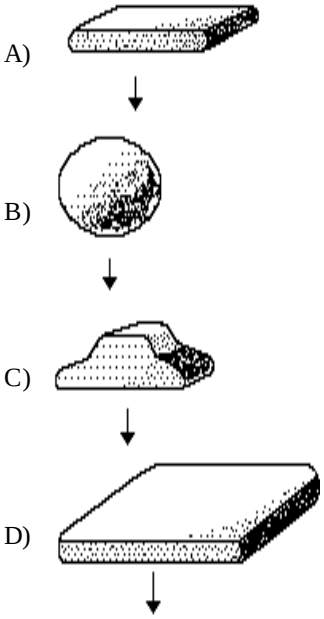
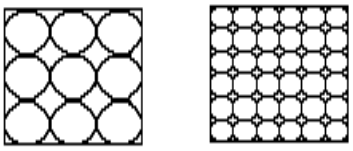
Name: _____

1) If all the particles below have the same mass and density, which particle will settle fastest in quiet water? [Assume settling takes place as shown by arrows.]

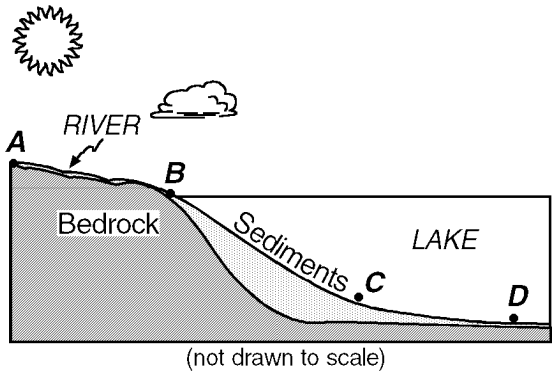


2) The diagram below represents two identical containers filled with samples of loosely packed sediments. The sediments are composed of the same material, but differ in particle size. Which property is most nearly the same for the two samples?



A) infiltration rate
B) water retention
C) porosity
D) capillarity

3) The diagram below represents a river flowing into a large lake on a hot, sunny afternoon in July in New York State. The river is carrying particles ranging in size from cobbles to clay.



When water from the river enters the lake, particles of which size will usually settle out *first*?

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

4) Which factor has the *greatest* influence on the weathering rate of Earth's surface bedrock?

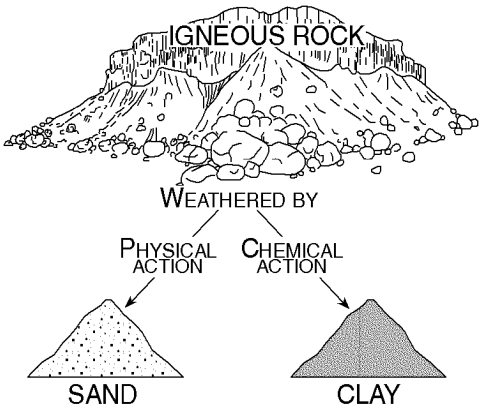
A) regional climate
B) local air pressure
C) angle of insolation
D) age of the bedrock

5) The composition of sediments on the Earth's surface usually is quite different from the composition of the underlying bedrock. This observation suggests that most

A) bedrock is formed from sediments
B) sediments are transported
C) sediments are residual
D) bedrock is resistant to weathering

Questions 6 through 8 refer to the following:

The diagram below shows igneous rock that has undergone mainly physical weathering into sand and mainly chemical weathering into clay.



6) Compare the particle size of the physically weathered fragments to the particle size of the chemically weathered fragments in the given diagram.

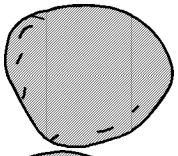
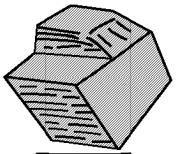
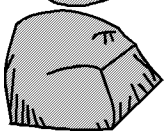
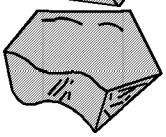
7) If the igneous rock is a layer of vesicular andesite, identify *three* types of mineral grains that could be found in the sand shown in the diagram.

8) Describe the change in temperature and moisture conditions that would cause an increase in the rate of chemical weathering into clay.

9) Transported rock materials are more common than residual rock materials in the soils of New York State. Which statement best explains this observation?

A) Weathering changes transported rock materials more easily than residual rock materials.
B) Most rock materials are moved by some agent of erosion at some time in their history.
C) Solid rock must be transported to break.
D) Residual rock material forms only from bedrock that is difficult to change into soil.

10) The diagrams below represent magnified views of rock particles. Which rock particle was most likely transported by a stream for the *longest* period of time?

A) 
C) 
B) 
D) 

11) A large, scratched boulder is found in a mixture of unsorted, smaller sediments forming a hill in central New York State. Which agent of erosion most likely transported and then deposited this boulder?

A) ocean waves
B) wind
C) a glacier
D) running water

12) Which change in the climate of New York State would most likely cause the *greatest* increase in chemical weathering of local bedrock?

A) lower humidity in winter
B) greater precipitation in summer
C) lower temperature in winter
D) higher atmospheric pressure in summer

13) What is the *largest* particle that can be kept in motion by a stream that has a velocity of 100 centimeters per second?

A) cobble
B) pebble
C) silt
D) sand

14) Which situation exists in a section of a river where the amount of deposition is the same as the amount of erosion?

A) Lowest elevation has been reached in that section.
B) The water is flowing swiftly in that section.
C) That section of the river is a delta region.
D) Dynamic equilibrium has been reached in that section.

15) Which type of climate causes the fastest chemical weathering?

A) hot and humid
B) cold and dry
C) cold and humid
D) hot and dry

16) The surface bedrock of a region of eastern New York State is shale. Which statement *best* explains why the soil that covers the shale in this region contains abundant garnet and gneiss pebbles?

A) The soil formed from the chemical and physical weathering of shale.
B) The soil consists of rock materials transported to this region by agents of erosion.
C) Volcanic lava flowed over the shale bedrock.
D) A meteor impact scattered garnet and gneiss pebbles over the area.

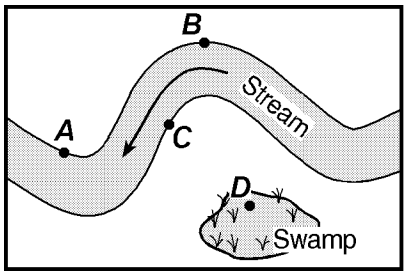
17) According to the *Earth Science Reference Tables*, what is the minimum stream velocity that would maintain movement of a quartz cobble with a diameter of 10.0 centimeters?

A) 120 cm/sec
B) 210 cm/sec
C) 280 cm/sec
D) 80 cm/sec

18) Compared to a low-density spherical particle, a high-density spherical particle of the same size will sink through water

A) more slowly
B) at the same rate
C) more rapidly

19) The map below shows the area surrounding a meandering stream.



At which point is erosion *greatest*?

