Warm-up

1. Which type of rock is formed from cooling magma?

2. Define “Weathering” in your own words.

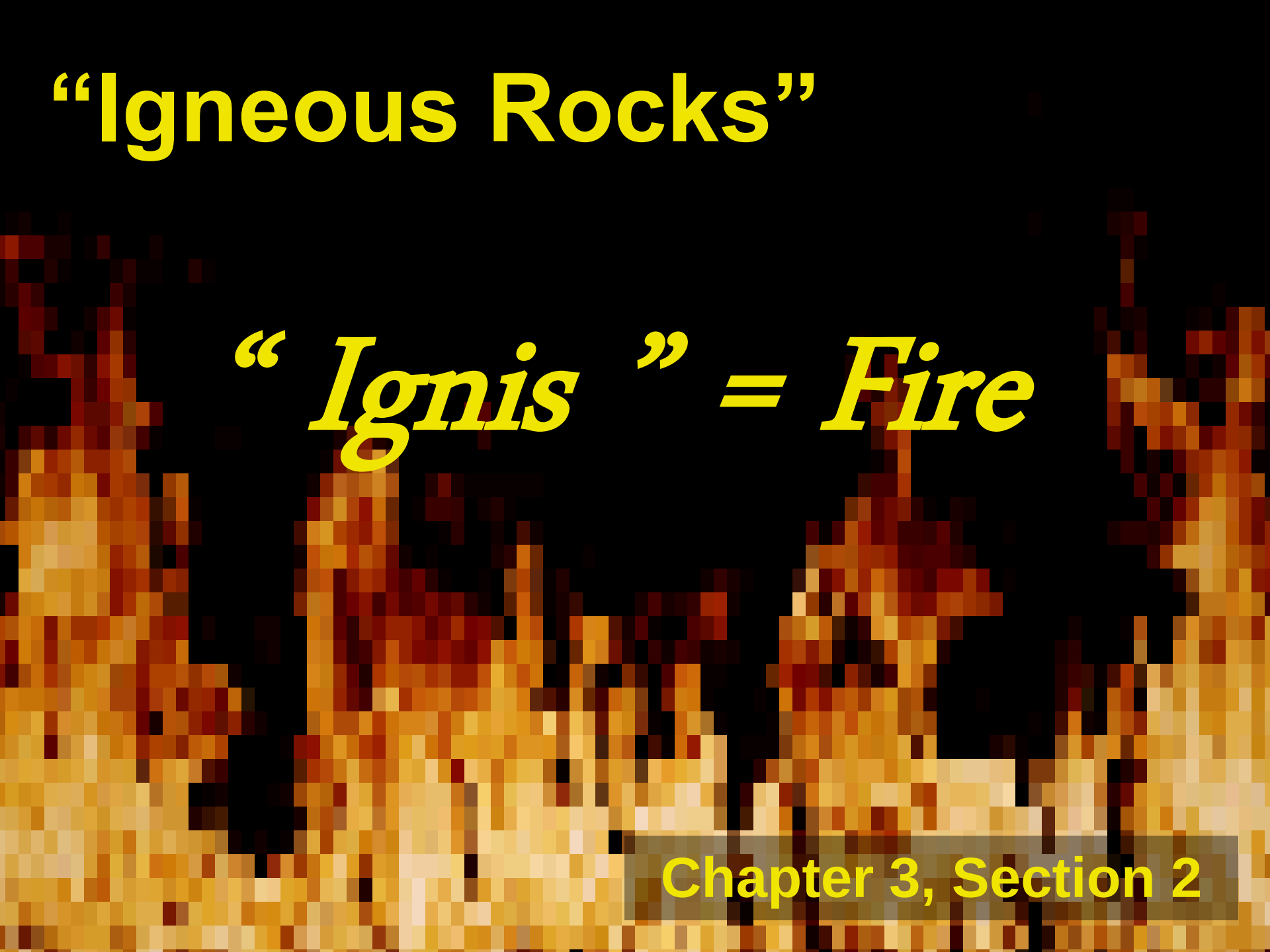
3. Which type of rock is formed due to extreme heat and pressure?

