

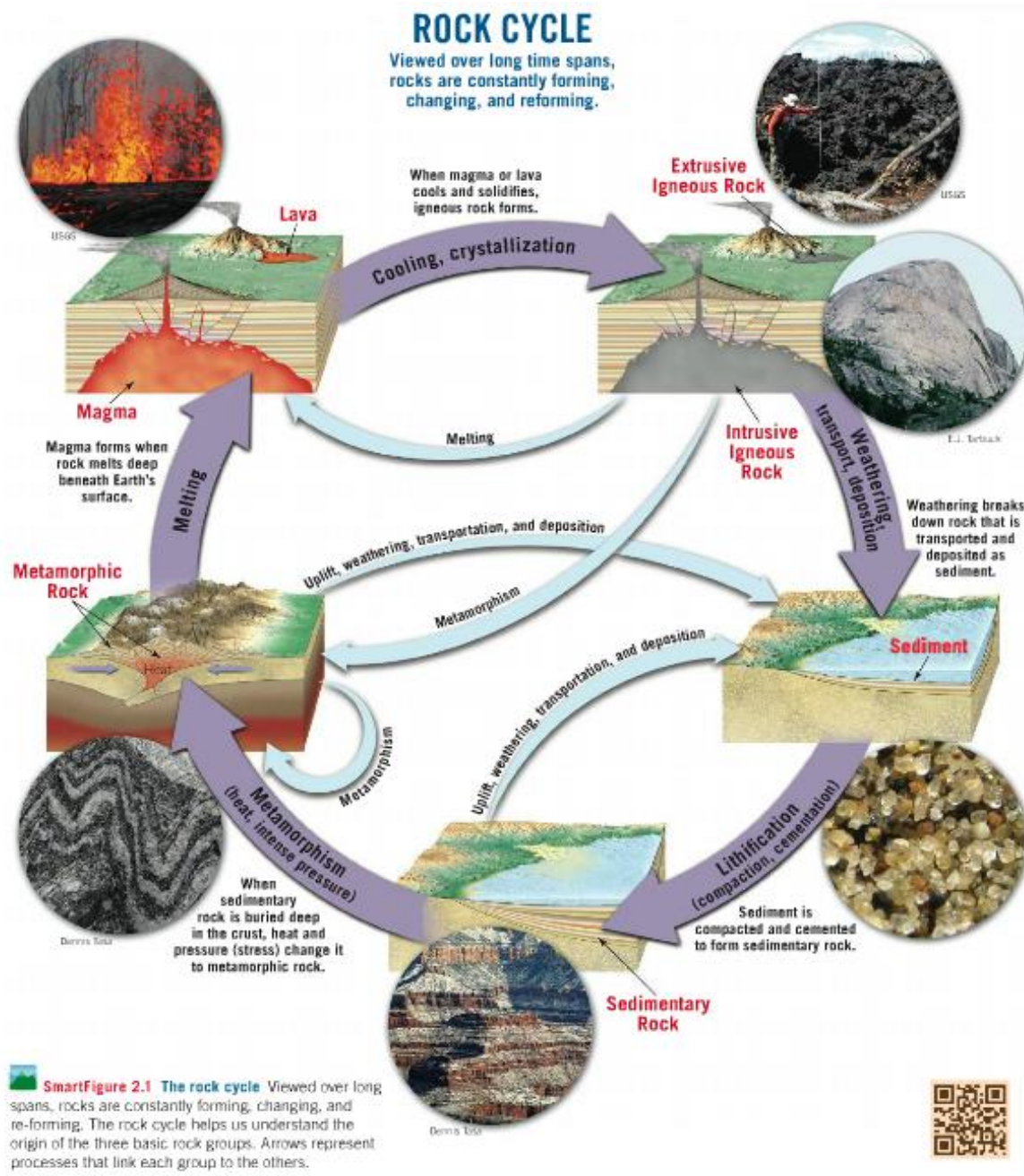
# Earth Science 11: Earth Materials: Rock Cycle

## Chapter 2, pages 44 to 46

### 2.1: Rock Cycle

#### What is a Rock?

- A solid mass of mineral or mineral-like matter that occurs naturally as part of our planet



Explain the statement “One rock is the raw material for another”

\*Go to the following link to learn more about the rock cycle: <https://goo.gl/q7qRd5>

Use the diagram above to describe the how the parent rock is transformed into the daughter rock. Make sure you talk about the processes involved.

