Name_____   Porosity and Permeability

Porosity/Permeability Relationships

1. The spaces between particles of earth material are called_____.
2. _____ is the % of open space in an earth material .
3. How does pouring water into a beaker of beads tell us about the total pore space?
   _____

Porosity is independent of grain size as long as samples have same volume, shape and packing
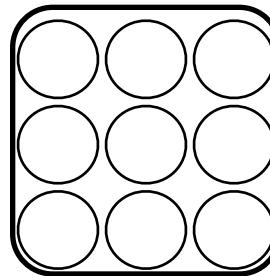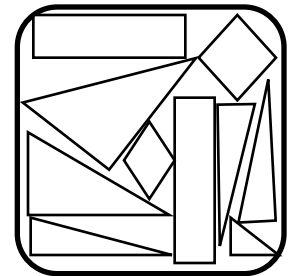

Particle Size (graph with Porosity on y-axis)
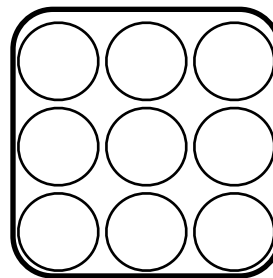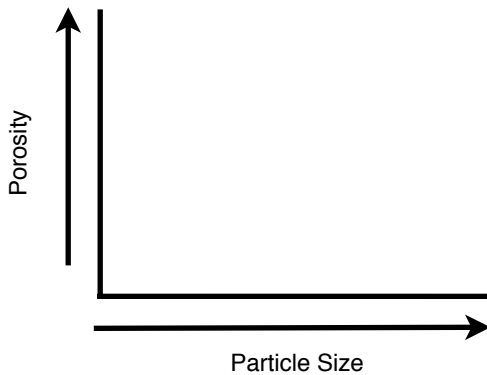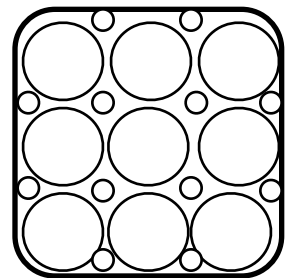
Sorted   Unsorted

Porosity depends on shape: Rounded particles has higher porosity than angular particles

Shape	% Porosity
Round	
Oval	
Flat	

Round   Angular

Loosely packed particles have more porosity than closely packed particles

Packing	Porosity
Loose	
Tight	
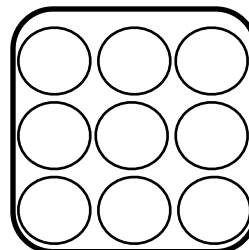
Tight Pack   Loose Pack
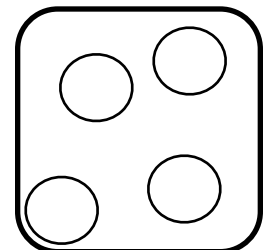
4. **Questions A-F will be based on samples below-ALL HAVE SAME VOLUME!!!!!**

| Sample A	Sample B	Sample C
Large	Small	Mixed
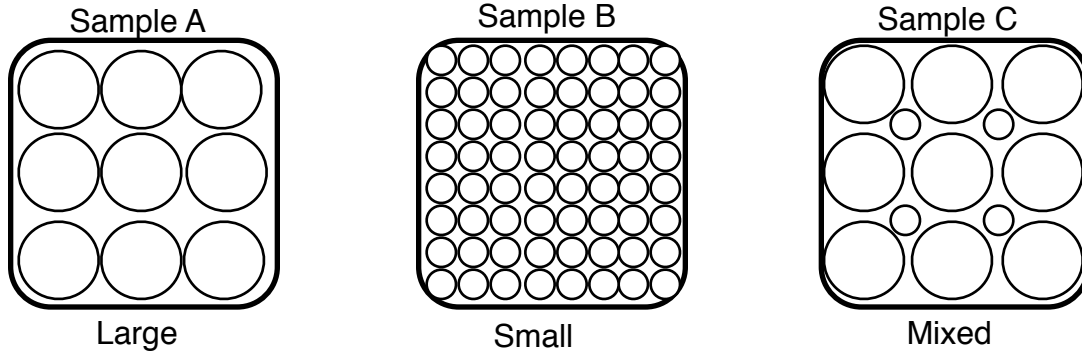
A. Which sample (s) has the greatest amount of pore space? _____