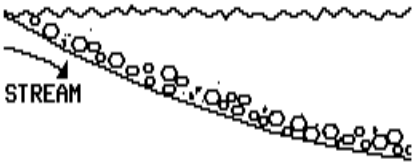
A) *A*
B) *B*
C) *C*
D) *D*

20) Why do the particles carried by a river settle to the bottom as the river enters the ocean?

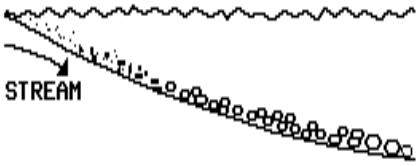
A) The velocity of the river water decreases as it enters the ocean.
B) The large particles have a greater surface area than the small particles.
C) The density of the ocean water is greater than the density of the river water.
D) The kinetic energy of the particles increases as the particles enter the ocean.

21) A stream is entering the calm waters of a large lake. Which diagram best illustrates the pattern of sediments being deposited in the lake from the stream flow?

A)


B)


C)


D)


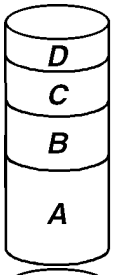
22) Transported sediments are usually deposited at locations in which

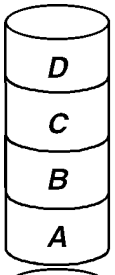
A) an increase in the physical weathering of rocks occurs
B) the freezing and thawing of water occurs
C) the chemical breakdown of rocks occurs
D) a decrease in the speed of the agent of erosion occurs

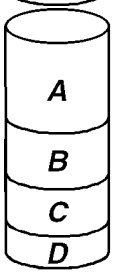
23) Four different kinds of particles (*A*, *B*, *C*, and *D*) with the same shape and diameter were mixed and poured into a column of water. The mass, volume, and density of the particles are shown below.

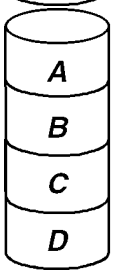
Particle	Mass (g)	Volume (cm^3)	Density (g/cm^3)
A	100	67	1.5
B	100	33	3.0
C	100	22	4.5
D	100	17	6.0

Which diagram *best* shows how the particle beds would be arranged in the column of water after settling?

A)


C)


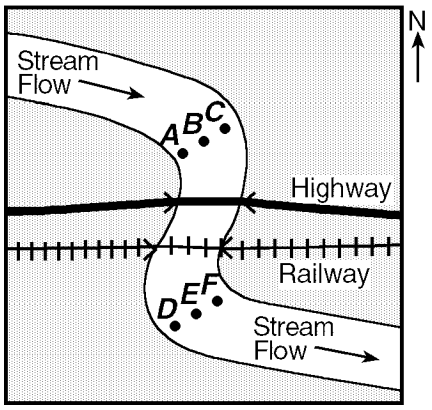
B)


D)


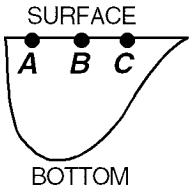
24) Which change will most likely take place in a landscape region when the climate becomes warmer and more humid?

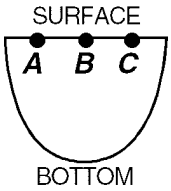
A) The vegetation covering the hillslopes will decrease.
B) The rate of chemical weathering will increase.
C) The rate of chemical weathering will decrease.
D) The gradient of the hillslopes will increase.

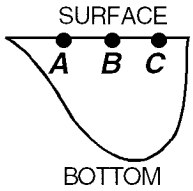
25) The map below represents a meandering stream with a constant gradient. The arrows show the direction of stream flow. Points *A* through *F* are locations in the stream.

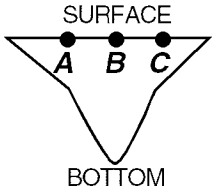


Which diagram *best* represents the cross section of the stream through points *A*, *B*, and *C*?

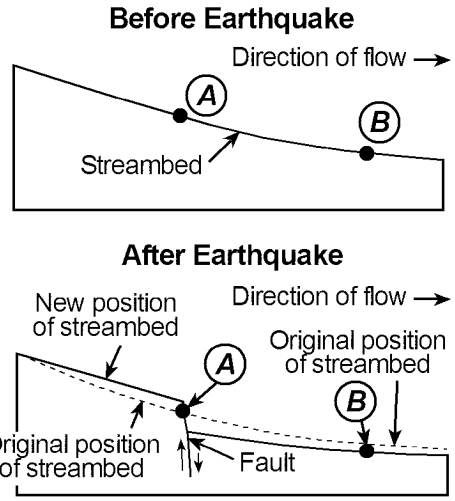
A)


B)


C)


D)


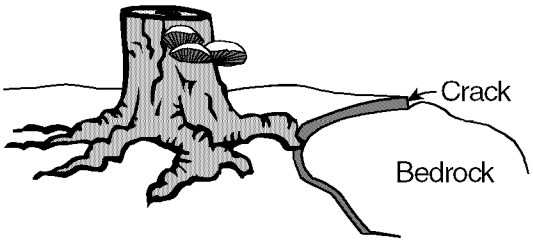
26) The diagram below shows a stream profile before and after an earthquake. Points *A* and *B* are locations along the streambed.



What is the probable relationship between erosion and deposition at points *A* and *B* after the earthquake?

A) There is more deposition at point *A* and more erosion at point *B*.
B) There is more erosion than deposition at points *A* and *B*.
C) There is more erosion at point *A* and more deposition at point *B*.
D) There is more deposition than erosion at points *A* and *B*.

27) The diagram below shows the stump of a tree whose root grew into a small crack in bedrock and split the rock apart.



The action of the root splitting the bedrock is an example of

A) erosion
B) chemical weathering
C) physical weathering
D) deposition

28) The chart below indicates the densities of four different minerals.

MINERAL	DENSITY (g/cm^3)
Calcite	2.8
Diamond	3.5
Hematite	5.3
Quartz	2.7

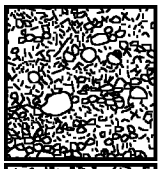
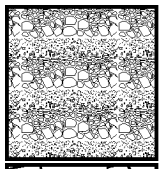
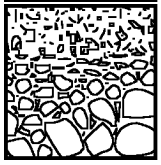
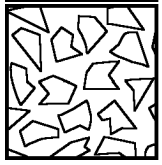
If spheres 5 millimeters in diameter of these four minerals are dropped at the same time into a large tube filled with water, which would settle to the bottom first?

A) quartz
B) diamond
C) calcite
D) hematite

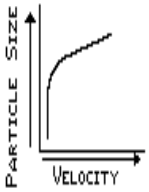
29) A landscape region has an average annual temperature of 0DC and an average annual precipitation of 100 centimeters. Which types of weathering and erosion would have the *greatest* effect on the landscape of this region?

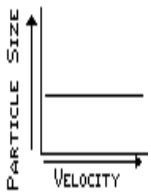
A) rapid mass movement and wind action
B) frost action and stream erosion
C) glacial erosion and chemical weathering
D) slow mass movement and glacial erosion

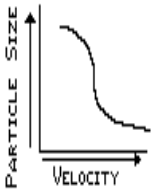
30) Which diagram *best* illustrates a cross section of sediments that were transported and deposited by a glacier?

