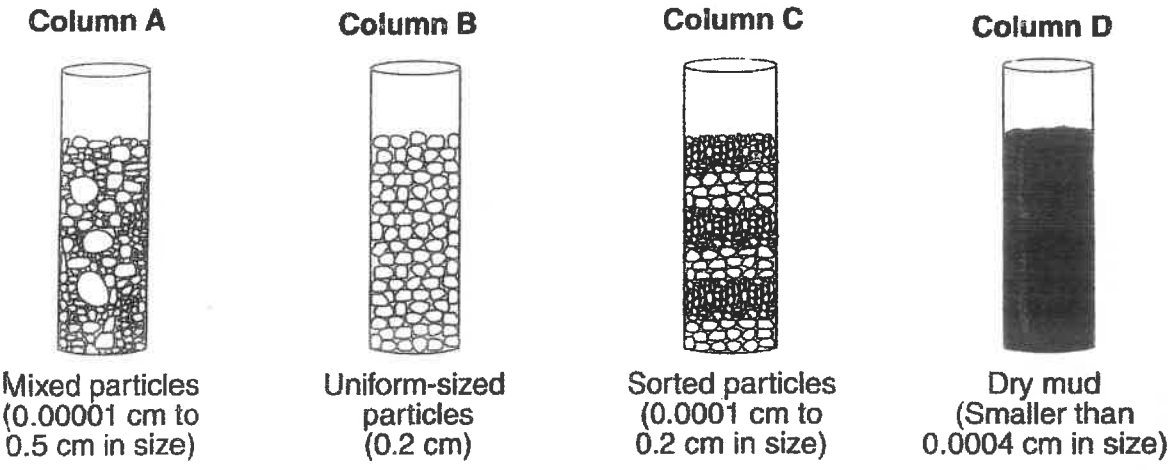
Name:_____ Date:_____

Infiltration Practice

1. The columns *A*, *B*, *C*, and *D* shown below contain equal volumes of sediment.



(Not drawn to scale)

When an equal volume of water is added to each column, the greatest rate of infiltration will occur in which column?

A) A B) *B* C) C D) *D*

2. Compared to an area of Earth's surface with gentle slopes, an area with steeper slopes most likely has

A) less infiltration and more runoff
B) less infiltration and less runoff
C) more infiltration and more runoff
D) more infiltration and less runoff

3. Which sediment size would allow water to flow through at the fastest rate?

A) clay B) silt
C) sand D) pebbles

4. Which set of surface soil conditions on a hillside would result in the most infiltration of rainfall?

A) gentle slope, saturated soil, no vegetation
B) gentle slope, unsaturated soil, vegetation
C) steep slope, saturated soil, vegetation
D) steep slope, unsaturated soil, no vegetation

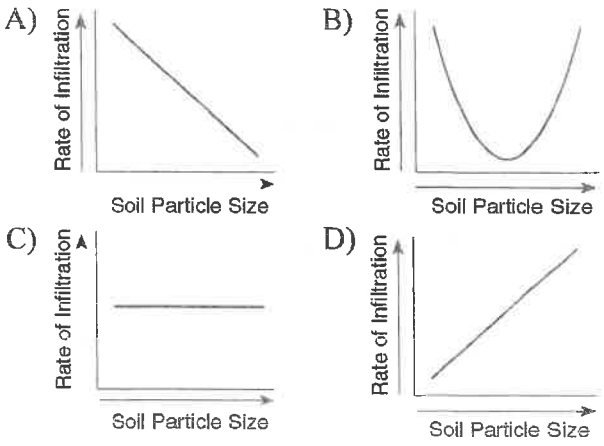
5. In general, the probability of flooding decreases when there is an increase in the amount of

A) precipitation B) infiltration
C) runoff D) snow melt

6. As the temperature of the soil decreases from 10°C to −5°C, the infiltration rate of ground water through this soil will most likely

A) decrease B) increase
C) remain the same

7. Which graph best represents the relationship between soil particle size and the rate at which water infiltrates permeable soil?



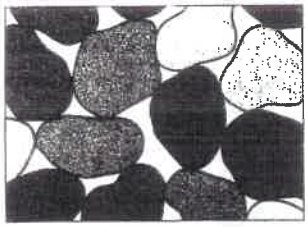
8. Which soil condition allows the most infiltration of precipitation?

