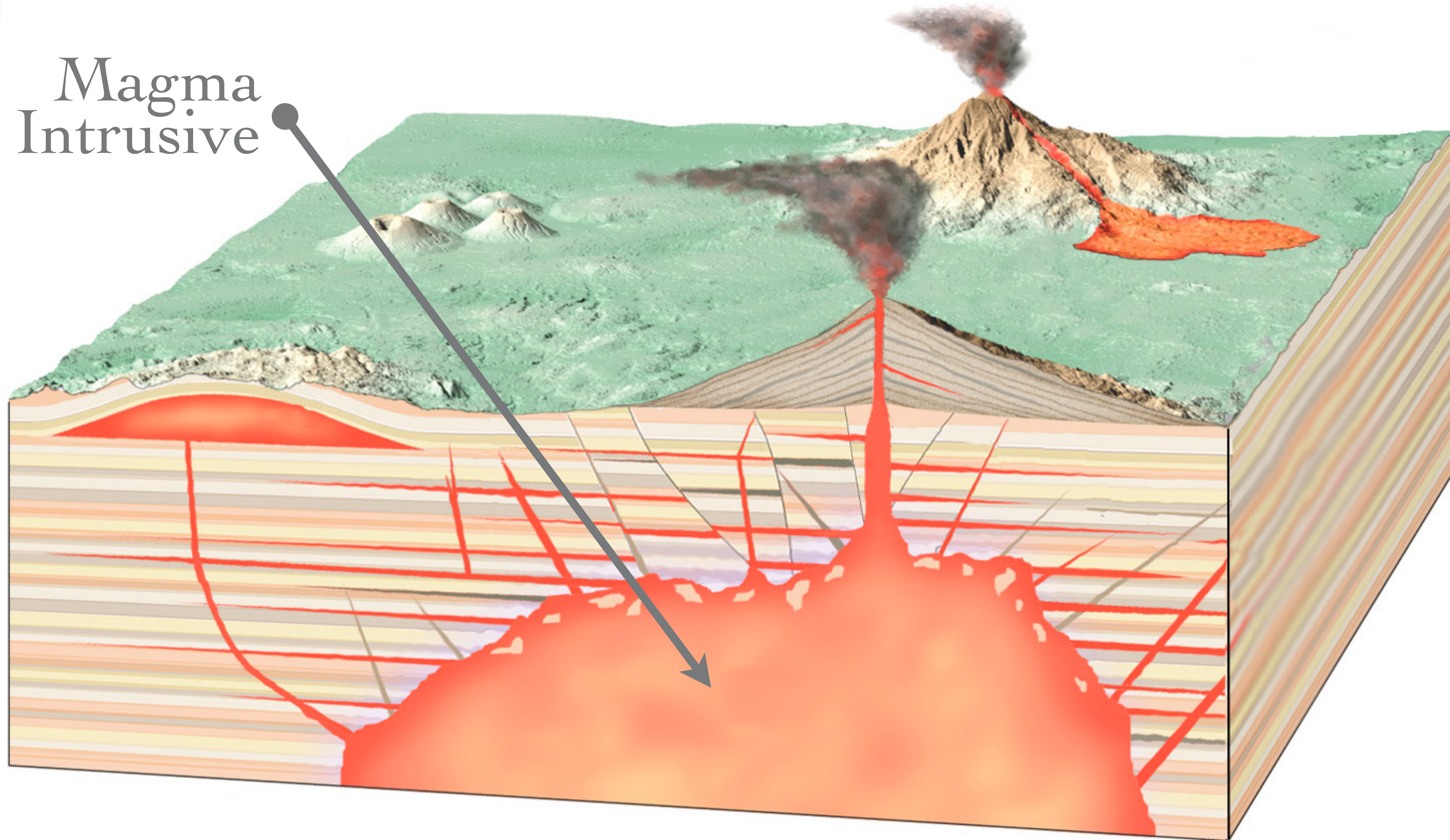


“Liquid Hot Magma”

# Igneous Rocks

- ♦ Magma - molten rock that is inside of the Earth
- ♦ Plutonic - rock that formed deep within the Earth
- ♦ Intrusive - below Earth's crust