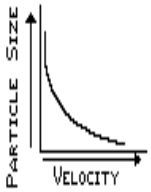
A) 
C) 
B) 
D) 

31) Which graph best represents the relationship between the maximum particle size that can be carried by a stream and the velocity of the stream?

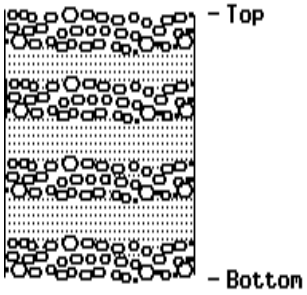
A) 

C) 

B) 

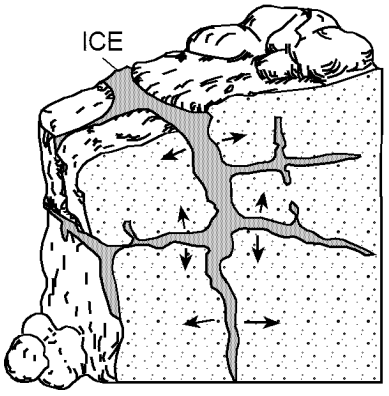
D) 

32) The diagram below represents a cross section of sedimentary deposits. Where would this type of deposition most likely occur?



A) at the base of a shifting sand dune
B) beneath a large glacier
C) in a lake fed by a stream
D) at the rapids in a stream

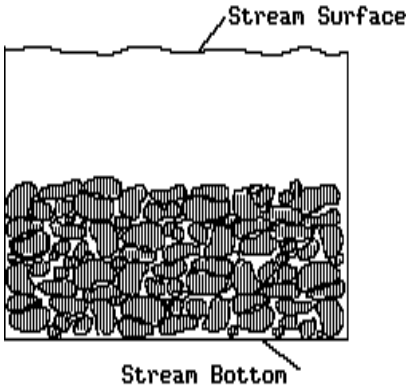
33) The diagram below shows granite bedrock with cracks. Water has seeped into the cracks and frozen. The arrows represent the directions in which the cracks have widened due to weathering.



Which statement *best* describes the physical weathering shown by the diagram?

A) Enlargement of the cracks occurs because water expands when it freezes.
B) The cracks become wider because of chemical reactions between water and the rock.
C) This type of weathering is common in regions of primarily warm and humid climates.
D) This type of weathering occurs only in bedrock composed of granite.

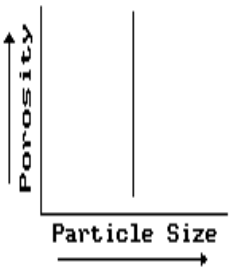
34) The diagram below represents a vertical cross section of sediments deposited in a stream.

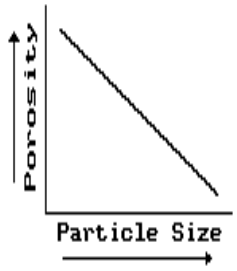


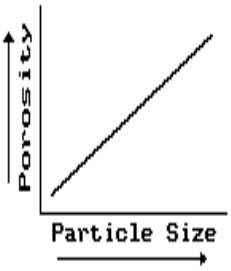
Which statement best explains the mixture of sediments?

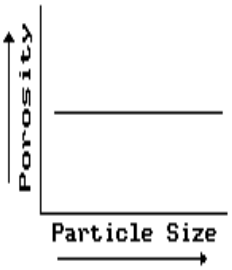
A) The velocity of the stream continually decreased.
B) The particles have different densities.
C) Smaller particles settle more slowly than larger particles.
D) The stream discharge continually decreased.

35) Which graph best represents the relationship between porosity and particle size for soil samples of uniform size, shape, and packing?

A)


B)


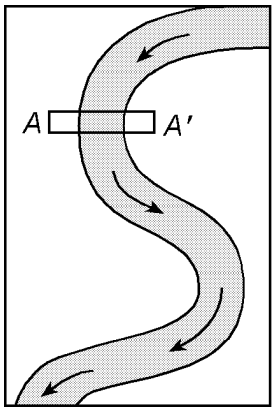
C)


D)


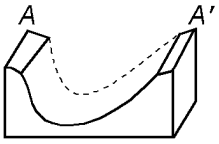
36) As the gradient of a stream increases, the stream's ability to carry sediment

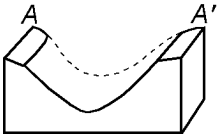
A) decreases
B) increases
C) remains the same

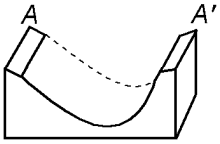
37) The map below shows a meandering river. *A-A1* is the location of a cross section. The arrows show the direction of the riverflow.

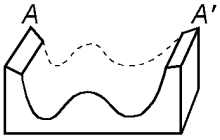


Which cross section *best* represents the shape of the river bottom at *A-A1*?

A)


B)


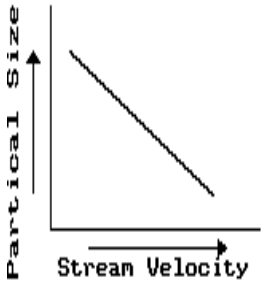
C)


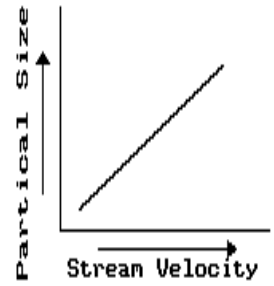
D)


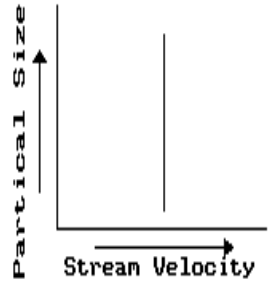
38) The diagram below shows a stream flowing past points *X* and *Y*. If the velocity of the stream at point *X* is 100 centimeters per second, which statement *best* describes the sediments being transported past these points?

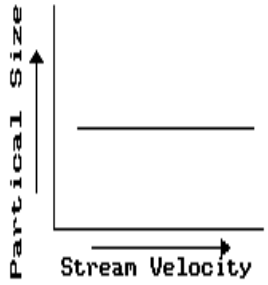
A) At points *X* and *Y*, only sand, silt, and clay are being transported.
B) At points *X* and *Y*, only clay is being transported.
C) Some pebbles being transported at point *Y* are bigger than those being transported at point *X*.
D) Some pebbles and cobbles are being transported at points *X* and *Y*, but not sand, silt, or clay.

39) Which graph best represents the relationship between a streams velocity and the size of the *largest* particles it can carry downstream?

