REGENTS EARTH SCIENCE
Igneous Rock Identification

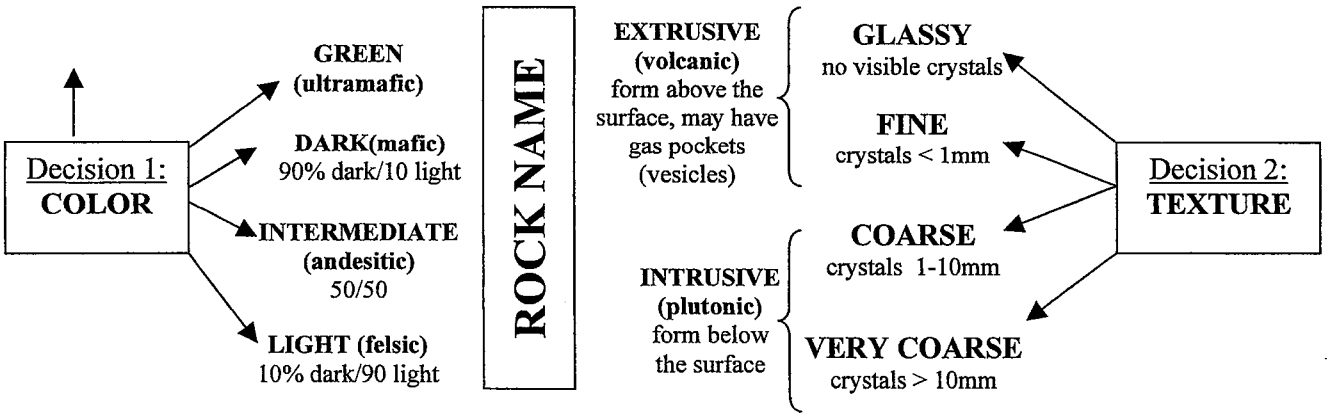
Name: _____

As you now know, rocks are composed of minerals or a combination of minerals. Rocks are categorized into types based on the way in which they form. Igneous rocks form as molten, mineral-rich material cools (or, you might say, "freezes") as it rises toward earth's surface. Igneous rocks are classified based on two main characteristics- ***mineral composition*** and ***mineral grain size (texture)***. These characteristics, in turn, signify a particular ***environment of formation***. Herein lies the key: **if you know the rock, you know the past environment!** Remember, rocks form the sentences and paragraphs of earth's language. Using your senses and the **Scheme for Igneous Rock Identification** found in your reference tables, you will be able to first classify then identify the environment of formation of a variety of different igneous rocks.

PROCEDURE

First, take some time to familiarize yourself with the ***flow*** of the identification chart. The chart is read by "plotting" two major physical characteristics- **color** and **texture**. The outline below may be helpful as a guide:

Although color is a poor Indicator for minerals, igneous rocks are typically composed of a combination of 7 major minerals with specific coloration. As a result, color turns out to be very useful for identifying composition.



Environments of Formation

The **composition** and **density** of igneous rocks determine *where* they are formed on the earth. As you already know, **plutonic** rocks form below the surface (big crystals), while **volcanic** rocks form at or above the surface (fine or glassy texture).