Parent Rock	Pathway	Daughter Rock
<i>Extrusive Igneous</i>		<i>Sedimentary</i>
<i>Metamorphic</i>		<i>Igneous</i>
<i>Intrusive Igneous</i>		<i>Metamorphic</i>

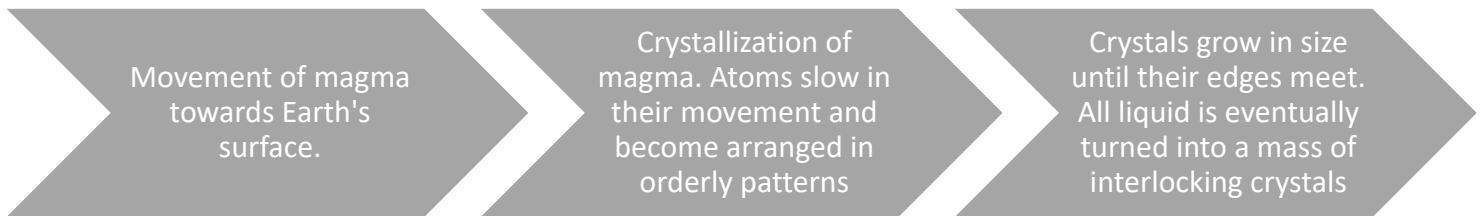
**\*Complete Activity 2.1 (pg. 28 – 29) in your workbook\***

# Earth Science 11: Earth Materials, Igneous Rocks

Chapter 1, pages 48 to 53

## 2.2: Igneous Rock Formation

Igneous rocks are formed by the following pathway:



<b>Extrusive Igneous Rock</b>	Molten rock solidifies at the surface
<b>Intrusive Igneous Rock</b>	Molten Rock solidifies below the surface



**What is the difference between magma and lava?**

**Magma – molten rock found in the mantle**

**Lava – molten rock found above the Earth's surface**

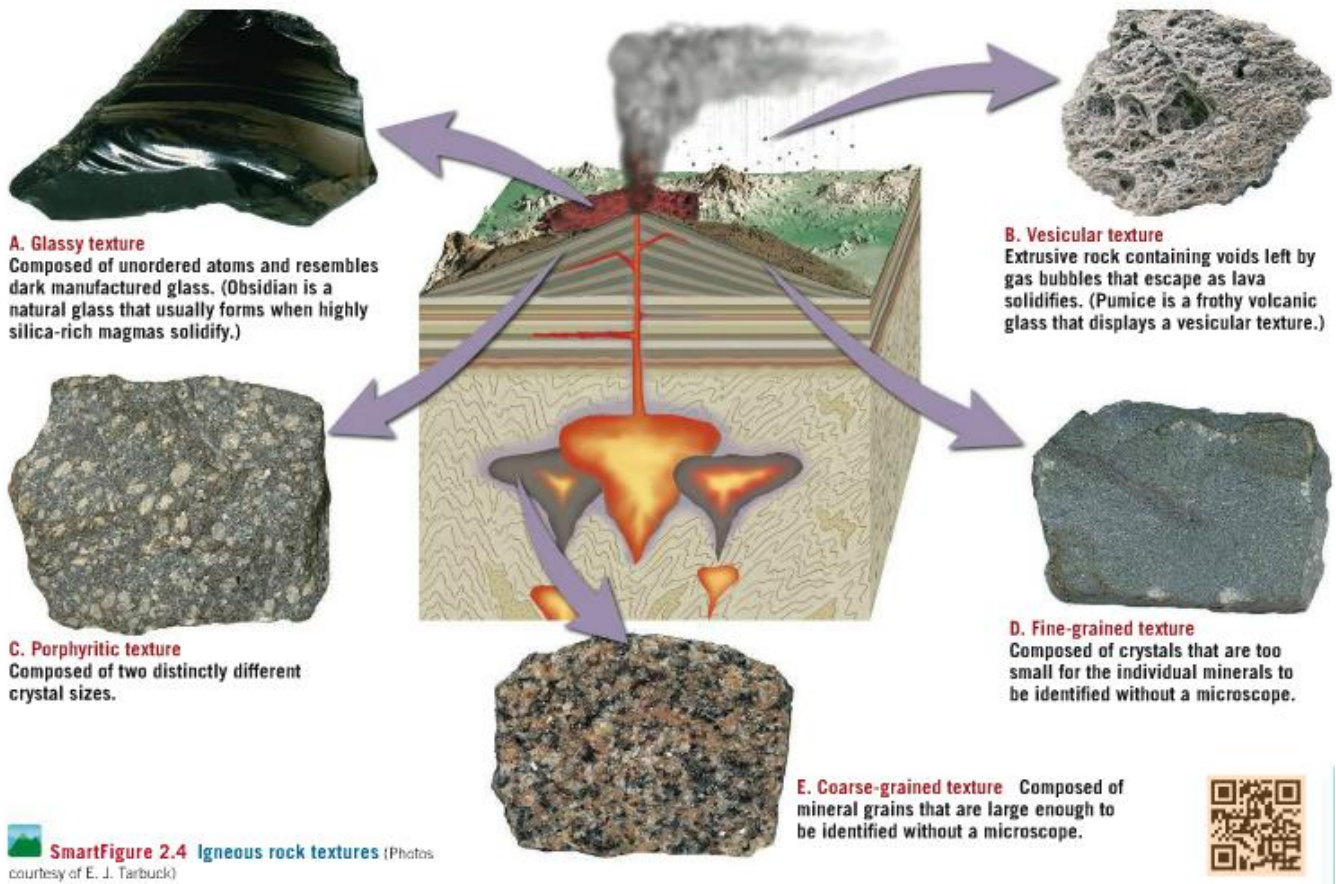
**What two factors affect crystallization?**