A)


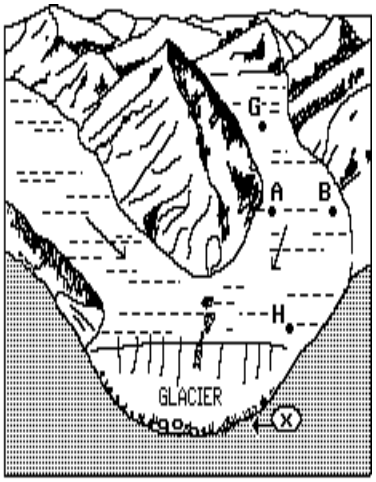
B)


C)


D)


Questions 40 through 43 refer to the following:

The diagram below represents two branches of a valley glacier. Points *A*, *B*, *G*, and *H* are located on the surface of the glacier. Point *X* is located at the interface between the ice and the bedrock. The arrows indicate the general direction of ice movement.



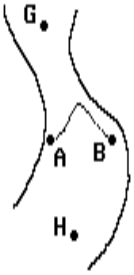
40) The sediment deposited by the valley glacier at position *X* is best described as

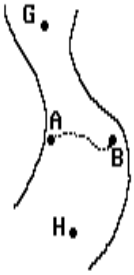
A) sorted according to particle size
B) unsorted
C) sorted according to particle texture
D) sorted according to particle density

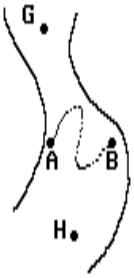
41) Which force is primarily responsible for the movement of the glacier?

A) ground water
B) gravity
C) running water
D) wind

42) Metal stakes were placed on the surface of the glacier in a straight line from position *A* to position *B*. Which diagram best shows the position of the metal stakes several years later?

A)


C)


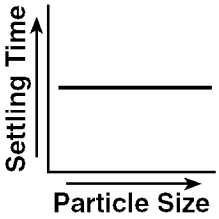
B)


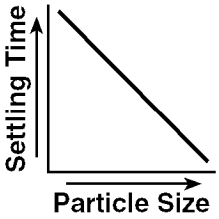
D)

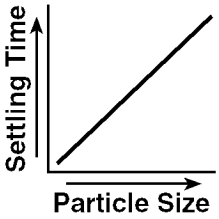

43) Which type of weathering most likely is dominant in the area represented by the diagram?

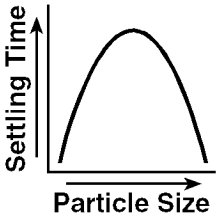
A) biologic activity
B) frost action
C) acid reactions
D) chemical reactions

44) In a soil sample, the particles have the same shape but different sizes. Which graph *best* represents the relationship between particle size and settling time when these particles are deposited in a quiet body of water?

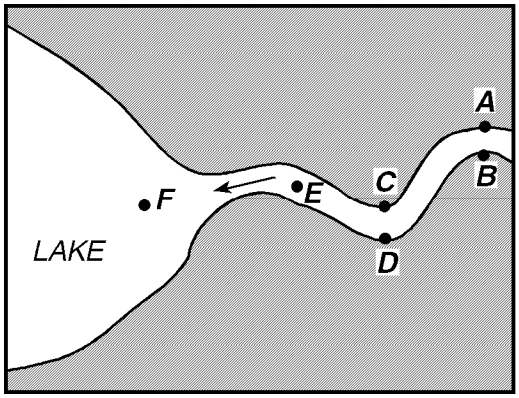
A)


B)


C)


D)


45) The map below represents a river as it enters a lake.



At which locations is the amount of deposition greater than the amount of erosion?

A) *A*, *C*, and *F*
B) *A*, *D*, and *F*
C) *B*, *D*, and *F*
D) *B*, *C*, and *F*

46) The chief agent of erosion on Earth is

A) running water
B) human beings
C) wind
D) glaciers

47) Which sediment is the *largest* that could be carried by a stream flowing at a velocity of 100 centimeters per second? [Refer to the *Earth Science Reference Tables*.]

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

48) A state of dynamic equilibrium exists in a stream when the

A) rate of stream flow is gradually increasing
B) rates of erosion and deposition are the same
C) rate of erosion is greater than the rate of deposition
D) rate of stream flow is gradually decreasing

49) The chart below shows the results of an activity in which three samples of copper (*A*, *B*, and *C*) of equal mass were timed as they settled to the bottom of a column of water.

SAMPLE A	SAMPLE B	SAMPLE C
13.10 sec	13.75 sec	13.50 sec

The differences in the settling time of the three samples are probably due to difference in their

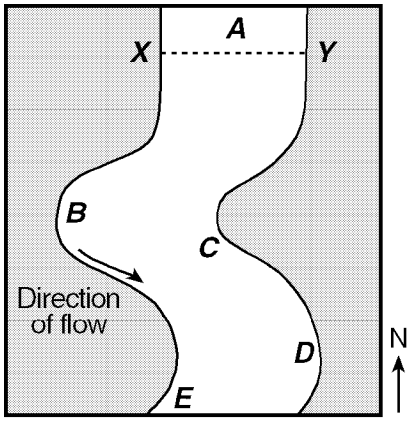
A) density
B) color
C) shape
D) composition

50) Which substance has the *greatest* effect on the rate of weathering of rock?

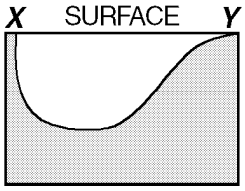
A) nitrogen
B) argon
C) hydrogen
D) water

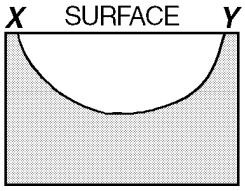
Questions 51 through 53 refer to the following:

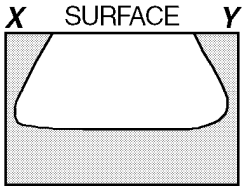
The map below shows a portion of a stream that flows southward. Letters *A* through *E* represent locations in the stream. Line *XY* is the location of a cross section.

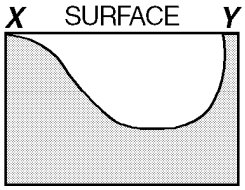


51) Which cross section along line *XY best* represents the shape of the stream bottom?

A)


B)


C)


D)


52) Where this stream's velocity decreases from 300 to 200 centimeters per second, which size sediment will be deposited?

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

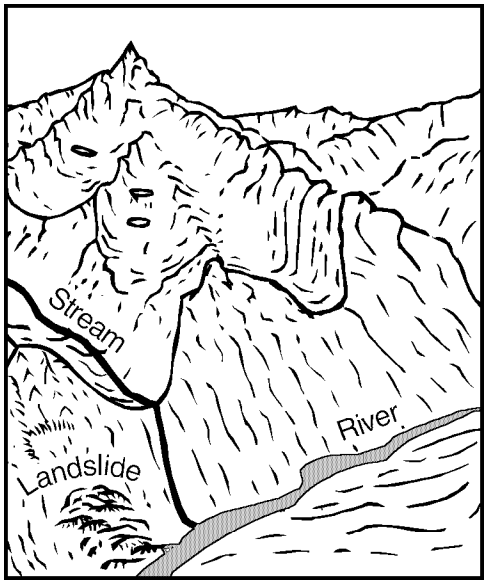
53) At which two locations in this stream is deposition normally dominant over erosion?

