

Activities about Sediments

Introduction

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

- using magnifying lenses (and, if available stereomicroscopes) to view types of sediments
- separating a beach sediment sample using a *set of **screen sieves*** and
- representing the *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.

In addition, you can earn extra credit on this activity by making a DLESE search. DLESE is the Digital Library for Earth Systems Education, www.dlese.org. It is one of the most valuable search engines available to find almost anything about our planet.

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 make drawings in the space below..

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**.

If available, use a magnet on your sample and describe what you observe..

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 describe 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.

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

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.)

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What to Include in Your Lab Report:

- Introduction (What were the reasons you did this activity?)
- Procedure (Tell what you did in each part—1st person, past tense.)
- Results (Use appropriate programs to make 'better' data tables and graphs.)
- Discussion
 - Include paragraphs about:
 - mineral composition of beach sediments;
 - differences between sediment samples;
 - comparison of the results your group found for the percent and cumulative percent with results from the class averages, and explain any differences;
 - factors that can produce different sediments at different locations, either on the same beach or on beaches in different locations