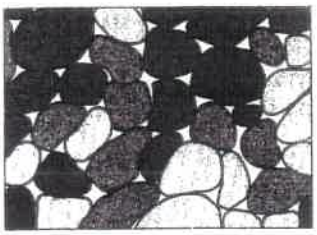
A) saturated soil
B) a steep soil surface
C) coarse-grained soil
D) an impermeable surface

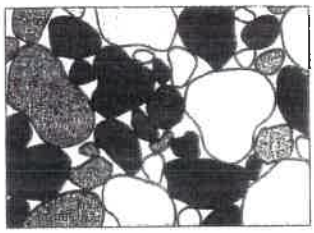
9. Sand sediments are usually more permeable than silt sediments because sand grains are

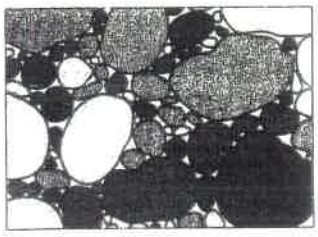
A) larger B) smoother
C) rounder D) more soluble

10. The diagrams below represent four permeable sediment samples. The sediments are composed of the same material, but differ in particle size and sorting. Which sediment sample will most likely have the fastest groundwater infiltration rate?

A) 

B) 

C) 

D) 

11. Flash flooding often occurs in city areas because

A) runoff decreases during precipitation
B) ground water storage is usually very large
C) roads, pavements, and buildings reduce the infiltration of water into the ground
D) the heat generated by city areas decreases actual evapotranspiration

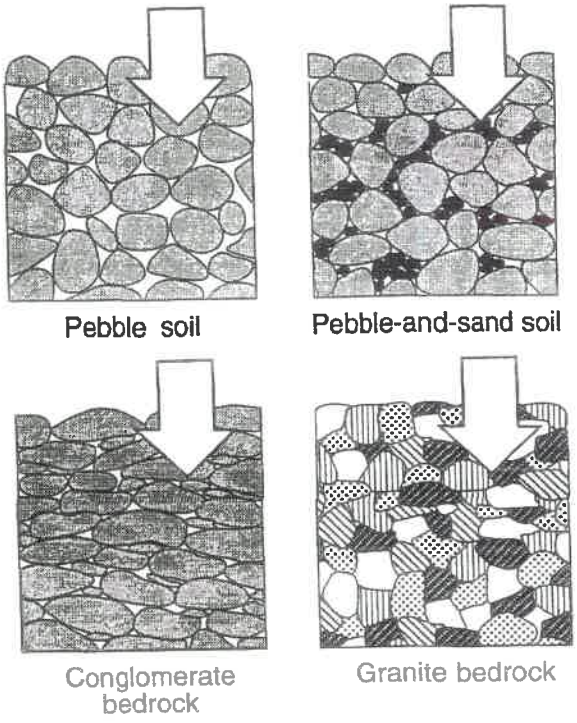
12. Soil with the greatest porosity has particles that are

A) poorly sorted and densely packed
B) poorly sorted and loosely packed
C) well sorted and densely packed
D) well sorted and loosely packed

13. Soil composed of which particle size usually has the greatest capillarity?

A) silt
B) fine sand
C) coarse sand
D) pebbles

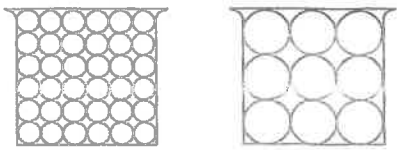
14. Base your answer to the following question on the diagram below, which represents samples of soil and bedrock at Earth's surface. The arrows represent possible infiltration of rainwater.



The least amount of rainwater will infiltrate the surface of the

A) pebble soil
B) pebble-and-sand soil
C) conglomerate bedrock
D) granite bedrock

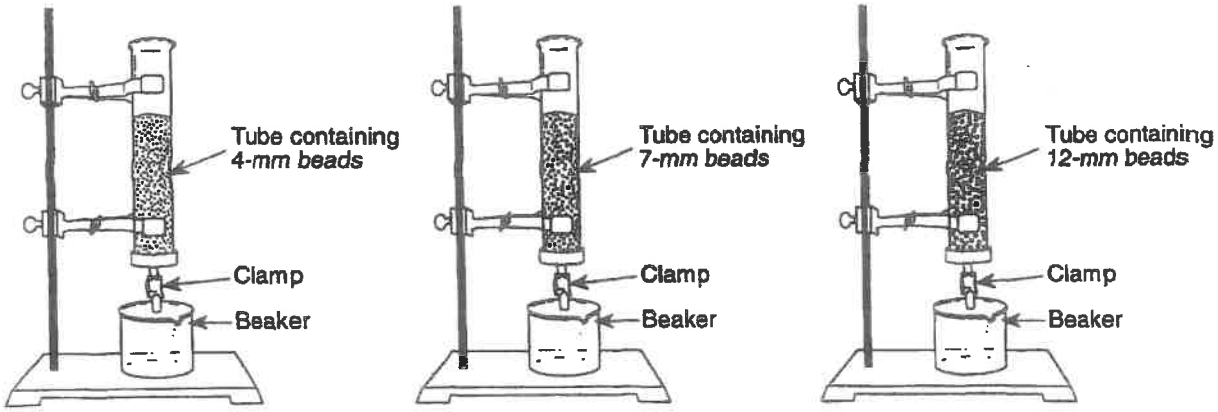
15. The diagrams below represent two containers, each filled with a sample of nonporous particles of uniform size.