B. Which sample has the lowest porosity? _____

C. If you were to compare the porosity of Sample A and Sample B, how would the porosities compare? _____

D. Explain your answer to letter "C"
_____
_____

E. What would happen to the porosities of all samples if they were mixed together?
_____

F. If particles are sorted, as particle size increases, the porosity of the particles.......
   _____

5. **Answer questions G-I on the following diagrams**

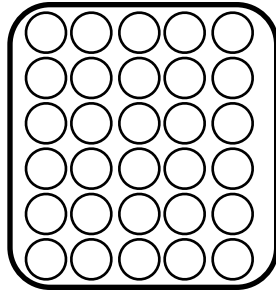| A. Round	B. Oval	C. Flat
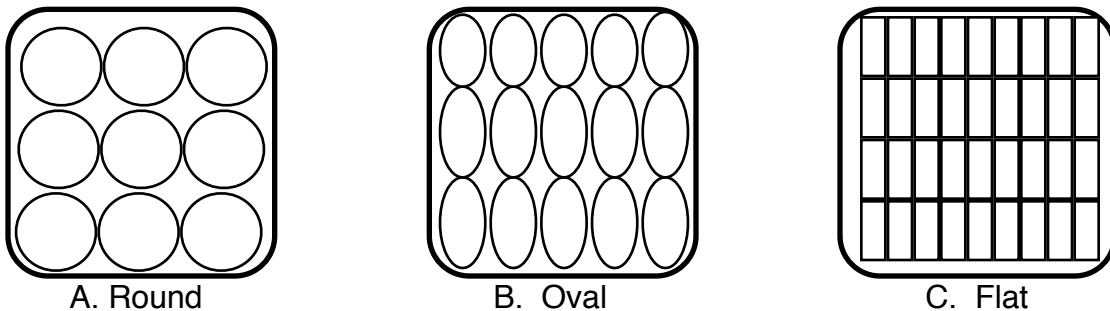
G. Which sample has the highest porosity? _____

H. Which sample has the lowest porosity? _____

I. What is the relationship between shape and porosity? _____

J. Which is most permeable? _____

K. Which is least permeable? _____

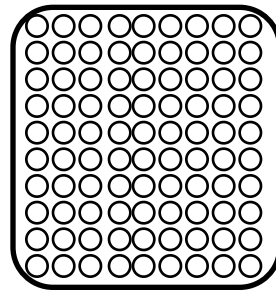L. As particle shape changes from FLAT to OVAL to ROUND, permeability _____
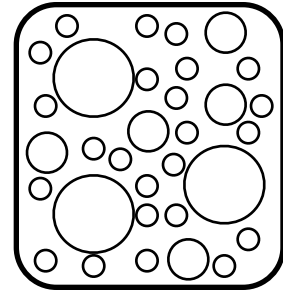
Name_____   Porosity and Permeability
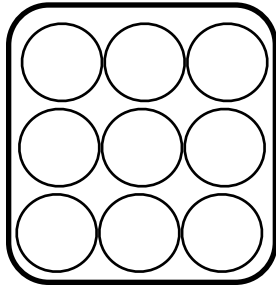
A. Large   B. Medium   C. Small   D. Mixed

Use the diagrams above to answer the following questions:

1. Which of the 4 samples is the most permeable? _____
2. Which sample is least permeable? _____
3. List the four columns in order of decreasing permeability:
   a. _____ Most Permeable
   b. _____
   c. _____
   d. _____ Least Permeable
4. What is the relationship between particle size and permeability:
   _____
5. List the 4 samples in order by using the time and rate needed for water to pass through them:

Time is how long it takes for something to happen	**Rate** is how fast something happens

_____ Took the least time   _____ Fastest Rate
_____   _____
_____   _____
_____ Took most time   _____ Slowest Rate

Capillarity is the ability for water to travel upward through the soil

1. Define capillary water: _____
2. What is the major factor that affects the force of capillarity? _____
3. As particle size decreases, capillarity _____
4. Water is attracted to LARGE or SMALL particles? _____