Magma  
Intrusive



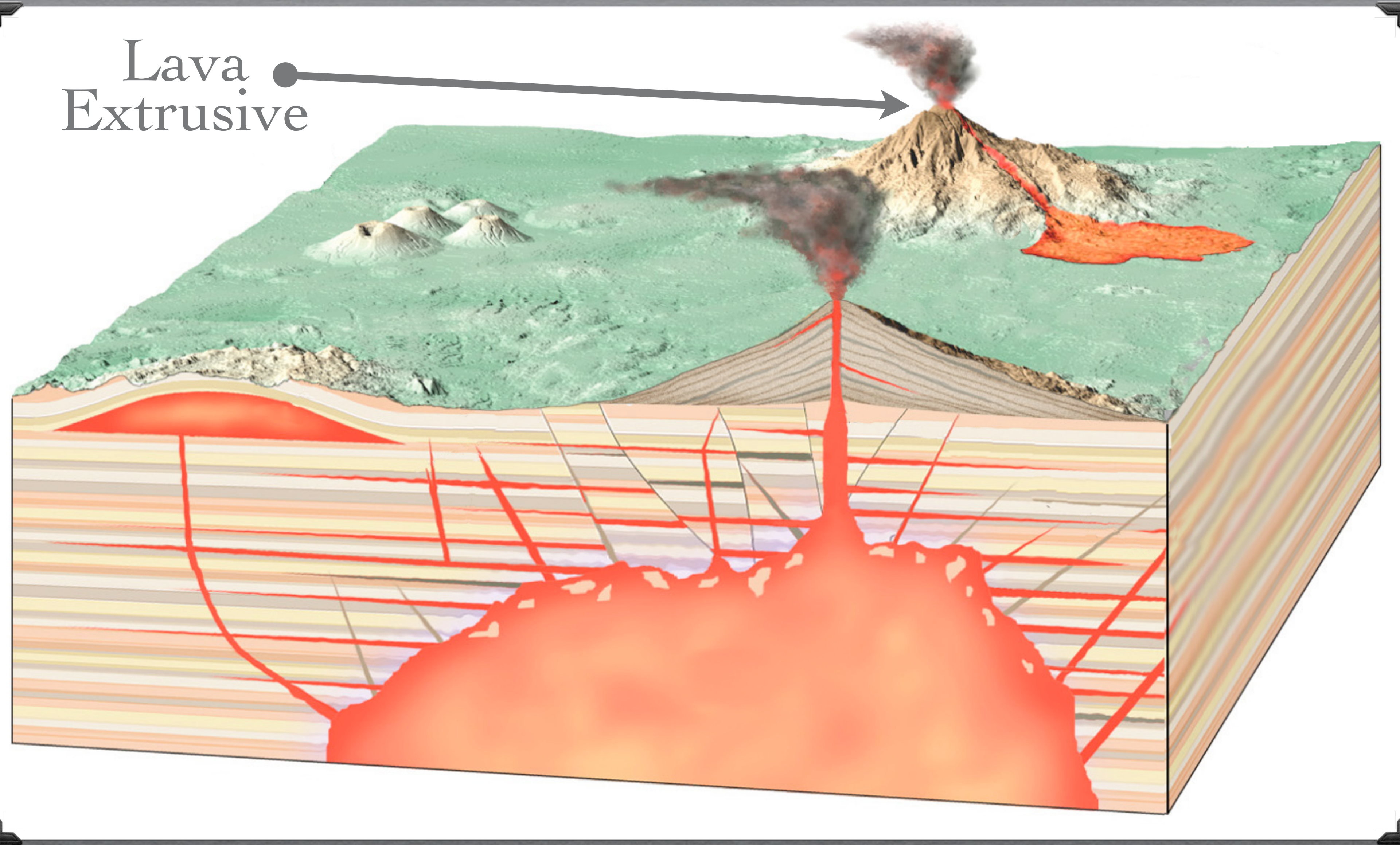
Environment of Formation

# Igneous Rocks

- ♦ Lava - molten rock that is outside of the Earth
- ♦ Volcanic - rock that formed above Earth's surface
- ♦ Extrusive - above Earth's crust



Lava  
Extrusive



Environment of Formation

# Igneous Rocks

2. Crystal Size - refers to an actual measurement of the individual crystals or aggregate



Obsidian



Granite

# Igneous Rocks

- ♦ Crystal size is an important factor to determine the environment of formation
  - ♦ The longer the cooling time the larger the crystal size [coarse or very coarse]
  - ♦ The shorter the cooling time the smaller the crystal size [glassy or fine]

# Igneous Rocks

Remember:

**THE LONGER THE  
COOL THE BIGGER  
THE JEWEL**

# Igneous Rocks



Long Cooling [Coarse]



Short Cooling [Fine]