Key to Rock Classification	
1. Does the rock contain visible connecting crystals?	*Yes:* Go to Question 2. *No:* Go to Question 4.
2. Are all of the crystals the same color and shape?	*Yes:* The rock is a nonfoliated metamorphic rock (possibly marble or quartzite). *No:* Go to Question 3.
3. Are all of the crystals in a mixed "salt-and-pepper" pattern?	*Yes:* The rock is an intrusive igneous rock (possibly granite or diorite). *No:* The rock is a foliated metamorphic rock (possibly schist or gneiss).
4. Does the rock contain many small holes or have a uniform dark color?	*Yes:* The rock is an extrusive igneous rock (possibly pumice or basalt). *No:* Go to Question 5.
5. Is the rock glassy (does it resemble broken glass)?	*Yes:* The rock is an extrusive igneous rock (obsidian). *No:* Go to Question 6.
6. Does the rock have flat, thin layers that can be broken apart?	*Yes:* The rock is a foliated metamorphic rock (slate). *No:* Go to Question 7.
7. Does the rock contain pebbles, sand, or smaller particles that are cemented together?	*Yes:* The rock is a clastic sedimentary rock (possibly conglomerate, sandstone, or shale). *No:* Go to Question 8.
8. Does the rock fizz when dilute HCl is dropped on it?	*Yes:* The rock is chemical or organic sedimentary rock (limestone or chalk). *No:* Ask your teacher for assistance.

Copy and complete…

Letter of Sample	Route Taken	Group to which rock belongs

“Igneous Rocks”



“ Ignis ” = Fire

Chapter 3, Section 2

Igneous

1. As magma/lava rises it cools
2. Elements get closer
3. Combine & form minerals
4. Minerals form igneous!

Igneous: 2 Types.

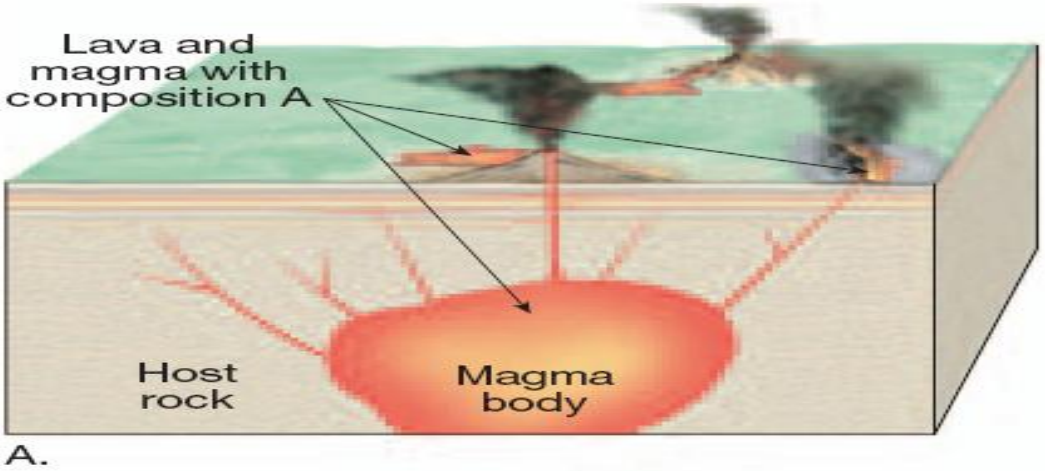
1. Intrusive

- Magma cools beneath surface
- “intruder!”

