

Name: _____ Class time: _____

Geology 12: Sediment Exercise

Purpose: to explore the relationship between sediments and their source, mode of transport and depositional environment.

San Bernardino Mountains - Santa Ana River - Newport Beach Sediments

1) Examine each of the samples in the set and describe the *attributes* of each in the table below. Remember to make your observations without bias. You may specify a range. Help with describing grain size, sorting and rounding is found on the last page of the lab.

#	Grain size	Sorting	Rounding	Comments
1.				
2.				
3.				
4.				
5.				
6.				

2) These samples represent the “life cycle” of sediment eroded in the mountains, transported down a river and deposited on the continental margin. Using your best judgment, list the sample numbers **in distance order** from their source in the mountains to the beach.

Source ⇒ # _____ # _____ # _____ # _____ # _____ # _____ ⇒ Beach

3) What *generalizations* can you draw about the effect of transport distance on the following?

a) With greater distance the **grain size** _____

b) With greater distance the **sorting** _____

c) With greater distance the **rounding** _____

4) The major source rock for the samples above is a metamorphic rock called *banded gneiss* (pronounced “nice”) with dikes or veins of *pegmatite*. The pink mineral is called *orthoclase*, a member of the mineral family *feldspar*. The white minerals are *quartz* and another type of feldspar called *plagioclase*. The black mineral is mostly a *mica* mineral called *biotite*. Note that the sand is not as dark as the gneiss from which it is derived. What do you think happened to the biotite?

5) CARBONATE SAND: Examine one of the sands in *Group A*. Sketch a few of the more interesting grains in the space to the right.

Is it: terrigenous, biogenous, hydrogenous or cosmogenous ? (Circle one)

What do you think the origin of this sand is? Why?

Why don't we find this kind of sand in California?

6) OLIVINE SAND: Examine one of the sands in *Group B*. This is the famous black sand of Hawaii. Note that there are also grains of a green mineral called *olivine*. Sketch a few of the olivine grains in the space to the right.

What is the source rock for this sand? _____

What does the grain size, sorting, and rounding tell you about how far these grains have been transported from their source?

7) OOLITIC SAND: Sketch some of these grains in the space on the right. This sand is composed of calcium Carbonate (CaCO_3).

Do you think it is: terrigenous, biogenous, hydrogenous or cosmogenous ? (Circle one)

How do you think this sediment formed? Why?

8) HEAVY MINERAL – the colorful grains are composed of garnet. Where do you think the came from?

Are any of the grains magnetic? _____

Why might a beach accumulate heavy mineral sand? _____

9) AEOLIAN – aeolian sand is transported and deposited by wind. How would you describe the sorting, rounding and grain size of this sand?

How is it different from the California beach sand?

6) SALT GRAINS – These aren't really sediments but salt crystals will be discussed latter in the course. Look at some salt grains in the microscope. Sketch them to the right.

How would you describe the shapes of the grains? _____

Sediment Textures