# Igneous Rocks

3. Texture - the appearance or character of a rock

- ♦ Vesicular - texture that consists of gas pockets that give the appearance of having holes
- ♦ Porphyritic - texture that contains large crystals in a fine grained matrix

# Igneous Rocks



Vesicular



Porphyritic

# Igneous Rocks

4. Color - the shade of the rock based on its composition
  - ♦ Either: light or dark





# Igneous Rocks



Dark



Light

# Igneous Rocks

5. Density - the ratio of mass to volume of the rock based on its composition
  - ♦ Either: lower or higher



# Igneous Rocks

6. Composition - a mixture of materials found in the rock
  - ♦ Either: felsic or mafic



# Igneous Rocks

- ♦ Felsic - light colored rocks that have a high aluminum [Al] content and silicon [Si]



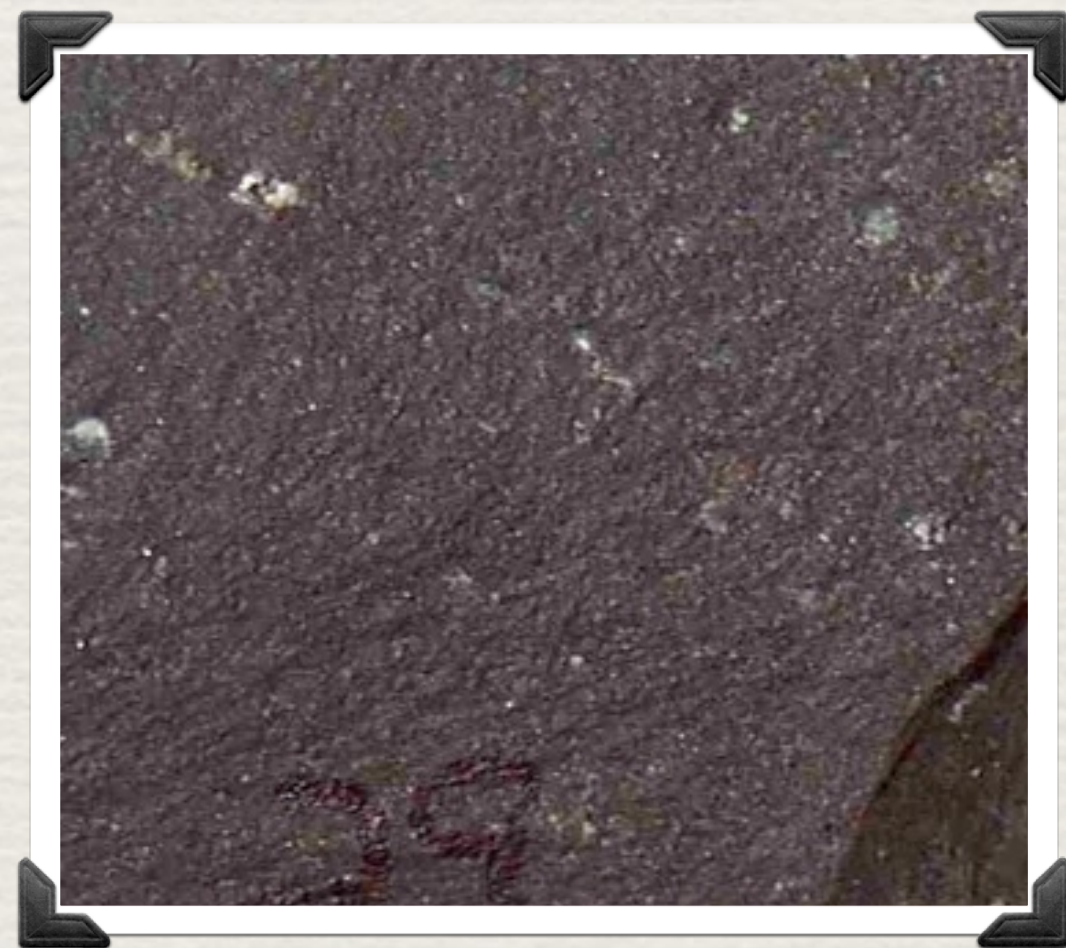
Granite



Rhyolite

# Igneous Rocks

- ♦ Mafic - dark colored rocks that have a high iron [Fe] or magnesium [Mg] content



