Igneous Rock Lab Answer Key

Name: ____________

Igneous Rock Classification Dichotomous Key

Use this dichotomous key to identify 6 igneous rocks in your rock kit. Then answer the statements below.

Note: Reminder that Potassium Feldspar is more of a pink color and Plagioclase Feldspar is more white and gray.

Igneous Rock #	Texture	Composition and Color				Your Classification
		Felsic >5% quartz More Potassium Feldspar than Plagioclase Feldspar <15% dark minerals	**Intermediate** <5% quartz More Plagioclase Feldspar than Potassium Feldspar 15-40% dark minerals	**Mafic** No quartz, no potassium feldspar, >40% dark minerals	**Ultramafic** Nearly 100% is formed from dark minerals	
	Pegmatic or Phaneritic (large grained crystals)	**Granite**	**Diorite**	**Gabbro**	**Peridotite**	
	Porphyritic (Large crystals mixed in mass of small crystals)	**Porphyritic rhyolite**	**Porphyritic andesite**	**Porphyritic basalt**	n/a	
	Aphanitic (fine grained)	**Rhyolite**	**Andesite**	**Basalt**	n/a	

Igneous rock lab answer key is an essential tool for students and educators involved in geology and earth sciences. Understanding igneous rocks is crucial for comprehending the Earth's composition and the processes that shape its surface. This article will provide a comprehensive overview of igneous rocks, their formation, classification, key characteristics, and how to interpret lab results effectively.

Understanding Igneous Rocks

Igneous rocks are one of the three primary types of rocks, alongside sedimentary and metamorphic rocks. They are formed from the cooling and solidification of molten material known as magma or lava. The type of igneous rock formed depends on the composition of the magma, the cooling rate, and the environment in which the cooling occurs.

Formation of Igneous Rocks

Igneous rocks can form in two primary settings:

1. Intrusive (Plutonic) Igneous Rocks: These rocks form when magma cools and solidifies beneath the Earth's surface. The slow cooling allows larger crystals to develop. Examples include granite and diorite.

2. Extrusive (Volcanic) Igneous Rocks: These rocks form when lava cools and solidifies on the Earth's surface, often following a volcanic eruption. The rapid cooling results in smaller crystals. Common examples include basalt and pumice.

Classification of Igneous Rocks

Igneous rocks can be classified based on their mineral composition and texture. The primary classifications are as follows:

- Composition:
- Felsic: Rich in silica and light-colored minerals (e.g., quartz, feldspar).
- Mafic: Lower in silica, richer in magnesium and iron, and typically darker in color (e.g., basalt, gabbro).
- Intermediate: Contains a mix of felsic and mafic minerals (e.g., andesite, diorite).
- Ultra-Mafic: Very low in silica, high in iron and magnesium (e.g., peridotite).

- Texture:
- Phaneritic: Coarse-grained texture with visible crystals (e.g., granite).
- Aphanitic: Fine-grained texture with crystals not visible to the naked eye (e.g., basalt).
- Porphyritic: Contains larger crystals (phenocrysts) embedded in a finer-grained matrix (e.g., porphyritic andesite).
- Glassy: Lacks crystal structure due to rapid cooling (e.g., obsidian).
- Vesicular: Contains gas bubbles, resulting in a porous texture (e.g., pumice).

Conducting Igneous Rock Labs

Laboratories focused on igneous rocks provide hands-on experience in identifying and analyzing rock samples. Students typically engage in activities that involve examining physical characteristics, conducting tests, and interpreting results.

Common Lab Activities

1. Sample Collection: Students collect various igneous rock samples from local areas or prepared specimens.

2. Visual Identification: Using hand lenses, students examine the rock samples for texture, color, and grain size.

3. Mineral Identification: Students identify minerals present in the rock using a mineral identification chart, focusing on hardness, luster, and streak.

4. Chemical Tests: Some labs may include simple chemical tests to identify specific minerals or to test for the presence of iron using a magnet.

5. Thin Section Analysis: Advanced labs might involve using a polarizing microscope to analyze thin sections of rock samples, allowing for detailed mineral identification and texture analysis.

Interpreting Lab Results

After conducting experiments and observations, students need to interpret their findings accurately. The igneous rock lab answer key serves as a reference to help students understand their results.

Key Points for Interpreting Results

- Rock Identification: Compare your observations with the characteristics listed in the answer key. Look at the mineral composition and texture to classify the rock accurately.

- Cooling History: Consider the cooling rate of the magma or lava. Intrusive rocks will have a different texture than extrusive rocks due to the differences in cooling rates.

- Environmental Context: Understand the geological setting where the rock was formed. For instance, basalt typically forms from volcanic activity, while granite forms from the slow cooling of magma underground.

- Assessing Mineral Presence: Use the answer key to confirm the presence of specific minerals and their implications regarding the rock's formation.

Common Igneous Rock Lab Questions

In an igneous rock lab, students may encounter various questions that challenge their understanding of rock properties and classification. Here are some examples of typical questions:

1. What are the primary differences between felsic and mafic rocks?
- Felsic rocks are high in silica and light-colored, while mafic rocks are lower in silica and darker due to higher iron and magnesium content.

2. How does the cooling rate affect crystal size in igneous rocks?
- A slower cooling rate allows larger crystals to form, resulting in a phaneritic texture, while rapid cooling results in smaller crystals or a glassy texture.

3. Identify the rock sample based on the following characteristics: fine-grained, dark in color, and formed from lava. What is the rock?
- The rock is likely basalt.

4. What is the significance of vesicles in volcanic rocks?
- Vesicles indicate that gas was trapped in the lava during solidification, often seen in pumice and scoria.

Conclusion

The study of igneous rocks through practical lab experiences enhances students' understanding of geological processes and rock classification. The **igneous rock lab answer key** is an invaluable resource, guiding students in interpreting their observations and solidifying their knowledge of rock formation. By mastering the identification and analysis of igneous rocks, students gain essential skills applicable to various fields, including geology, environmental science, and earth sciences. As they engage in these hands-on activities, students not only learn about the rocks themselves but also the dynamic processes that shape our planet.

Frequently Asked Questions

What are igneous rocks primarily formed from?

Igneous rocks are primarily formed from the cooling and solidification of molten rock material called magma or lava.

What is the difference between intrusive and extrusive igneous rocks?

Intrusive igneous rocks form from magma that cools slowly beneath the Earth's surface, while extrusive igneous rocks form from lava that cools quickly on the surface.

What are some common examples of intrusive igneous rocks?

Common examples of intrusive igneous rocks include granite, diorite, and gabbro.

What are some common examples of extrusive igneous rocks?

Common examples of extrusive igneous rocks include basalt, pumice, and obsidian.

How can you identify igneous rocks in a laboratory setting?

Igneous rocks can be identified by their texture, mineral composition, and color, often requiring the use of hand lenses and mineral identification charts.

What is the significance of crystal size in igneous rocks?

The crystal size in igneous rocks indicates the cooling rate; larger crystals indicate slower cooling (intrusive), while smaller crystals indicate rapid cooling (extrusive).

What role does composition play in the classification of igneous rocks?

Composition plays a crucial role in the classification of igneous rocks, as they can be classified based on their silica content into felsic, intermediate, mafic, and ultramafic categories.

Why is it important to understand igneous rocks in geology?

Understanding igneous rocks is important in geology because they provide insights into the Earth's interior processes and are key to understanding volcanic activity and plate tectonics.

What tools are commonly used in an igneous rock lab?

Common tools used in an igneous rock lab include hand lenses, microscopes, rock hammers, and mineral identification kits.

Igneous Rock Lab Answer Key

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