DMAE Name_____

Activities about Sediments

Introduction

Here are a series of activities that will allow you to learn about sediments, and expand your skills in using a variety of strategies to study our planet. These include:

- using magnifying lenses and stereomicroscopes to view types of sediments
- separating a beach sediment sample using a *set of* ***screen sieves*** and
- representing *grain size distribution* using bar graphs

You have used **compound microscopes** to view prepared slides, plankton, and other objects. Objects viewed with a compound microscope must be both tiny and transparent. **Magnifying lenses** and **stereomicroscopes** allow you to look at larger objects. These can be either transparent or opaque, so this instrument is often used to study sediments and soils.

Part 1: Measuring Particle Size Using Magnifying Glasses and/or Stereomicroscopes

A. Observing with a Magnifying Lens

Obtain a small (about one-half of a vial) sample of beach sediments. Pour them into a Petri dish. Observe them using your magnifying lens and describe what you observe. If possible, make drawings. Also, use a magnet on your sample and describe what happens.

Most of what you see will be **quartz** (glassy, various colors). You may also see **mica, feldspar,** and such dark-colored minerals as **ilmenite** and **magnetite**. There may also be shell fragments and plant debris.

B. You can find the *diameter* of the *field of view* of a microscope by placing the edge of a ruler across the image and observing how many mm can be seen. Then use this skill to find the size of sand grains.

Find the diameter of the field of view and record it here: _____ mm

Now place a few sand grains on the grid and try to find their grain size:

_____ mm

Explain your procedure, using full sentences:

Did your answer match the size range in the chart in the *ESRT?*

C.. Examine other beach materials available, such as mussel and other shells, corals, and pebbles. Provide brief descriptions of your observations.

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Part 2: Separating and Analyzing Sediment Samples

Beach sands and soils are **mixtures** composed of mineral fragments and other materials. Geologists and soil scientists often classify them based on their grain size distribution—that is, the percentage of the sample in different diameter ranges.

Samples can be easily separated using a set of **sieves**—containers that have different size screens inside them. As you do this lab, you will have the chance to practice your skills in using a **balance scale**, calculating **percentages**, and showing your results in **bar graphs**.

Begin by using your **balance scale** to find the **mass of each of the five empty sieves**. Then record them in the table below.

Next, make sure the sieves are **stacked in order** (largest screen on top, then next-largest, until smallest screen above pan on bottom.) **Pour a small amount (two vial-fulls) of your sample into the top sieve**, cover, and shake for about 10 seconds to make sure all the particles can fall through until they rest on the sieve that is smallest than their diameter. Tap the sieves gently on the side to help with the separation.

Find the **mass of each sieve and its sample**, and record in the table.

Then **subtract the mass of the empty sieve from the "sieve + sample mass"** to find the **mass of each sample**, and record these.

Sieve	**Empty sieve (g)**	**Sample + sieve (g)**	**Sample mass (g)**	**Percent of total mass**	**Cumulative percent**
1					
2					
3					
4					
pan					

Total sample mass: _____

Add all of the sample masses to find the **total sample mass** and record it on the line at the bottom of the sample mass column.

Divide each sample mass by the total sample mass to find the **percent of the total mass** in each sieve, and record these. Round your values to the nearest whole percent (example: 0.437 = 44%.)

Finally, find the **cumulative percent**. For sieve 1, this is the same as the sample percent. For sieve 2, it will be the percents in sieves 1 and 2. For sieve 3, it will be the percents in sieves 1, 2, and 3, and so on. The percent in the pan may not be exactly 100 because the percents in each sieve include some rounding.

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Part 2: Separating and Analyzing Sediment Samples, cont'd.

Scientists never use only one set of data when they can repeat the experiment or use multiple sets. Follow directions to post your group's results on the board and calculate class averages. In the table below, record your group's values and the class' averages.

Sieve	**Group's percent**	**Class' percent**	**Group's cum %**	**Class' cum %**
1				
2				
3				
4				
pan				

Then use these to make bar graphs

100				
90				
80				
70				
60				
50				
40				
30				
20				
10				
0				
	Group percent	Class percent	Group cumulative percent	Class cumulative percent

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Conclusions:

(In the space below and on the back, if necessary, write about the four or five most important things you have learned in doing this activity.)