

XI: The Formation of Rocks

LAB 11-2: IGNEOUS ROCK IDENTIFICATION

INTRODUCTION: The type of igneous rock formed when molten magma solidifies depends on the mineral composition and the rate at which the magma cools.

Igneous rocks which solidify deep underground are called intrusive or Plutonic. They can be observed when erosion wears away overlying layers.

When magma reaches the surface it forms volcanic igneous rocks. The texture of these extrusive igneous rocks will vary greatly from ones formed by the same magma deep below the surface.

OBJECTIVE: You will investigate the properties by which igneous rocks can be identified.

VOCABULARY:

igneous:

intrusive:

extrusive:

felsic:

mafic:

lava:

magma:

texture:

porphyry:

PROCEDURE:

1. Obtain the igneous rock samples from your instructor.
2. Arrange your samples in the order demonstrated by your instructor.
3. Complete the Report Sheet using your samples, the Scheme for Igneous Rock Identification in the Appendix, and the reference material provided by your instructor.
4. Observe the large igneous rock samples provided.

Sample #	Texture	How formed (Extrusive or intrusive)	Minerals Present	Composition (Felsic or Mafic)	Rock Name
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

DISCUSSION QUESTIONS: *(Answer in Complete Sentences)*

1. How is the size of the mineral grains affected by the rate at which molten rock material cools?

2. How can you determine if an igneous rock has had an intrusive or extrusive origin?

3. In general, how does the characteristic mineral composition of a light colored igneous rock differ from that of a dark colored igneous rock?

4. In general, how does the density of a light colored igneous rock differ from that of a dark colored igneous rock?

5. What is the main difference between lava and magma?

6. Describe a porphyritic texture.

CONCLUSION: On what basis are igneous rocks classified?

INSTRUCTOR _____ PERIOD _____ NAME _____
PARTNER _____

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LAB 11-3: SEDIMENTARY ROCK IDENTIFICATION

INTRODUCTION: Sedimentary rocks are formed from accumulated sediments. Most sedimentary rocks are formed from materials that have been deposited in calm water. Often some of the characteristics of the sediments are retained in sedimentary rocks. Geologists have classified the sedimentary rocks into three groups: clastic, chemical and organic.

OBJECTIVE: You will investigate the properties by which different types of sedimentary rocks can be identified.

VOCABULARY:

clastic:

lithification:

veneer:

cementation:

compaction:

precipitation (from solution):

organic:

fossiliferous:

PROCEDURE:

1. Obtain the sedimentary rock samples from your instructor.
2. Arrange your samples in the order demonstrated by your instructor.
3. Complete the Report Sheet using your samples, the chart on Common Sedimentary Rocks in the Appendix and reference materials supplied by your instructor.

**If you perform the acid test you
MUST WEAR GOGGLES.**

4. Observe the large sedimentary rock samples provided.

Sample #	Clastic, Chemical or Organic	Method of Lithification	Rock Name
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

DISCUSSION QUESTIONS: *(Answer in Complete Sentences)*

1. What are the maximum and minimum dimensions (the size range) for the following particle sizes?
 - a) cobble:
 - b) pebble:
 - c) sand:
2. On separate paper draw a picture of a pebble of maximum size.
3. How can you distinguish a clastic (fragmental) sedimentary rock from a chemically formed sedimentary rock?
4. Describe the sequence of events in the formation of an evaporite.
5. Distinguish between a chemical and an organic limestone.
6. Describe the sequence of events in the lithification of a sandstone.
7. Explain why sedimentary rocks are found as a veneer covering large areas of the continental igneous rocks.

CONCLUSION: On what bases can sedimentary rocks be identified?

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LAB 11-4: METAMORPHIC ROCK IDENTIFICATION

INTRODUCTION: The word "metamorphic" comes from Greek words meaning to change form (meta = change, morphe = form). Metamorphic rocks are those that have formed from other rocks as a result of the action of heat, pressure, and/or chemical action. Generally, metamorphic rocks are divided into two groups, REGIONAL metamorphic rocks, and CONTACT metamorphic rocks.

Regional metamorphic rock is formed by forces acting over wide areas under extreme conditions of temperature and pressure at great depths.

Contact metamorphic rocks are formed at the interface of hot magma and existing rocks. The surrounding rock is changed, or metamorphosed, as a result of being in contact with the hot magma.

OBJECTIVE: You will investigate the properties by which different types of metamorphic rocks can be identified.

VOCABULARY:

recrystallization:

foliation:

slaty foliation:

schistose foliation:

gneissic texture:

PROCEDURE:

1. Obtain the metamorphic rocks from your instructor.
2. Arrange your samples in the order demonstrated by your instructor.
3. Complete the Report Sheet using your samples and chart in the Appendix of this lab book titled "Metamorphic Rock Classification".

**If you perform the acid test you
MUST WEAR GOGGLES.**

4. Observe the large metamorphic samples provided.

Sample #	Foliated or Nonfoliated	If Foliated, Give Type	Type of Metamorphism	Probable Original Rock	Rock Name
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

DISCUSSION QUESTIONS: *(Answer in Complete Sentences)*

1. Why are metamorphic rocks formed by contact metamorphism usually not dense or resistant?

2. How could you differentiate between white marble and white quartzite?

3. Why do you seldom find fossils in metamorphic rocks?

4. Why do minerals in metamorphic rocks often rearrange in layers?

5. Why does a quartzite tend to be very hard and resistant?

CONCLUSION: On what bases can metamorphic rocks be identified?