Low Density/Light Color ⟷ High Density/Dark Color
Felsic — Mafic/Ultra Mafic

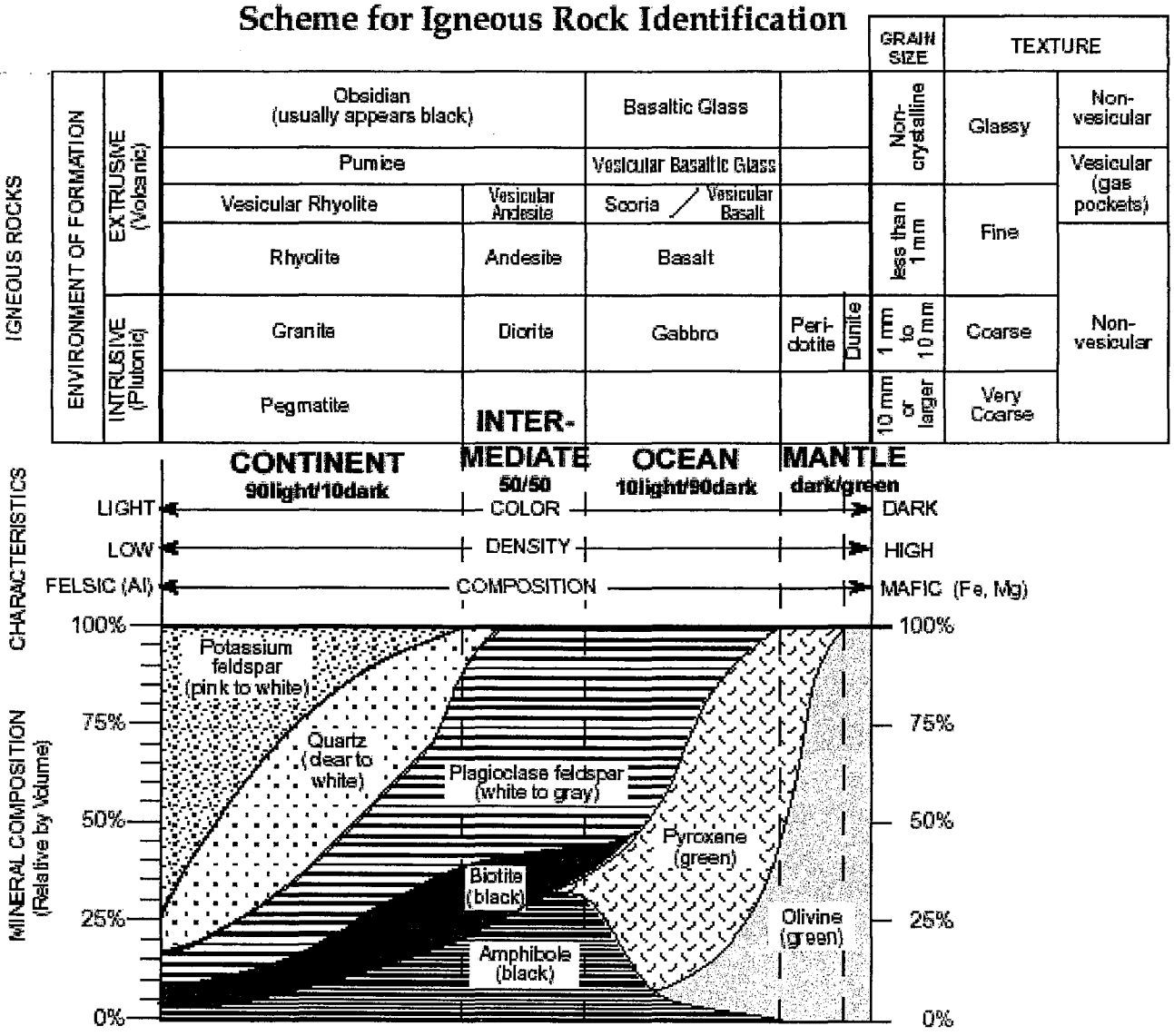
CONTINENTAL
Rocks form at the surface or beneath the surface of the Land (continent).

INTERMEDIATE
Rocks form where ocean crust and continent crust meet or collide (Andes Mtns)

OCEANIC
Rocks form in the ocean or beneath the ocean crust.

MANTLE
Rocks form in the mantle

Scheme for Igneous Rock Identification



COMPLETE THE CHART ON THE BACK USING THIS SCHEME AND YOUR OBSERVATIONS

Data Table – IGNEOUS ROCKS

COLOR (Dark w/green, Dark, Intermediate, Light	**ENVIRONMENT** (Continental, Mixed, Ocean, Mantle)	**INTRUSIVE** (Plutonic) **or EXTRUSIVE** (Volcanic)	**COOLING HISTORY** (Very fast, fast, slow, very slow)	**TEXTURE** (Glassy, vesicular, fine, coarse, very coarse)	**ROCK NAME**
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

Answer the following Regents questions...

1.____	Identify 3 minerals that can be found with quartz in andesite rock. 1. amphibole, olivine and biotite 2. plagioclase, amphibole and biotite 3. plagioclase, amphibole and biotite 4. plagioclase amphibole and olivine
2.____	In identifying igneous rocks the feature of texture is best described as 1. the way a rock feels 2. the size of mineral crystals 3. the color and clarity 4. number of holes per square cm
3.____.	Which relative concentration of elements is found in a mafic rock? 1. high concentration of silicon and a low concentration of iron 2. high concentration of iron and a low concentration of aluminum 3. high concentration of aluminum and a low concentration of iron 4. high concentration of aluminum and a low concentration of magnesium
4.____.	Which is an igneous rock with 5% plagioclase feldspar, 68% pyroxene, 25% olivine and 2% hornblende? 1. peridotite 2. andesite 3. basalt 4. rhyolite
5.____	For an igneous rock to be classified as vesicular rhyolite, it must be light colored, have gas pockets (holes), be fine grained and contain. 1. quartz 2. pyroxene 3. calcite 4. olivine
6.____	Compared to felsic igneous rocks, mafic igneous rocks contain greater amounts of 1. white quartz 2. aluminum 3. pink feldspar 4. iron

7.____	The photograph at right shows the intergrown crystals of a pegmatite rock. Which characteristic provides the best evidence that this pegmatite solidified deep underground? (1) low density (3) felsic composition (2) light color (4) very coarse texture