Basalt

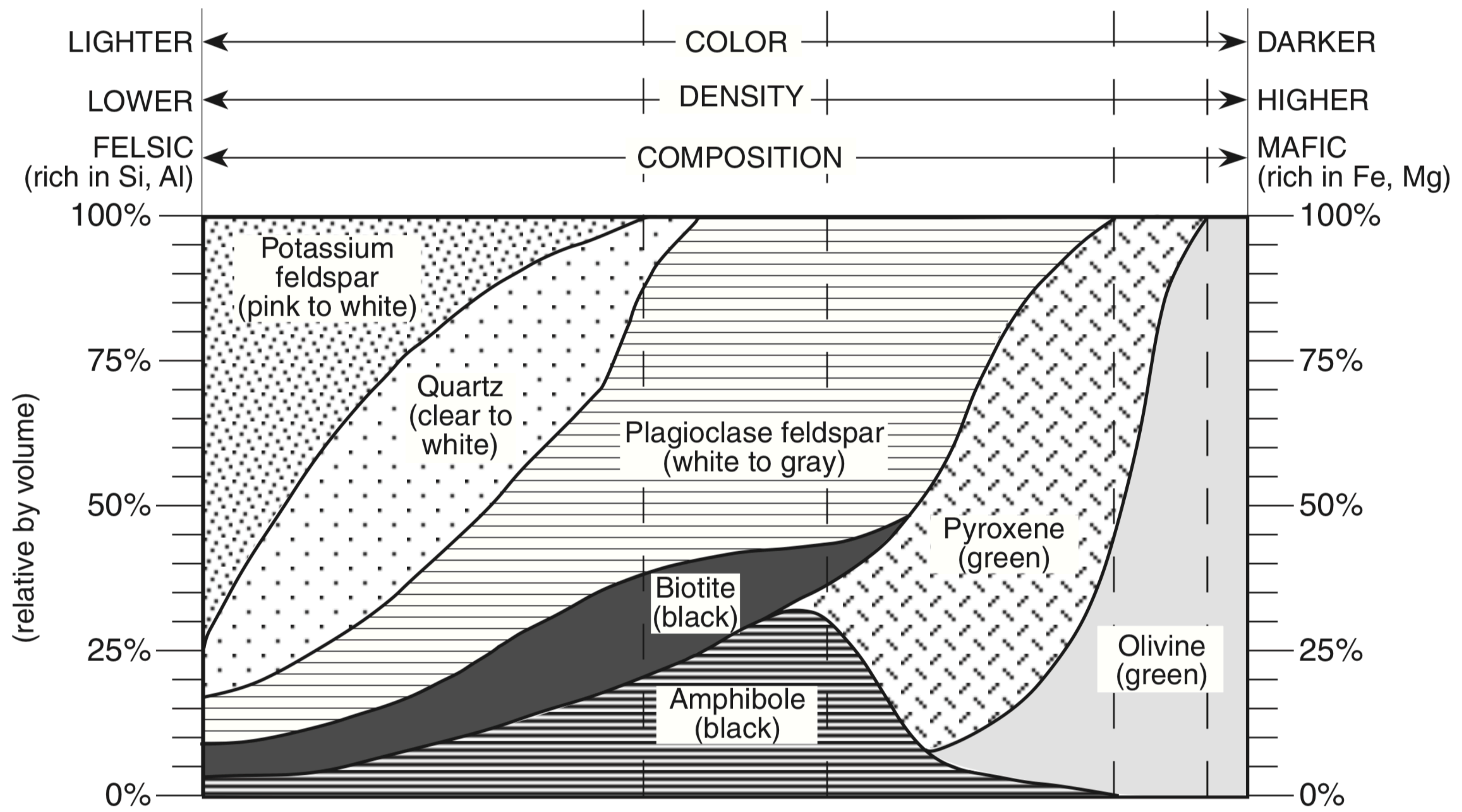


Scoria

# Igneous Rocks

7. Mineral Composition - the minerals and approximate percentages found in the rock





# Scheme for Igneous Rock Identification

						CRYSTAL SIZE	TEXTURE		
IGNEOUS ROCKS	ENVIRONMENT OF FORMATION	EXTRUSIVE (Volcanic)	Obsidian (usually appears black)		Basaltic glass		non-crystalline	Glassy	Non-vesicular
			Pumice		Scoria				less than 1 mm
			Vesicular rhyolite	Vesicular andesite	Vesicular basalt			1 mm to 10 mm	
			Rhyolite	Andesite	Basalt				
					Diabase				
			INTRUSIVE (Plutonic)	Granite		Diorite	Gabbro	Peridotite	Dunite
	Pegmatite							Very coarse	
								10 mm or larger	

