Sediment & Sand Lab **Names** _____ _____

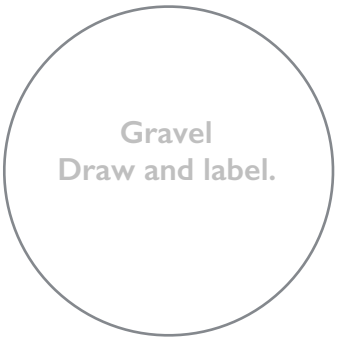
Objectives

1. Compare & contrast the 4 clast sizes from your sediment chart. Write and draw carefully.
2. Compare and contrast five sand samples, observing through careful writing & sketches.
3. Hypothesize the depositional environment of each sample based on size, shape and sorting.

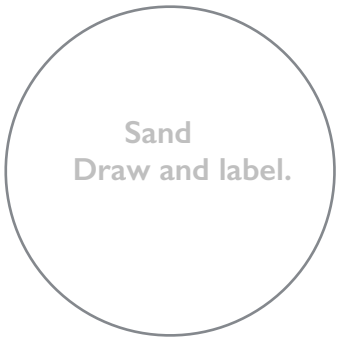
Materials - your sediment chart, 5 sand samples, stereoscope & light, mm graph paper, metric ruler

Introduction - Differences in the shape, size, and sorting - the 3 s - of sand grains can tell us about their transport to,and character of depositional environments, the place where sediments were deposited.

Step A - Describe and draw each of your class samples as seen under the stereo microscope.



Observations



Observations

Observations

Observations

Step B - Obtain the 4 sand samples. Observe each sand sample one at a time with the scope/loupe. Draw and describe each of your sand samples. Be careful not to cross-contaminate.

Sample 1
Draw and label.

Observations

Sample 2
Draw and label.

Observations

Sample 3
Draw and label.

Observations

Sample 4
Draw and label.

Observations

A. *Environment of Deposition - Energy & Sorting* - Your sand samples may show evidence of having been deposited in a *constant energy environment* (high, medium, or low energy) or a *fluctuating energy environment*. A high-energy environment results in well-sorted grains, grains of mostly one size. This means that the sediment was 1) transported for a long time and/or over a long distance and 2) also deposited in a fairly consistent energy environment. A consistent energy environment could be fast, medium or slow water or wind just as long as the energy is constant. An environment such as a beach has high kinetic energy because of wave action. A constantly swiftly flowing river is similar.

In contrast, a fluctuating environment mixes grain sizes. A poorly-sorted sand has a wide range of grain sizes because the energy of the environment changed. Using the charts below, categorize the sorting & rounding of each of the 5 samples with a √ or X.

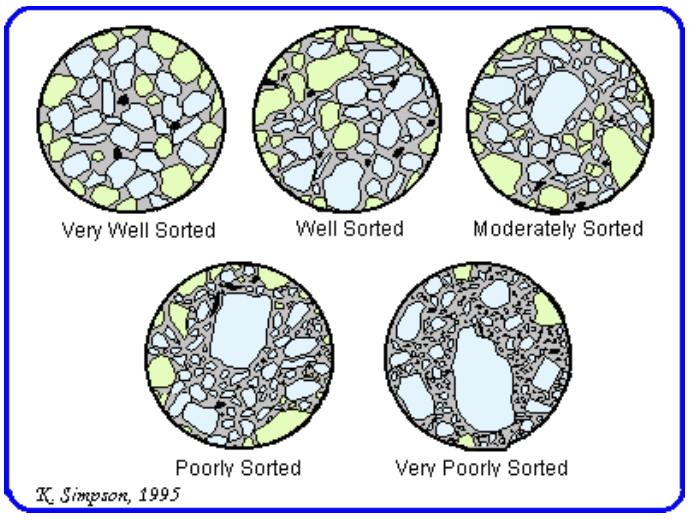
Sand and gravel are moved in the bed load while silt and clay are suspended. In medium and low energy environments, motion decreases and silt drops. The presence of clay indicates that water was practically still.

< — CONSTANT FLUCTUATING —>

	VWS	WS	MS	PS	VPS
Sample 1	____	____	____	___	____
Sample 2	____	____	____	___	____
Sample 3	____	____	____	___	____
Sample 4	____	____	____	___	____

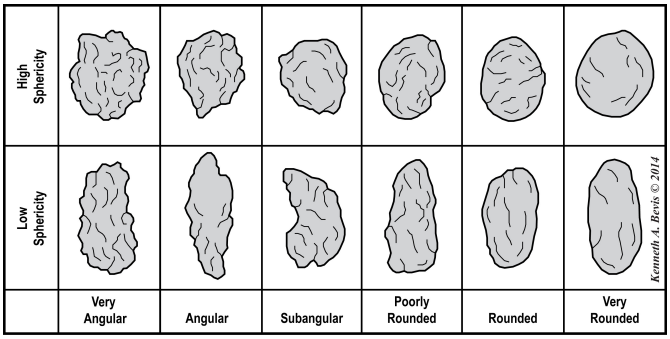
Sample _____ is most well sorted.

