

Activity #1 - Beach Sands of the World

Objective:

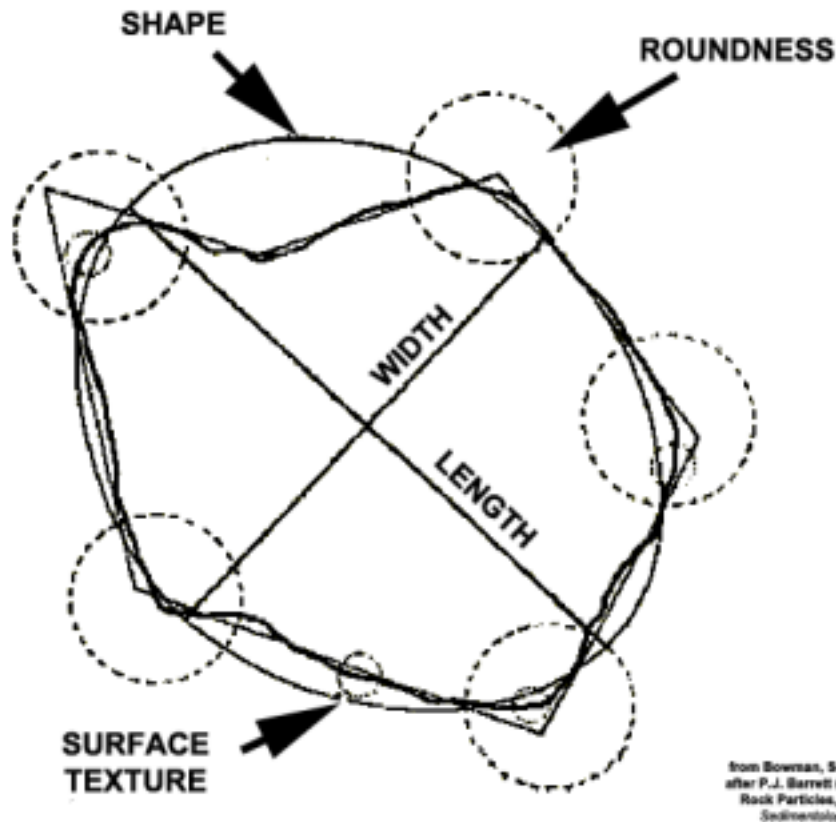
Students will observe sand samples and then find the possible origins of the sand on a world map by plotting the latitude and longitude.

Materials:

- sand samples
- magnets
- world maps for each student
- large world map for class, or a world map projected
- microscopes, or hand lenses
- scissors
- 3x5 index cards
- vinegar
- metric ruler
- petri dishes
- scotch tape
- data sheet

Procedures:

- 1) Obtain sand samples from all over the world (through travel, swapping, friends etc). Look up the approximate latitude and longitude for each sample and make a note of it. Assign a random letter of the alphabet to each team of students. The number of teams is determined by the number of different sand samples you have, teams of two would be ideal.
- 2) Each team of students will obtain a 3x5 index card. The card is folded in half lengthwise, and a V-shaped notch is cut in the middle of the fold so a diamond hole in the middle results when the card is unfolded.
- 3) Students then stick a piece of scotch tape across the hole and turn the card so the sticky side is facing up. The team obtains one of the teachers sand samples A small pinch or sprinkle of sand grains are spread across the sticky tape and pressed gently to make them adhere. Students should write their alphabetic team designation on the card.
- 4) Next, have the team complete a data record for their sand sample considering the following:
 - a. Color. Record the most obvious color and the other colors of the sand grains in your sample
 - b. Length*: Estimate the length of the smaller and large sand grains; compute the average size in mm. (*Advanced students can compute a nearly exact length using a microscope whose field diameter is known. The number of sand grains that would “fit” this diameter is estimated, then divided into the field diameter to calculate the length of one sand grain).
 - c. Particle name: Based on the size range, tell name?
 - d. Shape: Round, oval, square, rectangular, triangular?
 - e. Rounding: Are the corners sharp or rounded?
 - f. Surface Texture: smooth or rough?
- 5) An extended analysis can be done if you have a larger supply of each sand sample:
 - g. Magnetism: Is there a large, medium or small amount of material attracted to a magnet?
 - h. Quartz (SiO_2) or Calcite (CaCO_3): Place a drop of dilute vinegar on each sample and see if any grains fizz. Use your hand lens and note which grains react with acid.
- 6) When all the data charts have been completed, arrange your class into larger groups according to the



most obvious color of their sand sample. Have each team write their alphabetic team letter on the world map by matching the latitude and longitude coordinates they were given.

Discussion:

- 7) Are there any noticeable global patterns of distribution of sand by color? Explain.
 - 8) Are there any noticeable global patterns of distribution of sand by any other features? Explain.
 - 9) Give each large group an “unknown” sand sample that is the same as their unique color.
- Ask the group to perform an analysis of the unknown sample and to discuss these data among themselves.
- a) Can the origin of this unknown sample be determined by comparing it to the team data?
 - b) Which characteristics were most useful in identifying the unknown sample?
 - c) What other kinds of data (that we did not collect in our study) might also be helpful?

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SAMPLE 3X5 SPECIMEN CARDS

A.