A) *A* and *D*
B) *D* and *C*
C) *C* and *E*
D) *B* and *E*

54) During a rainfall, surface runoff will probably be *greatest* in an area that has a

A) steep slope and a clay-covered surface
B) steep slope and a gravel-covered surface
C) gentle slope and a tree-covered surface
D) gentle slope and a grass-covered surface

55) The diagram below shows a glacial landscape.



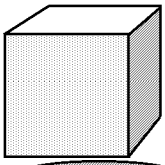
Which evidence suggests that ice created this landscape?

A) the landslide near the valley floor
B) sorted sediment on the valley floor
C) U-shaped valleys
D) many stream valleys

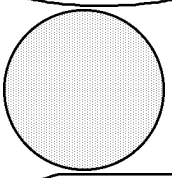
56) Four samples of aluminum, *A*, *B*, *C*, and *D*, have identical volumes and densities, but different shapes. Each piece is dropped into a long tube filled with water. The time each sample takes to settle to the bottom of the tube is shown in the table below.

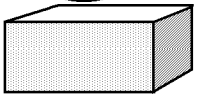
Sample	Time to Settle (sec)
A	2.5
B	3.7
C	4.0
D	5.2

Which diagram most likely represents the shape of sample *A*?

A) 

B) 

C) 

D) 

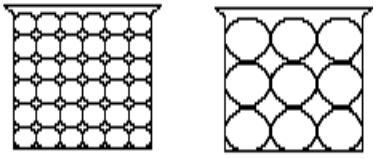
57) What is the slowest stream velocity necessary for a stream to carry the *smallest* boulders? [Refer to the *Earth Science Reference Tables*.]

A) 800 cm/sec
B) 100 cm/sec
C) 500 cm/sec
D) 300 cm/sec

58) Based on current trends in the climate of New York State, which erosional agent will be the most dominant during the next 20 years?

A) glaciers
B) streams
C) wind
D) ocean waves

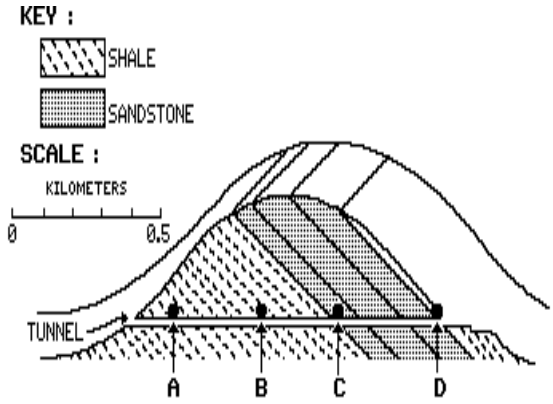
59) The diagrams below represent two identical containers filled with nonporous uniform particles. The containers represent models of two different sizes of soil particles.



Compared to the model containing larger particles, the model containing smaller particles has

A) greater permeability and greater porosity
B) less permeability and greater porosity
C) greater porosity and greater capillarity
D) less permeability and greater capillarity

60) The diagram below represents a cross-sectional view of a tunnel cut through a mountain. The area where the mountain is located receives heavy rainfall. If the shale layers are impermeable, at which point would the most water seep through the roof of the tunnel?



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

61) During the past 100 years, which erosional agent has been the most dominant in changing the landscape of New York State?

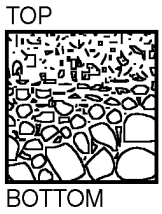
A) glacial erosion
B) wind erosion
C) stream erosion
D) wave erosion

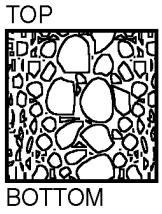
62) Which earth material covering the surface of a landfill would permit the *least* amount of rainwater to infiltrate the surface?

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

63) Which soil profile diagram *best* represents a deposit of sand and gravel left by a glacier?

A)


C)


B)


D)


64) The amount of surface runoff increases as

A) permeability increases
B) the infiltration rate decreases
C) porosity increases
D) the slope of the land decreases

65) According to the *Earth Science Reference Tables*, which stream velocity would transport cobbles, but would *not* transport boulders?

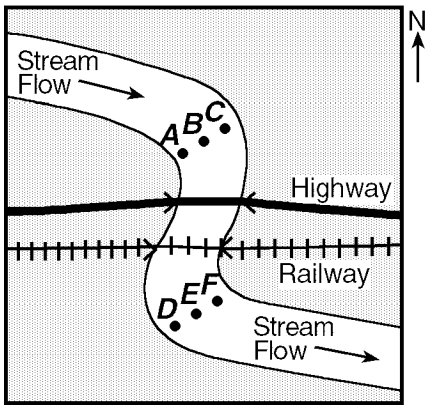
A) 100 cm/sec
B) 400 cm/sec
C) 50 cm/sec
D) 200 cm/sec

66) Which is the best example of physical weathering?

A) the reaction of limestone with acid rainwater
B) the formation of a sandbar along the side of a stream
C) the transportation of sediment in a stream
D) the cracking of rock caused by the freezing and thawing of water

Questions 67 through 69 refer to the following:

The map below represents a meandering stream with a constant gradient. The arrows show the direction of stream flow. Points *A* through *F* are locations in the stream.



67) At which point would the stream most likely be flowing *fastest*?

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

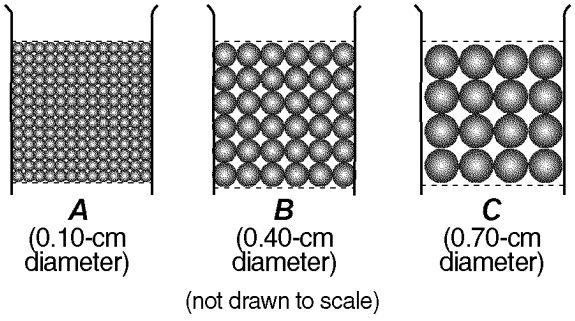
68) At which point would the most material be deposited by the stream?

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

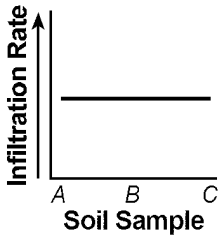
69) With which landscape feature would this meandering stream most likely be associated?

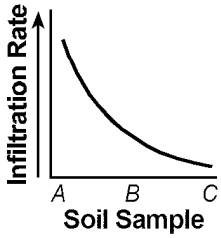
A) a gently sloping plain
B) a canyon
C) a large area of rapids
D) a mountainous area

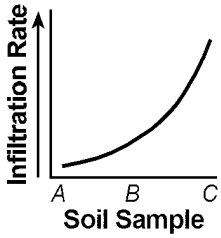
70) The diagrams below show the relative sizes of particles from soil samples *A*, *B*, and *C*. Equal volumes of each soil sample were placed in separate containers. Each container has a screen at the bottom. Water was poured through each sample to determine the infiltration rate.

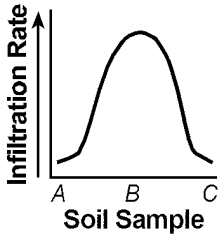


Which graph *best* shows how the infiltration rates of the three soil samples would compare?