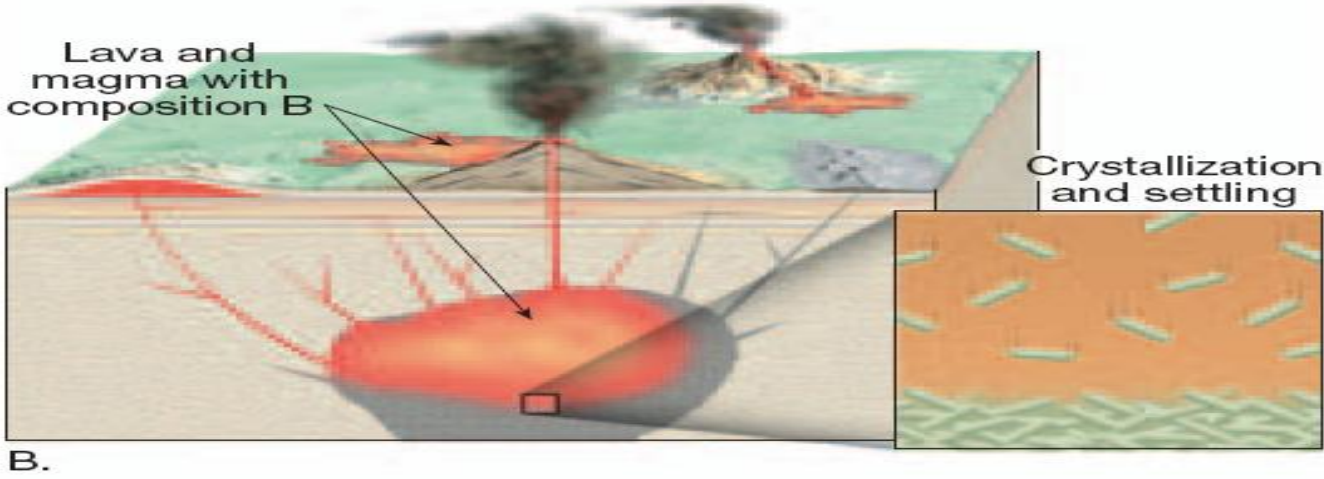
2. Extrusive

- Lava cools above surface
- “Extrusive” rock
- “Ex-it!”

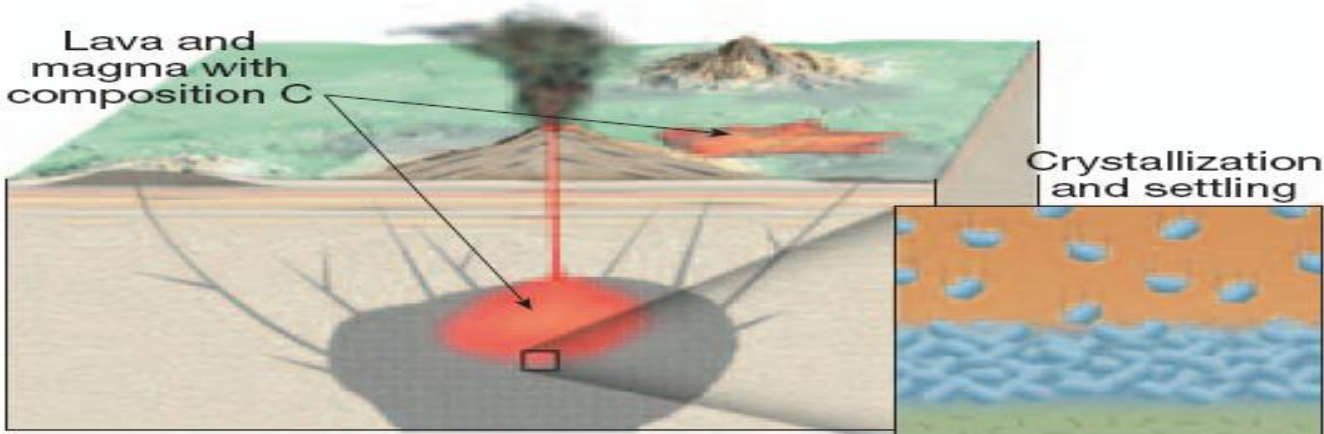
Magma vs. Lava



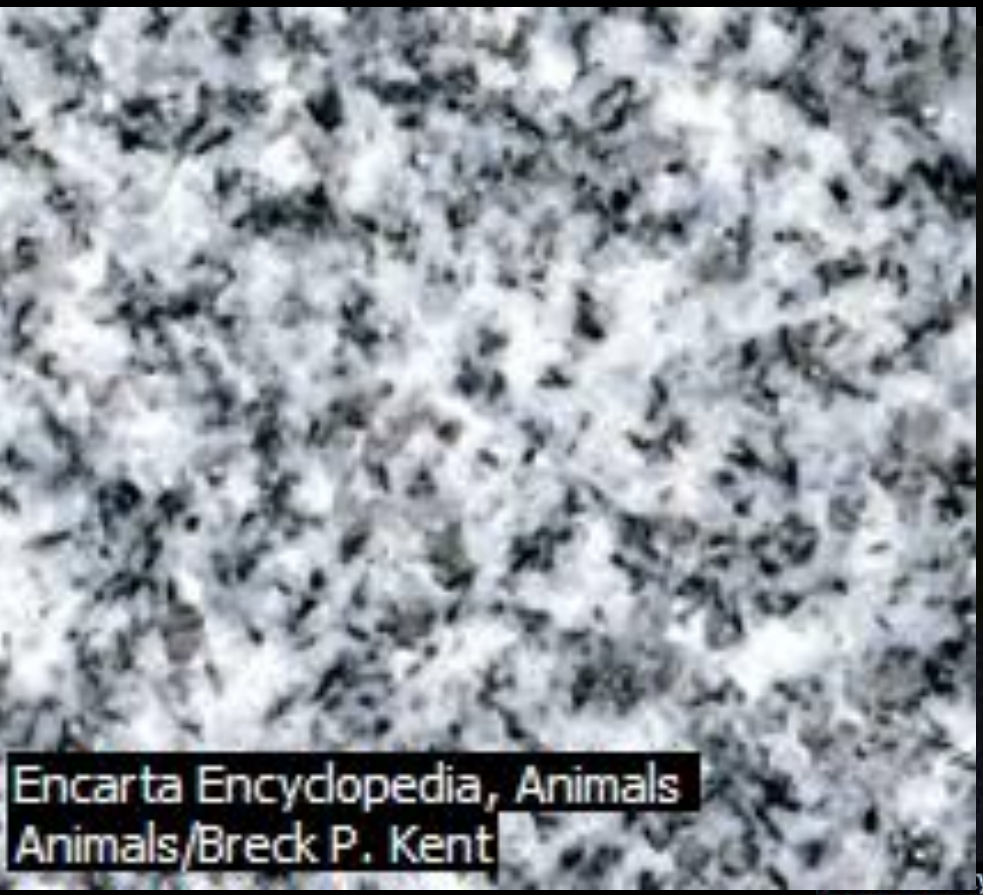
A.