**Cooling time and parent magma composition**

### Texture

- A rock's texture is described using the **size, shape and arrangement** of its mineral grains.
- Texture is very useful in determining the environment in which rock's formed.

\*Examine the diagram below and watch the smartfigure on texture.



Which of the igneous textures above best describe a rock that:



- a) Cooled so quickly its atoms froze in place without forming mineral crystals? **Glassy texture**
- b) Cooled slowly for millions of years below ground? **Coarse – grained texture**
- c) Began cooling slowly underground but finished crystallizing quickly when it was ejected above Earth’s surface?

**Porphyritic texture**

- d) Crystallized rapidly at Earth’s surface and contained a large amount of gas or water vapour? **Fine Grained and vesicular texture**

\*Complete Workbook Activity 2.2 (pg. 30 – 31)

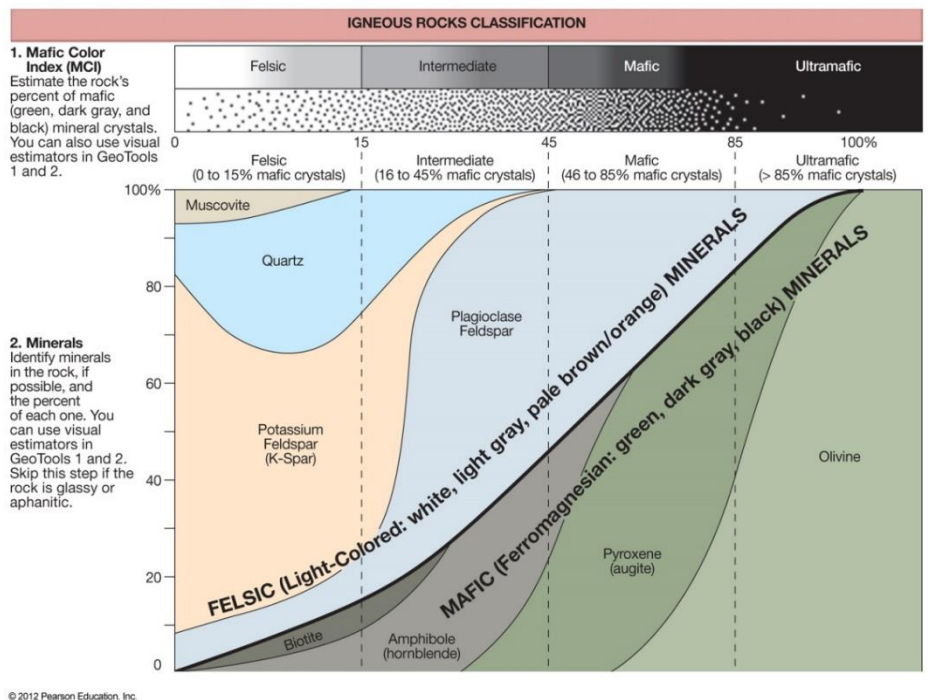
Use what you know about rock texture to determine the formation environment of the rocks below:

	Sample A	Sample B
<b>Image</b>		
<b>Formation Environment</b> <i>(Intrusive or Extrusive)</i>		
<b>Evidence of Formation Environment</b>		

### Igneous Rock Families

Igneous rocks are divided into four basic families based on their proportion of:

- a) **Light silicate minerals**, which are silica, potassium and sodium rich.
- b) **Dark silicate minerals**, which are iron, magnesium and calcium rich.