A)


B)


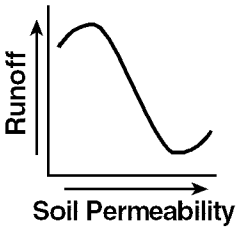
C)


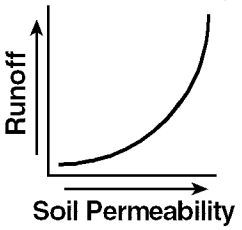
D)


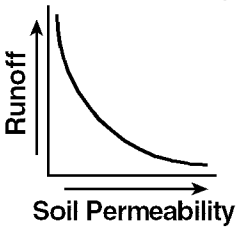
71) What is the maximum size particle that can be carried by a stream having a velocity of 250 centimeters per second?

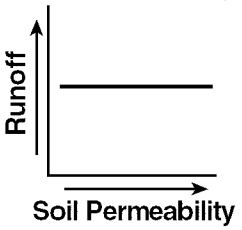
A) 0.01 cm
B) 0.0004 cm
C) 9.0 cm
D) 6.4 cm

72) Which graph shows the effect of soil permeability on the amount of runoff in an area?

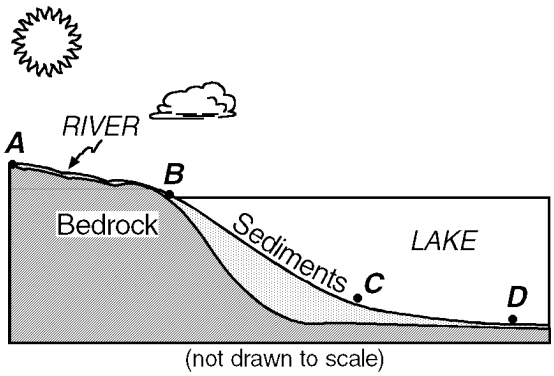
A)


B)


C)


D)


73) The diagram below represents a river flowing into a large lake on a hot, sunny afternoon in July in New York State. The river is carrying particles ranging in size from cobbles to clay.



Part of the shoreline at *B* is a beach consisting of sand. The rate of water infiltration into this sand is *best* described as

A) greater than that for clay
B) less than that for silt
C) less than that for mixed sediment sizes
D) greater than that for pebbles

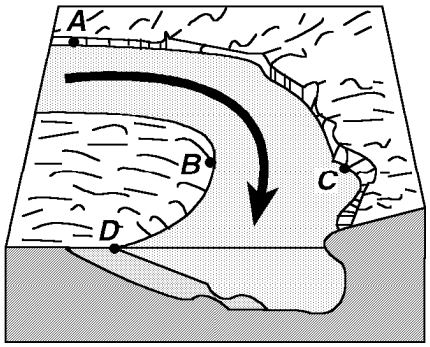
74) On a field trip 40 kilometers east of the Finger Lakes, students observed a boulder of gneiss on the surface bedrock. This observation *best* supports the inference that the

A) surface sedimentary bedrock melted and solidified to form a boulder of gneiss
B) gneiss boulder was transported from its original area of formation
C) gneiss boulder was formed from sediments that were compacted and cemented together
D) surface sedimentary bedrock was weathered to form a boulder of gneiss

75) The occurrence of parallel scratches on bedrock in a U-shaped valley indicates that the area has most likely been eroded by

A) a stream
B) waves
C) a glacier
D) wind

76) In the diagram below, the arrow shows the direction of stream flow around a bend.



At which point does the *greatest* stream erosion occur?

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

77) The table below shows the density of four mineral samples.

Mineral	Density (g/cm3)
Cinnabar	8.2
Magnetite	5.2
Quartz	2.7
Siderite	3.9

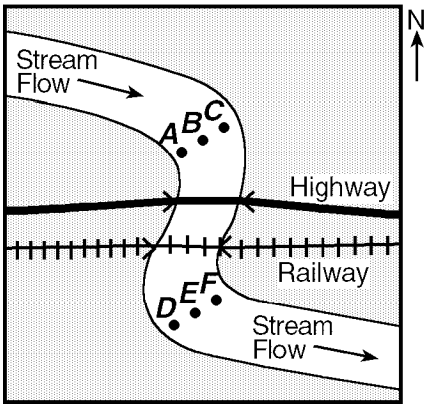
If the shape and size of the four mineral samples are the same, which mineral will settle most slowly in water?

A) magnetite
B) cinnabar
C) siderite
D) quartz

78) A glass sphere and a lead sphere have the same volume. Each sphere is dropped into a container of water. Which statement best explains why the lead sphere settles faster?

A) The lead sphere has a higher density.
B) The glass sphere has more surface area.
C) The glass sphere has a smoother surface.
D) The lead sphere takes up less space.

79) The map below represents a meandering stream with a constant gradient. The arrows show the direction of stream flow. Points *A* through *F* are locations in the stream.



Which sediment would usually be deposited by the stream *first*?

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

80) A low hill is composed of unsorted sediments that have mixed grain sizes. This hill was probably deposited by

A) a glacier
B) the wind
C) running water
D) wave action

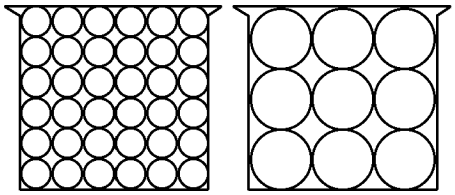
81) A landfill is most likely to directly pollute

A) water vapor over the landfill
B) precipitation about to fall on the landfill
C) ground water under the landfill
D) surface streams flowing to the landfill

82) The rate at which particles are deposited by a stream is *least* affected by the

A) size and shape of the particles
B) velocity of the stream
C) stream's elevation above sea level
D) density of the particles

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

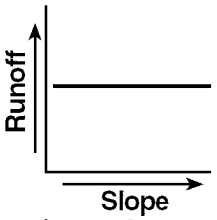
84) During a rainstorm, when is surface runoff *least* likely to occur?

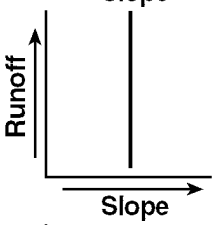
A) when the pore spaces of the ground are saturated with water
B) when the permeability rate of the soil equals the rainfall rate
C) when the slope of the surface is too great for infiltration to occur
D) when the rainfall rate exceeds the permeability rate of the soil

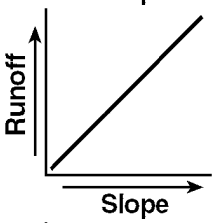
85) A pebble with a diameter of 5.0 centimeters is being rolled in a rapidly moving stream. The velocity of the pebble is most likely

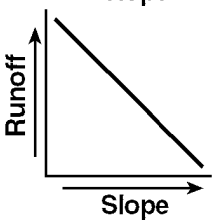
A) greater than the velocity of the stream
B) the same as the velocity of the stream
C) less than the velocity of the stream

86) Which graph *best* illustrates the relationship between the slope of the land and the amount of surface runoff?