B.



Compare / Contrast!



Intrusive - Granite

Extrusive - Rhyolite

Classification?

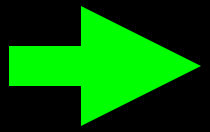
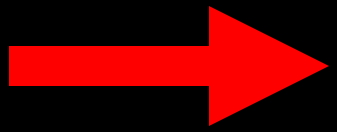
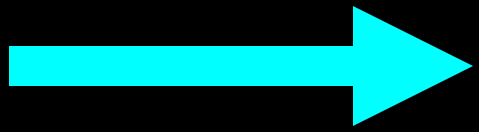
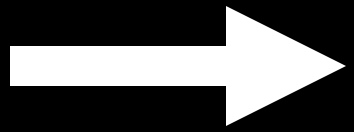
1. Texture

- Size
- Shape
- Arrangement of crystals

2. Composition

- What it's made of!
- Proportion of light & dark minerals

4 Textures

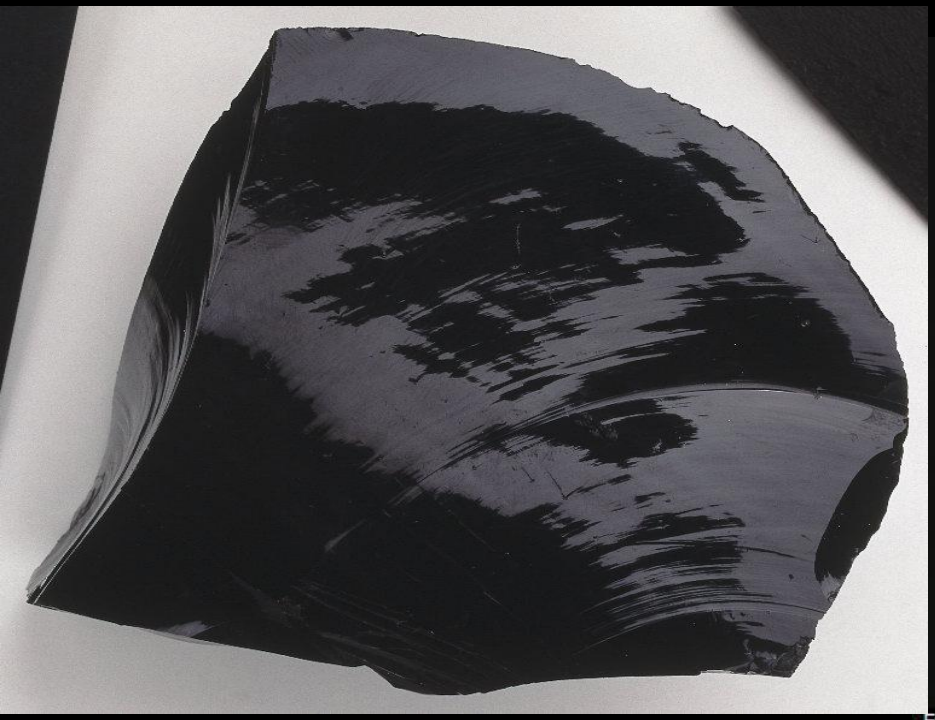
1. **Coarse-grain** 
   - Slow cooling
   - Large crystals
2. **Fine-grain** 
   - Fast
   - Small
3. **Glassy** 
   - VERY fast
   - NO TIME for crystals!
4. **Porphyritic** 
   - Different cooling speeds
   - Different sizes!