Sample _____ is least well sorted or most varied.



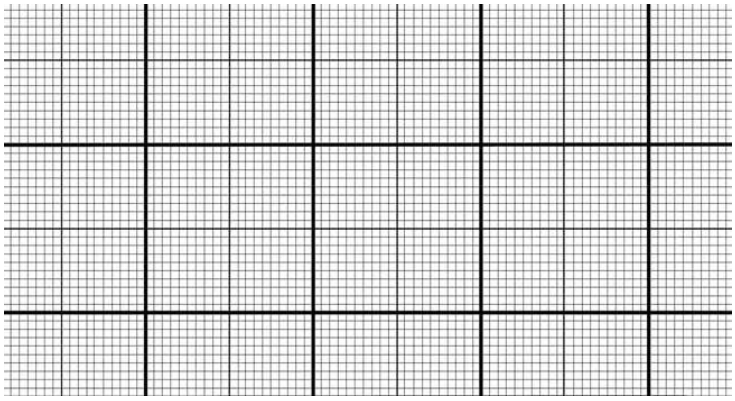
B. *Environment of Deposition - Rounding & Grain Shape* - Are your sand grains more like a ball or more like a sub sandwich? This is sphericity. Are the surfaces of the grains smooth or bumpy? This is angularity. These characteristics can give us clues to where the sand was deposited. A *highly spherical, well-rounded* sand grain has traveled far from its original source and/or has been constantly weathered and eroded back and forth. In sand dunes, grains are constantly weathered and transported by wind and tend to be the most spherical and smoothly rounded. *Low sphericity, angular sand* grains likely have had short transport times and were dropped quickly. Categorize below both the sphericity (HIGH SPHERICITY = HS, LOW SPHERICITY = LS) and the roundness (angularity) of each of the 5 samples with a √ or X.

< — ANGULAR				ROUNDED —>		
HS / LS	VA	A	SA	PR	R	VR
Sample 1 _____	_____	_____	_____	_____	_____	_____
Sample 2 _____	_____	_____	_____	_____	_____	_____
Sample 3 _____	_____	_____	_____	_____	_____	_____
Sample 4 _____	_____	_____	_____	_____	_____	_____



Sample _____ was transported for a longer time or farther. Sample _____ was transported for a shorter time or less far.

C. *Grain Size* - Select 20 grains of each sample. Use the grain size chart below and a metric ruler or the mm sized graph paper below to measure their size. Record your findings.



Grain size (metric)	Name
1–2 mm	Very coarse sand
0.5–1 mm	Coarse sand
0.25–0.5 mm	Medium sand
125–250 µm	Fine sand
62.5–125 µm	Very fine sand

	RANGE (SMALL TO LARGE in MM)	AVERAGE SIZE (MM)
Sample 1	_____	_____
Sample 2	_____	_____
Sample 3	_____	_____
Sample 4	_____	_____

Based on the average grain size, sample(s) _____ indicate(s) at least one period of high energy needed for transport and deposition.

D. *Minerals* - Most sands contain few hard-to-weather minerals such as quartz (most common grain present & only grain present in mature sands; white/grey, or glassy), feldspar (pinkish or white/grey, may look blocky), muscovite (flat silvery or black glittery sheets), and even magnetite or ilmenite (black/steel gray, magnetite is magnetic). Try to group grains according to observed mineral types. Estimate the occurrence of the identified mineral types by percent (you may include "unknown" as a percent).

Minerals & Estimated Percentage

Sample 1 _____

Sample 2 _____

Sample 3 _____

Sample 4 _____

E. *Conclusion: The Environment of Deposition* - Your sand samples may have come from an ocean beach, a desert wash below mountains, a delta (where a river entering another body of water slows and drops sediments), a glacial lake, a side channel of a stream, or other site. Use your observations from above to hypothesize which sample is from which environment and then explain how you arrived at that conclusion. We think…

Sample 1 came from a _____ because _____

_____

Sample 2 came from a _____ because _____

_____

Sample 3 came from a _____ because _____

_____

Sample 4 came from a _____ because _____

_____

Draw a sketch of each environment where the sands were deposited.

Sample 1 Sample 2 Sample 3 Sample

5. What are 2 reasons that a depositional environment may experience fluctuating energies?

A. B.

Which Sand Come from Which Site?

https://www.google.com/maps/@32.8566364,-117.2583112,690m/data=!3m1!1e3

https://www.google.com/maps/@21.2708038,-157.6957701,383m/data=!3m1!1e3

https://www.google.com/maps/@33.7036903,-111.9179575,85m/data=!3m1!1e3

https://www.google.com/maps/@32.3305371,-64.6913463,695m/data=!3m1!1e3