NAME _____

Class _____ Date _____

POROSITY AND PERMEABILITY BEAD LAB

Objective- _____

Materials: different sizes of beads
Transparent tubes with rubber nozzles
Ring stands
Stop watch
Graduated cylinders

Define permeability – _____

_____

Hypothesis for permeability of several bead sizes:_____

Permeability Procedure:

A. As a class group, come up with an acceptable procedure to gather data on permeability. One person prepares the procedure on the word processor for the group.
***Items to note:

a) Beads used must be equivalent in volume.
b) Water used must be equivalent in volume.
c) More than one trial should occur for each set of beads.

Questions:

1. Which set of beads did the water travel through the fastest? Why?

2. Which set of beads did the water travel through the slowest? Why?

3. Identify particles from the ESRT that would compare in relationship to the above beads (Diameters measurements don't have to match, but what particles are the beads representing?)

5. Name rocks that may have a high permeability.
Name rocks that may have a low permeability. Explain your choices.

What is the definition of porosity? -_____

Hypothesis for porosity of several bead sizes:_____

Procedure of Porosity:

A. As a class group, come up with an acceptable procedure to gather data on porosity. One person prepares the procedure on the word processor for the group.
***Items to note:
a) Beads used must be equivalent in volume.
b) Water used must be equivalent in volume.
c) More than one trial should occur for each set of beads.

B. Have one person prepare a table to display the gathered data for the following beads: small, medium, large, mixed. Don't forget proper units.

Questions:

7. Which bead type held the most water? Which held the least water? Explain.

8. This situation is true for particles that are uniform size, uniform shape, and not

compacted. Is this typical of real life, with real particles in a river delta, lake or stream? Why or why not?

7. For the mixed sample, how was the porosity? Why?

8. Identify a rock type that may have a high porosity, low porosity.

10. Theoretically compare the porosity of sandstone and conglomerate.

11. Define capillarity-

12. Which bead type will have the best capillarity? Why?

Bead Drop Procedure:

Using the equipment provided:

1. Record the diameter of 3 different bead sizes. _____ (X), _____ (Y), _____ (Z)

2. Drop bead X into the column of water. Determine the time the bead takes to move from line A to line B in the column. Record your time in the table as the First Trial. Repeat this step with a second Bead X and record the time as the Second Trial.

3. Drop Bead Y into the column of water. Determine the time the bead takes to move from line A to line B in the column. Record your time in the table as the First Trial. Repeat this step with a second Bead Y and record the time as the Second Trial.

4. Drop Bead Z into the column of water. Determine the time the bead takes to move from line A to line B in the column. Record your time in the table as the First Trial. Repeat this step with a second Bead Z and record the time as the Second Trial.

Data Table for Bead Drop Time Recordings

Trial #
X (sec)
Y (sec)
Z (sec)

Trial 1

Trial 2

5. Calculate the average settling times for the three beads to the nearest tenth of a second. Record these settling times in the Data Table.

Data Table for Bead Drop Average Time
Average Time
X (sec)
Y(sec)
Z(sec)

6. Using the graph given, plot Beads X-Z onto the graph.

7. A fourth bead is not given during the experiment. Find the anticipated settling time for Bead Q by using the graph. Bead Q's diameter is 10.5mm.