Course & Fine-Grained Texture

- **Coarse-Grain**
- Slow cooling
- Large crystals

- **Fine-Grain**
- Fast cooling
- Small crystals

Glassy & Porphyritic Texture

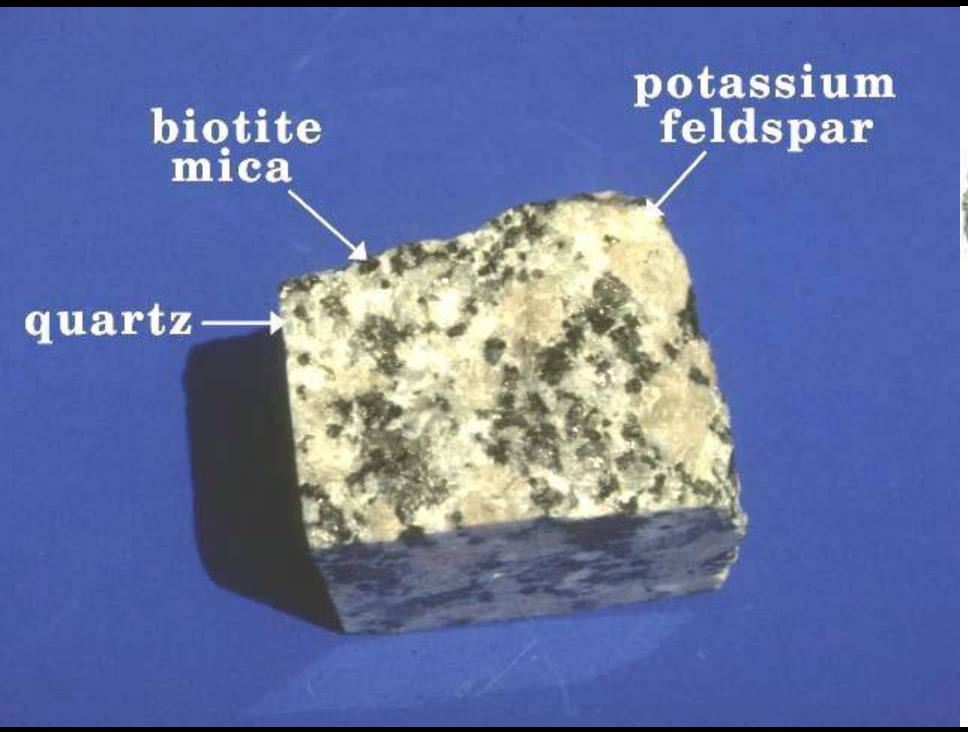


Encarta Encyclopedia, Corbis/Maurice Nimmo/Frank Lane Picture Agency

- **Glassy:**
- **Fast!**
- **Ions can't "align"**

- **Porphyritic:**
- **Different size minerals**
- **B/C of different rates of cooling**