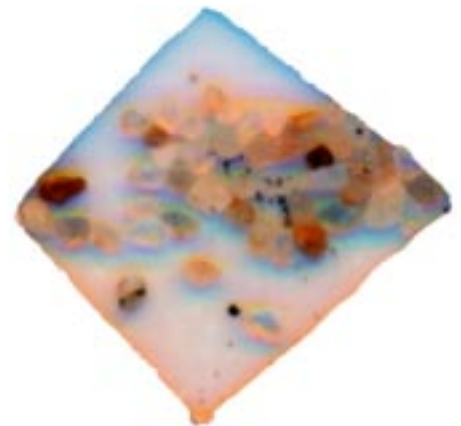
Lat. 45°S
Lon. 145°E



CLOSE UP VIEW
of SAND IN CENTER

B.

Lat. 45°N
Lon. 75°W



CLOSE UP VIEW of
SAND IN CENTER

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SAND GRAIN DATA SHEET

Student name _____

Team Members _____

Sand Sample Letter Code _____

Latitude _____ Longitude _____

DATA OBSERVATIONS:

a. Color: Main Color: _____ Other Colors: _____

b. Length Smallest: _____ Largest: _____ Average: _____

c. Particle name: _____

d. Shape: _____

e. Rounding: _____

f. Surface Texture: _____

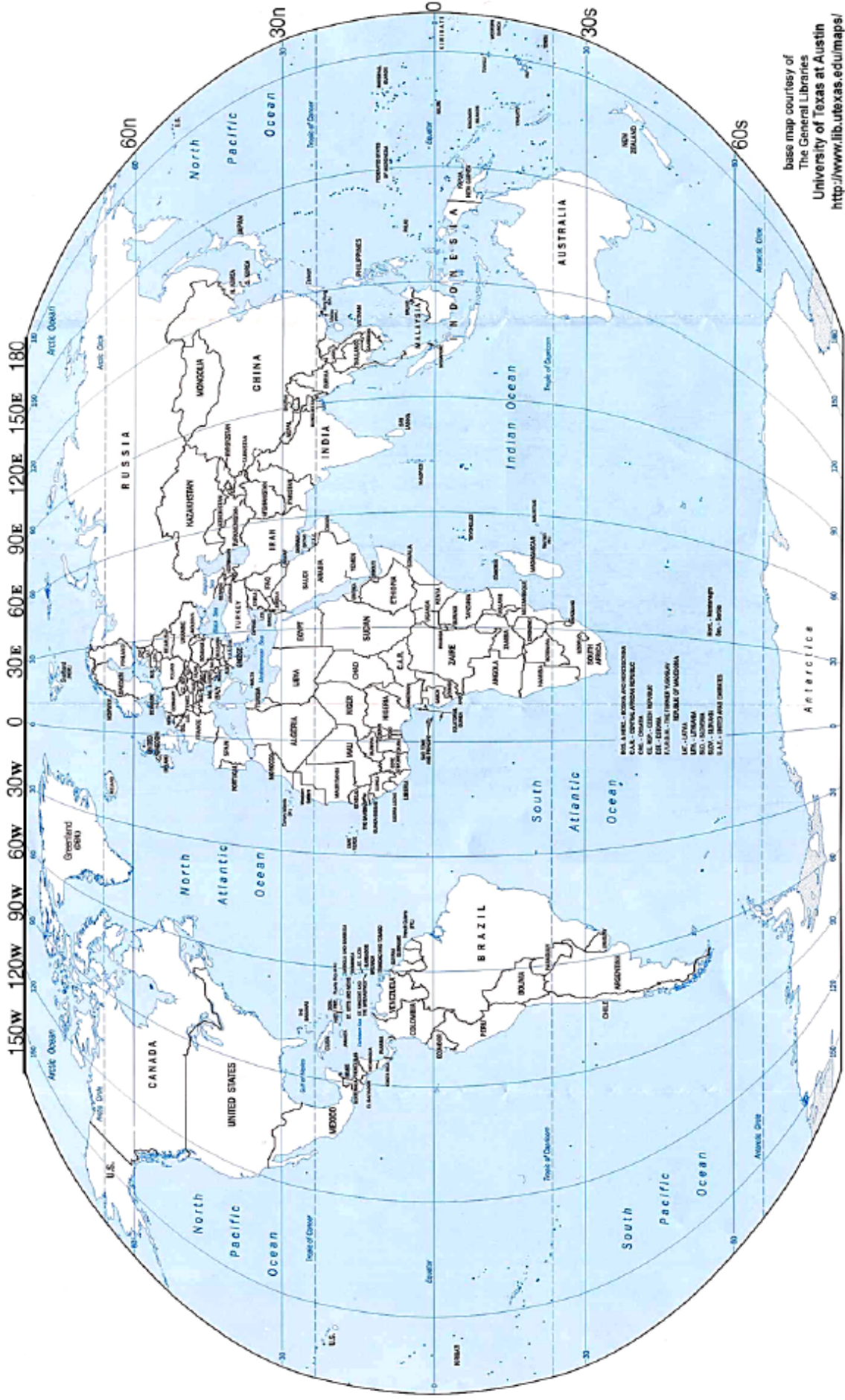
g. Magnetism: _____

h. Quartz (SiO_2) or Calcite (CaCO_3): _____

DRAW A DIAGRAM OR SKETCH OF YOUR SAND GRAINS. (Label by pointing out the features you recorded above)

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MAP OF SAND SAMPLE LOCATIONS



base map courtesy of
The General Libraries
University of Texas at Austin
<http://www.lib.utexas.edu/maps/>