

LAB assignment Classifying Common Igneous Rocks

For a rock to be classified as igneous, it must have been melted at some time and then hardened to become solid again. When melted rock material cools and hardens, it may form crystals, depending on how fast it cools. How fast the rock material cools depends on where it cools. If melted rock cools deep within the Earth, the resulting rocks are referred to as *intrusive igneous* rocks. They cool very slowly, giving crystals long periods of time to grow. The more slowly they cool, the larger the crystals grow. Intrusive rocks have crystal sizes, or grain sizes, that are larger than sand-sized and, under rare circumstances, may be larger than a penny. A good example is granite (which makes up most to the continent) which contains the minerals Quartz, Feldspar, Mica, & Hornblende.

If the melted rock materials cooled near or on the Earth's surface, the resulting rocks are called *extrusive igneous rocks*. If extrusive igneous rocks have crystals, they are smaller than sand-sized. A good example is basalt (mostly found on the ocean floor) which contains the minerals Iron, Magnesium, Pyroxene, & Amphibole. However, some extrusive igneous rocks cool so fast that crystals do not form at all. For example Pumice and Obsidian.

Sometimes when extrusive igneous rocks are cooling, volcanic gases bubble through the melted rock material much like water vapor bubbles through boiling water. When the rock hardens, these bubbles may become trapped to produce holes in the final product. The holes tend to make the rock light in weight. Such rocks are called *vesicular*.

		Common Igneous Rocks	
		← Composition →	← Density →
		Felsic (Aluminum)	Mafic (Iron and Magnesium)
		Low	High
		← Color →	← Color →
		Light-colored or red	Dark-colored or green
INTRUSIVE	CRYSTAL SIZE Coarse (larger than sand-sized)	Granite	Gabbro
EXTRUSIVE	CRYSTAL SIZE Fine (smaller than sand-sized)	Rhyolite	Basalt
	NO CRYSTALS The material cooled too fast to allow time for the crystals to form.	<p>Obsidian (Resembles granite chemically)</p> <ul style="list-style-type: none"> • commonly called natural or volcanic glass • most commonly black but may be red, gray or brown • breaks in shell-like fractures 	
		<p>Pumice (Resembles granite chemically)</p> <ul style="list-style-type: none"> • very porous volcanic glass • color from white to yellowish gray to grayish brown • made of silky glass fibers full of tiny pores. Millions of pores make pumice so light that some floats in water 	

LAB CHECK for Classifying Common Igneous Rocks WS

Directions: the following lab check is based of the paper lab version. Select the best answer to each question.

1. According to your lab, name the igneous rocks whose crystal size is *LARGE* and color is *GENERALLY LIGHT USUALLY WHITE/GRAY?*
 - a. GRANITE
 - b. BASALT
 - c. RHYOLITE
 - d. GABBRO

2. According to your lab, name the igneous rocks whose crystal size is *LARGE* and color is *BLACKISH GREEN (DUE TO OLIVINE AND PYROXENE)?*
 - a. GRANITE
 - b. BASALT
 - c. RHYOLITE
 - d. GABBRO

3. According to your lab, name the igneous rocks whose crystal size is *SMALLER THAN SAND-SIZED* and color is *BLACK ?*
 - a. GRANITE
 - b. BASALT
 - c. RHYOLITE
 - d. GABBRO

4. According to your lab, name the igneous rocks whose crystal size is *SMALLER THAN SAND-SIZED* and color is *GENERALLY LIGHT COLORED (PINKISH DUE TO K-FELDSPAR?)*
 - a. GRANITE
 - b. BASALT
 - c. RHYOLITE
 - d. GABBRO

5. SELECT the two intrusive igneous rocks.
 - a. GRANITE & OBSIDIAN
 - b. RHYOLITE & PUMICE
 - c. RHYOLITE & BASALT
 - d. GRANITE & GABBRO

6. Using your selected answer from the previous question, did the two types of igneous rocks cool relatively fast, slow, or at the same time?
 - a. Fast
 - b. Slow
 - c. At the same time

7. SELECT the BEST explanation to your previous answer.
 - a. Since both GRANITE & OBSIDIAN are found on the earth's crust they cooled at the same time
 - b. Since both RHYOLITE & PUMICE are found on the earth's crust they cooled at the same time
 - c. Since both RHYOLITE & BASALT are both extrusive they cooled fast
 - d. Since both GRANITE & GABBRO are both intrusive they cooled slow

8. Do all extrusive igneous rocks contain crystals?
- a. YES
 - b. NO
9. Why do some igneous rocks have bubble holes?
- a. Gas bubbles are present when the rock begins to cool and all the gas escapes before the rock begins to solidify
 - b. Gas bubbles are not present when the rock begins to cool and can escape before the rock begins to solidify
 - c. Small animals dig holes into the rock as the rock begins to solidify
10. Select which two extrusive igneous rocks that contain crystals
- a. GRANITE & OBSIDIAN
 - b. RHYOLITE & PUMICE
 - c. RHYOLITE & BASALT
 - d. GRANITE & GABBRO
11. Granite and obsidian are similar chemically. How are they different?
- a. Since both GRANITE & OBSIDIAN are found on the earth's crust they are not different
 - b. GRANITE cools slowly because it forms deep within Earth & OBSIDIAN cooled rapidly not allowing crystals to grow
 - c. GRANITE cools fast because it forms on Earth's surface & OBSIDIAN cooled slowly which allowed crystals to grow
12. What igneous rock may have cooled deep beneath the Earth's surface and have a dark blackish-green color?
- a. GRANITE
 - b. BASALT
 - c. RHYOLITE
 - d. GABBRO
13. Igneous rocks can be classified as mafic or felsic depending on the amount of aluminum or iron and magnesium they contain. What are two igneous rocks that are felsic and are light in color?
- a. GRANITE & GABBRO
 - b. RHYOLITE & BASALT
 - c. RHYOLITE & GRANITE
 - d. BASALT & GABBRO
14. Which rock contains the largest crystals (intrusive igneous rock)?
- a. GRANITE
 - b. BASALT
 - c. RHYOLITE
 - d. OBSIDIAN

NAME:

DUE DATE:

CLASS PERIOD

15. Select which mafic igneous rock formed when melted rock material cooled near the surface of the Earth.
- a. GRANITE
 - b. BASALT
 - c. RHYOLITE
 - d. GABBRO
16. Is the rock you selected from the previous question classified as having a high density or a low density?
- a. high density
 - b. low density
17. What dominate mineral gives question #4 from the data table its composition?
- a. Quartz
 - b. K-feldspar
 - c. Mica
 - d. Hornblende
18. Identify which mineral makes up the rock in question #1?
- a. Quartz
 - b. Basalt
 - c. Iron
 - d. Sulfur
19. Where is Granite and Basalt mostly likely located in the Earth's crust?
- a. Granite makes up the continental crust; Basalt makes up the ocean crust
 - b. Basalt makes up the continental crust; Granite makes up the ocean crust
 - c. Granite & Basalt makes up the ocean crust only
 - d. Granite & Basalt makes up the continental crust only
20. Select the BEST example of a rock having NO crystals?
- a. GRANITE
 - b. OBSIDIAN
 - c. RHYOLITE
 - d. GABBRO
21. Which is the only rock that floats in water?
- a. GRANITE
 - b. OBSIDIAN
 - c. PUMICE
 - d. GABBRO
22. Which is the only rock that is considered volcanic glass?
- a. GRANITE
 - b. OBSIDIAN
 - c. TUFF
 - d. GABBRO