Granitic & Basaltic Composition



- **Granitic:**
- 10% dark minerals
- 70% **light**

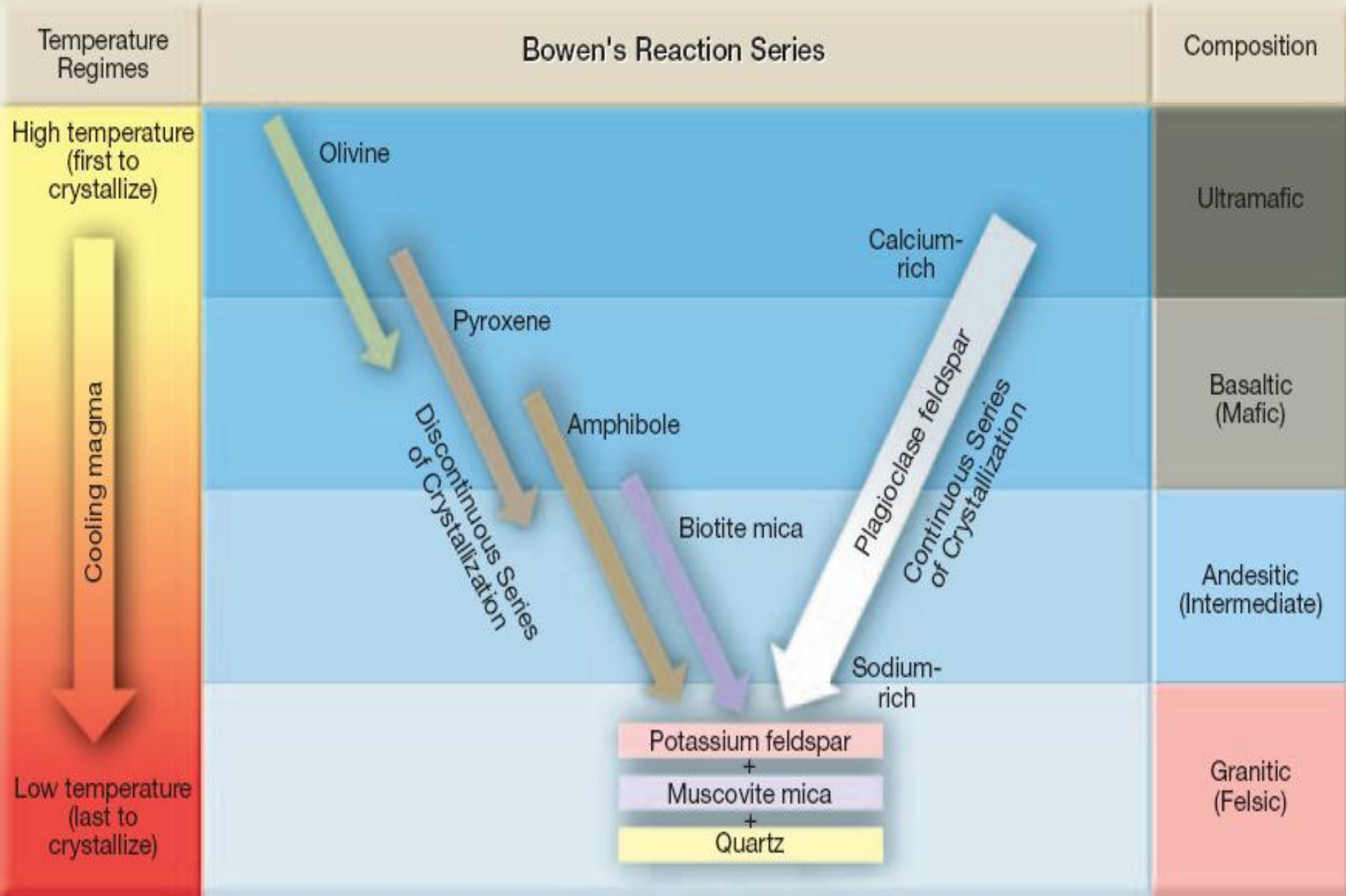
- **Basaltic:**
- **Many dark minerals**
- Iron & Magnesium!

Andesitic & Ultramafic Composition

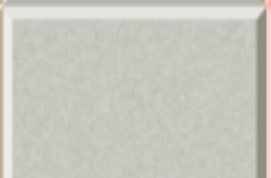
- **Andesitic**
- In-between granitic & basaltic
- 25% dark minerals

- **Ultramafic:**
- **Mostly** dark minerals
- Mantle

Bowen's Reaction Series



Classification of Igneous Rocks

Chemical Composition			Granitic (Felsic)	Andesitic (Intermediate)	Basaltic (Mafic)	Ultramafic
Dominant Minerals			Quartz Potassium feldspar Sodium-rich plagioclase feldspar	Amphibole Sodium- and calcium-rich plagioclase feldspar	Pyroxene Calcium-rich plagioclase feldspar	Olivine Pyroxene
TEXTURE	Phaneritic (coarse-grained)		**Granite**	**Diorite**	**Gabbro**	**Peridotite**
	Aphanitic (fine-grained)		**Rhyolite**	**Andesite**	**Basalt**	**Komatiite** (rare)
	Porphyritic		"Porphyritic" precedes any of the above names whenever there are appreciable phenocrysts			Uncommon
	Glassy		**Obsidian** (compact glass) **Pumice** (frothy glass)			
Rock Color (based on % of dark minerals)			0% to 25%	25% to 45%	45% to 85%	85% to 100%

HW

- **Read Chapter 3, Section 3**
- **Do 3.3 SA #1-9 (pg. 79)**

Assignment:

OBJECTIVE:

- Get your quiz results
- Get a copy of the quiz
- Correct missed questions

INCLUDE:

1. **Number.**
2. **Question** (written-out)**.**
3. **Complete sentence from book.**
4. **Page number from book.**

- **For EVERY missed problem**
- **Attach your quiz score sheet to your corrections**