Compared to the sample of larger particles, the sample of smaller particles has

A) lower permeability
B) higher permeability
C) less porosity
D) more porosity

16. Base your answer to the following question on the diagram, data and information below. The diagram below represents part of the laboratory setup for an activity to investigate the effects of particle size on permeability, porosity, and water retention. Three separate tubes were used, each containing 300 milliliters of beads of uniform size. Bead sizes were 4 millimeters, 7 millimeters, and 12 millimeters in diameter, respectively.



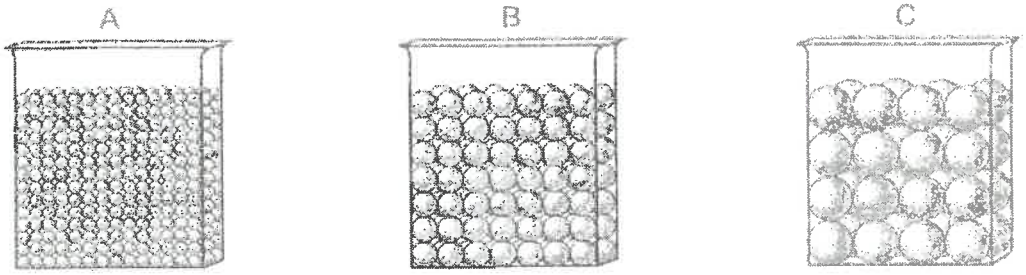
The amount of water added to each tube to cover the beads was determined. The clamp was then removed, the flow of the water was timed, and its volume was measured. Data are shown in the table below. (The amount of water retained on the 7-millimeter beads has been omitted.)

	Particle Size		
	4 mm	7 mm	12 mm
Infiltration Time (seconds)	3.7	3.0	2.4
Amount of Water Needed To Cover All Beads (mL)	147	145	147
Water Recovered from Tube After Clamp Was Removed (mL)	111	123	135
Water Retained on Beads (mL)	36		12

Soil composed of which kind of particles would have the longest infiltration time? [Assume that all particles allow some water to pass through.]

A) pebbles B) sand C) silt D) clay

17. The diagrams below represent three containers, *A*, *B*, and *C*, which were filled with equal volumes of uniformly sorted plastic beads. Water was poured into each container to determine porosity and infiltration time.



(Not drawn to scale)

Which data table best represents the porosity and infiltration time of the beads in the three containers?

A)

Beaker	Porosity (%)	Infiltration Time (sec)
A	40	5.2
B	40	2.8
C	40	0.4

B)

Beaker	Porosity (%)	Infiltration Time (sec)
A	40	0.4
B	40	2.8
C	40	5.2

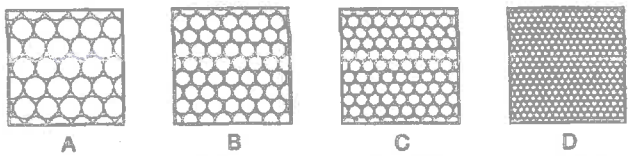
C)

Beaker	Porosity (%)	Infiltration Time (sec)
A	20	5.2
B	30	2.8
C	40	0.4

D)

Beaker	Porosity (%)	Infiltration Time (sec)
A	20	0.4
B	30	2.8
C	40	5.2

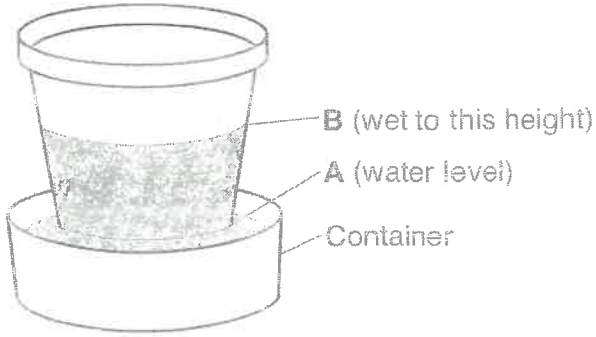
18. Base your answer to the following question on the diagrams below, which represent cross sections of four samples of loosely packed, uniformly sorted soil particles. The diameter of the particles is given below each diagram. All soil samples consist of solid spherical particles.



If equal amounts of 0.2-centimeter soil particles are mixed into each sample, which sample's porosity will *not* be affected?

A) *A* B) *B* C) *C* D) *D*

19. The diagram below shows the result of leaving an empty, dry clay flowerpot in a full container of water for a period of time. The water level in the container dropped to level *A*. The top of the wet area moved to level *B*.



Level *B* is higher than level *A* because water

A) is less dense than the clay pot
B) is more dense than the clay pot
C) traveled upward in the clay pot by capillary
D) traveled downward in the clay pot by capillary action