Name_____

Physical Geography
Lab Activity #07

Due date_____

Rocks & Minerals

COR Objective 8

7.1. Introduction

One part of being a physical geographer is having a basic knowledge of the rocks around us. In this lab you will get experience handling rock and mineral samples. You will look for specific characteristics in each sample and by the end of the lab you should have a good idea as to how rocks form.

7.2. Minerals

Minerals are the building blocks of the rocks and crust around us. Rocks are typically made up of multiple minerals

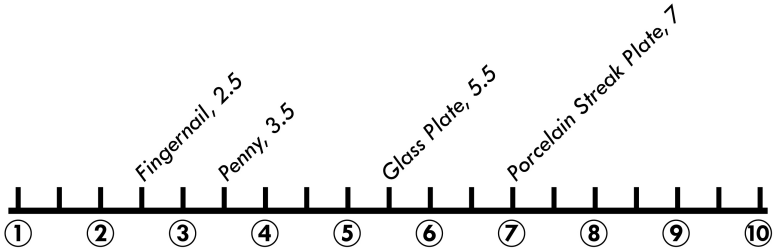
1. According to De Blij et al's Physical Geography, what is the definition of a mineral?

2. According to De Blij et al's Physical Geography, what are the most abundant elements in the Earth's crust?

In this section of the lab, you will examine some of the mineral samples your instructor has set out. The ability to describe minerals is straightforward. You will need to identify the color, luster, crystals, and hardness of each type of mineral.

- Color is rather simple; just look at your sample and describe the color.
- Luster refers to how a mineral reflects light. Is it vitreous (glassy) or dull? Other luster types include: metallic, adamantine (brilliant like a diamond), resinous, pearly, and waxy
- Crystals are not present on every mineral sample we have in the lab, but every mineral has a specific crystalline structure. If you see a crystal on your sample describe its shape. Is it cubic, hexagonal, etc?
- To test the hardness of a mineral we use the Mohs Scale, developed by the German mineralogist Frederick Mohs. It ranges from 1-10 with 1 being the

softest mineral and 10 being the hardest. Below you will see the Mohs ranking of common objects. For example, your fingernail is a 2.5. If you can scratch a mineral with your fingernail that means the mineral is less than 2.5. If you cannot scratch it, it is greater than 2.5.



Mohs Hardness Scale

The Silicates

3. *Quartz*
   Color:
   Luster:
   Crystals:
   Hardness:

4. *Feldspar*
   Color:
   Luster:
   Crystals:
   Hardness:

The Oxides

5. *Gypsum*
   Color:
   Luster:
   Crystals:
   Hardness:

6. *Hematite*
   Color:
   Luster:
   Crystals:
   Hardness:

The Carbonates

7. *Calcite*

    Color:
    Luster:
    Crystals:
    Hardness:

7.3. Rocks

In this section you will start examining rocks, which are different from minerals.

8. According to De Blij et al's *Physical Geography*, what is the definition of a rock?

Rocks fall into three separate classes: Igneous, Sedimentary, and Metamorphic. The classes refer to how the rock was formed.

- Igneous rocks are those formed from the cooling of molten rock. The way in which molten rock cools and the minerals inside it determine what rock will form when it solidifies.
    - Intrusive igneous rocks cool inside the Earth's crust. Because they cool under the surface they cool slowly. This slow cooling allows the molten minerals time to crystallize and gives these rocks a coarse-grained appearance. *Granite* is a good example.
    - Extrusive igneous rocks cool outside of the crust. When lava leaves a volcano it cools quickly, which causes these rocks to be fine-grained. *Basalt* is a good example. A rock like *obsidian* is an example of lava cooling so quickly that the minerals don't have time to differentiate leaving a shiny volcanic glass.

- Sedimentary rocks are those formed from little bits of other rock.
    - Clastic sedimentary rocks form from small pieces of rock being eroded, deposited, and cemented. *Sandstone* is simply grains of sand getting glued into rocks. Shale is finer grained clay cementing together. Often this can trap deceased creatures and form fossils.
    - Chemically precipitated sedimentary rocks form when the hard parts or organisms (e.g. shell) or mineral compounds that separate out of water solutions. *Limestone* is an example of this. Hydrochloric acid (HCl) can be used to test for limestone. It reacts with the cemented shell and releases carbon dioxide while also dissolving the rock. A weaker version of this acid is found in rainwater and slowly dissolves large amounts of limestone creating underground caverns.

- Metamorphic rocks were once igneous or sedimentary rocks that were subjected to extreme heat and/or pressure. They recrystallize and become totally different rocks. Limestone turns to marble, sandstone turns to quartzite, and granite turns to gneiss.
    - Foliation refers to when the minerals of a metamorphic rock align in a specific direction. Any color or structural pattern you see in the metamorphic rock samples in the lab can be described as foliation.

Using the rock samples provided by your instructor, study and describe two of each class of rock. Be thorough and think carefully about what you see in each sample.

Igneous Rocks

Rock Sample 1.

Color:
Luster:
Structure:
Likely Formation Process:

Rock class and subclass:
Rock name:

Rock Sample 2.

Color:
Luster:
Structure:
Likely Formation Process:

Rock class and subclass:
Rock name:

Metamorphic Rocks

Rock Sample 3.

Color:
Luster:
Structure:
Likely Formation Process:

Rock class and subclass:
Rock name:

Rock Sample 4

Color:
Luster:
Structure:
Likely Formation Process:

Rock class and subclass:
Rock name:

Sedimentary Rocks

Rock Sample 5

Color:
Luster:
Structure:
Likely Formation Process:

Rock class and subclass:
Rock name:

Rock Sample 6

Color:
Luster:
Structure:
Likely Formation Process:

Rock class and subclass:
Rock name:

7.4. Mystery Rocks

Now you will be tested to see if you have been paying attention. At the back of the lab you will find three mystery rocks. Using what you have learned in this lab, you should be able to find the clues in each rock to determine their class and name.

Rock Sample 7.

Color:
Luster:
Structure:
Likely Formation Process:

Rock class and subclass:
Rock name:

Rock Sample 8.

Color:
Luster:
Structure:
Likely Formation Process:

Rock class and subclass:
Rock name:

Rock Sample 9.

Color:
Luster:
Structure:
Likely Formation Process:

Rock class and subclass:
Rock name:

End of Lab 7