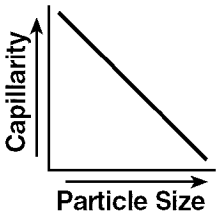
A)


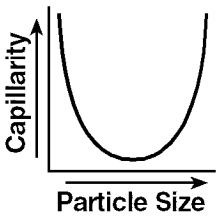
B)


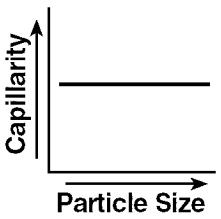
C)


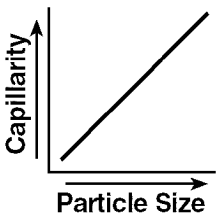
D)


87) Which graph *best* represents the relationship between the particle size and the capillarity of a sample of soil?

A)


B)


C)


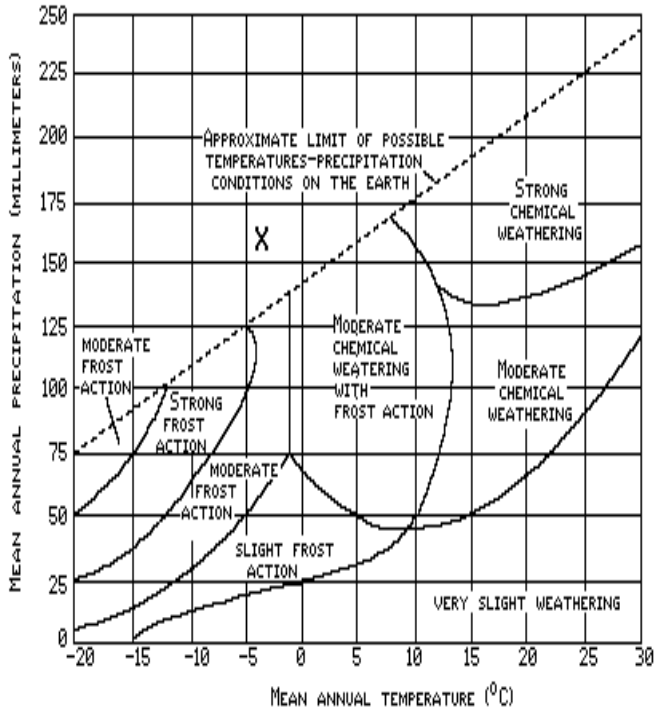
D)


88) The velocity of a stream is 100 centimeters per second. According to the *Earth Science Reference Tables*, what is the *largest* diameter particle that can be transported?

A) 0.0001 cm
B) 0.01 cm
C) 0.1 cm
D) 1.0 cm

Questions 89 through 93 refer to the following:

The diagram below represents the dominant type of weathering for various climatic conditions.



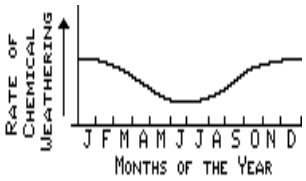
89) Which climatic conditions would produce very slight weathering?

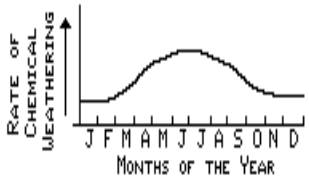
A) a mean annual temperature of -5°C and a mean annual precipitation of 50 mm
B) a mean annual temperature of 15°C and a mean annual precipitation of 25 mm
C) a mean annual temperature of 5°C and a mean annual precipitation of 50 mm
D) a mean annual temperature of 25°C and a mean annual precipitation of 100 mm

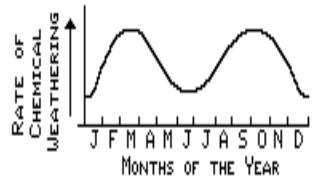
90) There is no particular type of weathering or frost action given for the temperature and precipitation values at the location represented by the letter *X*. Why is this the case?

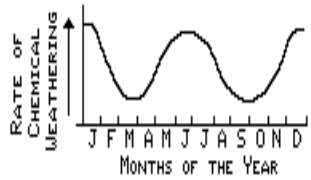
A) These conditions create both strong frost action and strong chemical weathering.
B) These conditions probably do not occur on the Earth.
C) Only chemical weathering would occur under these conditions.
D) Only frost action would occur under these conditions.

91) Assume that the rate of precipitation throughout the year is a constant. Which graph would most probably represent the chemical weathering of most New York State bedrock?

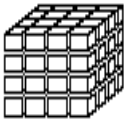
A)


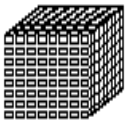
B)


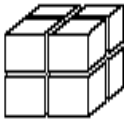
C)


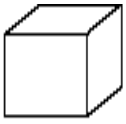
D)


92) Four samples of the same material with identical composition and mass were cut as shown in the diagrams below. When subjected to the same chemical weathering, which sample will weather at the fastest rate?

A)


C)


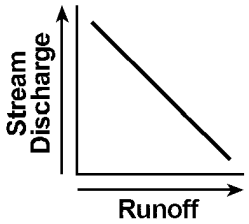
B)


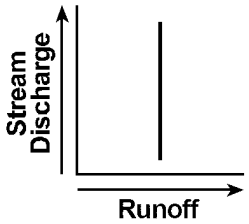
D)


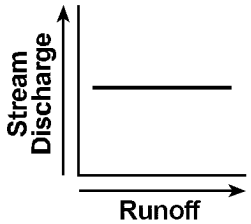
93) Why is no frost action shown for locations with a mean annual temperature greater than 13°C?

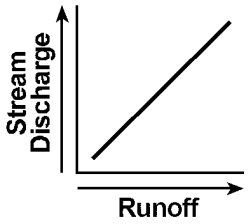
A) Large amounts of precipitation fall at these locations.
B) Large amounts of evaporation takes place at these locations.
C) Very little precipitation falls at these locations.
D) Very little freezing takes place in these locations.

94) Which graph *best* represents the relationship between surface-water runoff and stream discharge?

A)


B)


C)


D)


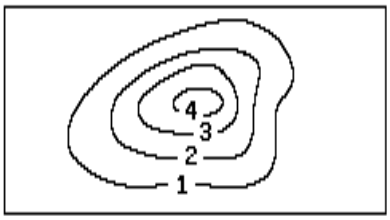
95) The data table below contains data taken at locations *A* through *E* in a stream. The volume of the stream is the same at all locations.

Location in the System	Average Velocity (cm/sec)	Elevation Above Sea Level (m)	Distance From Source (km)
A	10	640	10
B	130	570	20
C	210	200	80
D	100	100	130
E	70	40	200

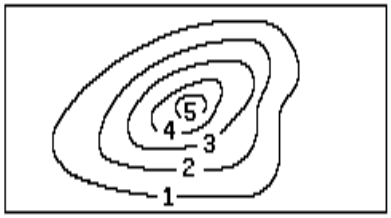
According to the *Earth Science Reference Tables*, which sediments transported by the stream at location could *not* be transported by the stream at location *D*?

