

Name _____

LAB: IGNEOUS ROCKS

Identify rocks from Rock Sets and Unknowns:

- Rock Sets:** 1. Identify and describe Samples #1-18.
Identify the minerals (visible) in samples that have porphyritic and pegmatitic textures.
2. For the last column (rock origin/history), indicate whether rock is plutonic or volcanic, and its cooling history: rapid, slow, or 2-stage cooling (slow then rapid), lava flow, explosive.

Unknowns: 3. Identify Unknown igneous rock samples. Identify ALL minerals large enough to see.

Questions: Answer the following questions (use Bowen's Reaction Series):

Which of the phaneritic unknown rocks formed at the highest temperature? # _____ name: _____

Which of the phaneritic unknown rocks formed at the lowest temperature? # _____ name: _____

Would you expect to find quartz and olivine together in an igneous rock? Explain your answer.

List four black minerals commonly found in igneous rocks :

Classification of Igneous Rocks

Mineral Composition Texture	Felsic	Intermediate	Mafic	Ultramafic
	>10% quartz >70% Feldspar, biotite, muscovite, hornblende, tourmaline	0-10% quartz 50-70% feldspar 30-50% dark mins (esp hornblende)	No quartz <50% feldspar >50% dark mins (olivine,pyx,hbl)	Olivine and/or Pyroxene 0-5% feldspar
Pegmatitic (crystals>1 cm)	Granite pegmatite	Diorite pegmatite	Gabbro pegmatite	
Phaneritic (coarse crystals)	Granite	Diorite	Gabbro	Peridotite=olivine+pyrox Dunite= olivine Pyroxenite=pyroxene
Aphanitic (micro crystals)	Rhyolite	Dacite	Andesite	Basalt
Porphyritic (scattered visible crystals in aphanitic matrix)	Rhyolite Porphyry		Andesite Porphyry	Basalt Porphyry
Glassy	Obsidian			
Frothy (glassy+vesicles) -lightweight	Pumice	Pumice	Basaltic pumice	
Pyroclastic - Ash (fragments<2 mm)	Tuff			
Pyroclastic - (rock fragments>2 mm)	Volcanic Rhyolite breccia	Breccia: Andesite breccia	Basalt breccia	

Additional Textures:

Porphyritic - 2 distinct sizes of crystals or scattered visible crystals in a microcrystalline groundmass.

Vesicular

Amygdaloidal – filled vesicles

Recognizing Minerals in Igneous Rocks

Mineral	Properties
Potassium Feldspar	Usually white or pink Rectangular crystals; cleavage
Plagioclase Feldspar	Usually white or gray Rectangular crystals; cleavage, may see striations
Quartz	Colorless to gray, translucent and vitreous Irregular or equidimensional crystals
Muscovite Mica	Silvery white, vitreous One cleavage, thin flexible crystals
Biotite Mica	Black, vitreous One cleavage, thin flexible crystals
Hornblende (Amphibole)	Black, usually satiny Splintery elongate crystals, stepped cleavage
Augite (Pyroxene)	Black, greenish black, brownish black (bronzy) Vitreous to dull, blocky crystals
Olivine	Green to yellow green, vitreous granular
Tourmaline	Black, vitreous Striations, may have triangular cross sections

Igneous Rock Chart – Rock Set

#	Texture Phaneritic, Aphanitic, Porphyritic	Composition Felsic, Intermediate, Mafic	Visible Minerals	Rock Name	Volcanic/Plutonic	Rock History
1						
2						
3						
4						
5						
6						
8						
9						
10						
11						
12						
13						
14						
15						

16						
17						
18						

Igneous Rock Chart – Unknowns

#	Texture Phaneritic, Aphanitic, Porphyritic	Composition Felsic, Intermediate, Mafic	Visible Minerals	Rock Name	Volcanic/Plutonic	Rock History
1						
2						
3						
4						
5						
6						
8						
9						
10						