### 1) Felsic Igneous Rocks: Granitic

- Felsic rocks form from magma containing a large amount (~70%) of the light silicate minerals **feldspar**, and **silica** and little (~10%) dark silicate minerals.

Most Felsic rocks are intrusive. Why do you think this could be?

- Parent magma has high silica content
- Resistant to flow since the silica bonds must be broken for this to happen
- Intense pressure can push felsic magma above ground creating violent volcanic eruption (mount st helens)



### 2) Mafic Igneous Rocks: Basaltic

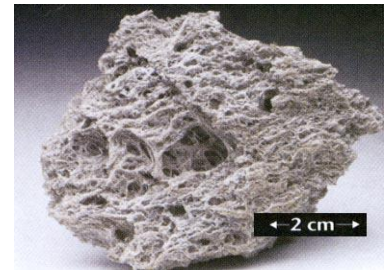
- form from magma containing a large amount of the dark silicate minerals **Magnesium** and **Iron** and little light silicate minerals.

Will Mafic rocks be lighter or darker than Felsic rocks? Why?

- **Darker, as made up of dark coloured silicate minerals**

Will Mafic rocks be heavier or denser than igneous rocks? Why?

- **Denser, as their components are made of heavier elements**



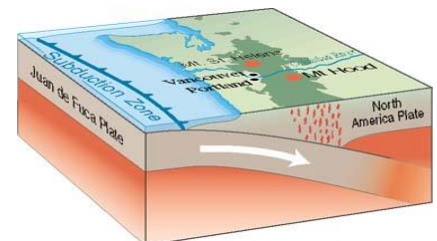
Pumice (Felsic)



Scoria (Mafic)

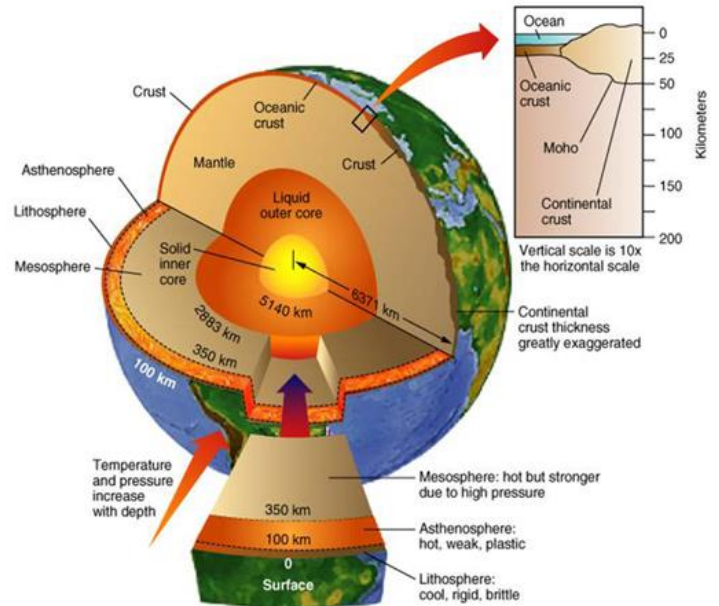
### 3) Intermediate Igneous Rocks: Andesitic

- Contain a mixture of both light and dark coloured silicate minerals, they are commonly medium gray to green in colour.
- Associated with volcanic activity at the edge of continents where mafic magma mixes with felsic continental crust to form an intermediate magma.



#### 4) Ultramafic Igneous Rocks

- Peridotite is the only ultramafic rock and is largely composed of olivine and pyroxene with very little light coloured silicate minerals.
- Ultramafic rocks are rare, but important parts of the upper mantle.



#### Classifying Igneous Rocks



Igneous rocks are classified based on their textures and compositions.

*\*Watch the smartfigure to learn how igneous rocks are classified*

***\*Complete Activity 2.3 and 2.4 (pg. 31 – 34)***