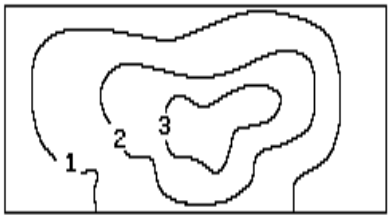
A) silt
B) cobbles
C) clay
D) sand

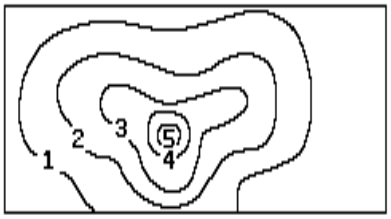
96) The map below shows the elevation field for a 30-by-50-meter section of a parking lot on which a large pile of sand has been dumped. The isolines show the height of the sand above the surface of the parking lot in meters.

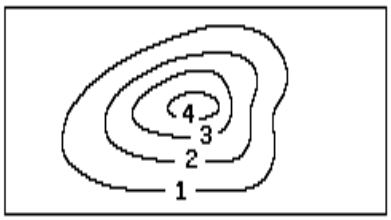


Which map represents the most likely elevation field for the same area after several heavy rainstorms?

A)


B)


C)


D)


97) Water can infiltrate loose soil when the soil is

A) saturated and permeable
B) unsaturated and impermeable
C) saturated and impermeable
D) unsaturated and permeable

98) The greatest mass of rock material is transported to the Earth's oceans by

A) glaciers
B) extraterrestrial events
C) wind
D) rivers

99) Surface runoff will generally be *greatest* when the

A) infiltration rate is greater than the rainfall rate
B) ground is permeable and unsaturated
C) rainfall is light and the ground is permeable
D) slope of the land is too great to permit infiltration

100) When rainfall exceeds the rate of permeability for saturated soil, the most likely result will be

A) soil moisture deficit
B) soil moisture utilization
C) infiltration
D) surface runoff

101) In which type of climate would the rate of chemical weathering be *greatest*?

A) warm and dry
B) cold and moist
C) warm and moist
D) cold and dry

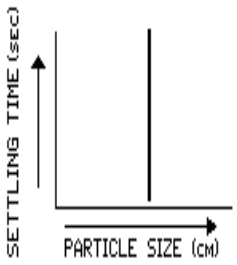
102) Which substance found in a soil sample collected in an arid region would most likely be absent in a soil sample collected in a humid region?

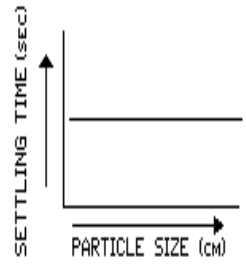
A) quartz
B) rock salt
C) obsidian
D) pyroxene

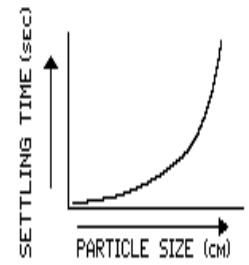
103) Water will infiltrate surface material if the material is

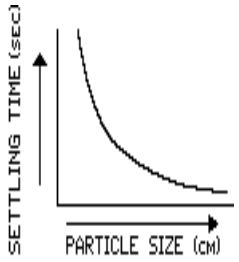
A) permeable and saturated
B) impermeable and saturated
C) permeable and unsaturated
D) impermeable and unsaturated

104) A sample of rounded quartz sediments of different particle sizes is dropped into a container of water. Which graph best shows the settling time for these particles?

A)


B)


C)


D)


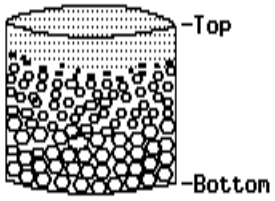
105) The particles in a sand dune deposit are small and very well-sorted and have surface pits that give them a frosted appearance. This deposit most likely was transported by

A) ocean currents
B) glacial ice
C) gravity
D) wind

106) The chemical composition of a residual soil in a certain area is determined by the

A) slope of the land and the particle size of the soil
B) minerals in the bedrock beneath the soil and the climate of the area
C) method by which the soil was transported to the area
D) length of time since the last crustal movement in the area occurred

107) The diagram below represents a core sample of a sedimentary deposit found at a particular location. The deposition most likely occurred as a result of



A) dropping directly from a glacier
B) dropping of weathered rock fragments from a cliff
C) an avalanche on a mountainside
D) a decrease in the velocity of a stream

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

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

109) The velocity of a stream is decreasing. As the velocity approaches zero, which size particle will most likely remain in suspension?

A) pebble
B) boulder
C) sand
D) clay

110) Which is the best evidence that erosion has occurred?

A) a layer of basalt found on the floor of the ocean
B) a soil rich in lime on top of a limestone bedrock
C) sediments found in a sandbar of a river
D) a large number of fossils embedded in limestone

111) In general, the probability of flooding decreases when there is an increase in the amount of

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

112) Which erosional force acts alone to produce avalanches and landslides?

A) winds
B) running water
C) sea waves
D) gravity

113) The data table below gives information about four samples of limestone particles. Each sample has a total mass of 1 kilogram. The particles in each sample are of uniform diameter.

DATA TABLE:

Sample	Particle Diameter (cm)
A	2.20
B	0.40
C	0.20
D	0.10

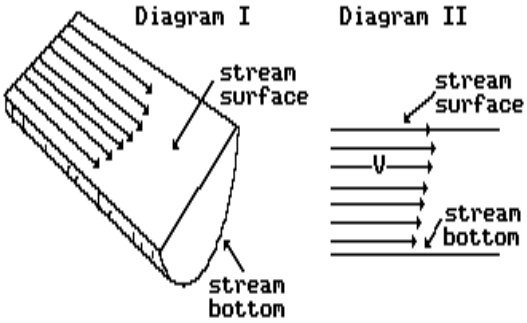
Which sample would dissolve at the *fastest* rate when placed in a container of dilute hydrochloric acid?

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

114) Which particles are the last to settle as a river's velocity decreases?

A) rounded sand particles
B) rounded silt particles
C) flattened pebbles
D) flattened clay particles

115) In the two diagrams below, the length of the arrows represents the relative velocities of stream flow at various places in a stream. Diagram *I* shows the different water velocities across the surface. Diagram *II* shows the different water velocities at various depths.



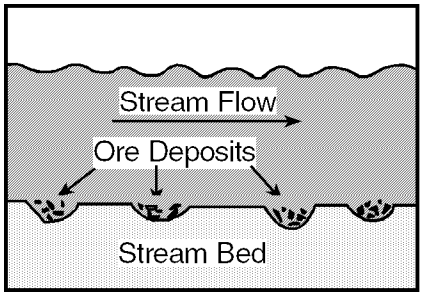
At which location in the stream is the water velocity *greatest*?

A) at the center near the surface
B) at the sides near the surface
C) at the center along the bottom
D) at the sides along the bottom

116) In which area will surface runoff most likely be *greatest* during a heavy rainfall?

A) sandy desert
B) wooded forest
C) paved city street
D) level grassy field

117) The diagram below shows mineral ore sediments deposited in depressions on the bottom of a stream.



These deposits accumulated because the

A) stream velocity increased
B) ore particles are more dense than other sediments
C) ore particles are smaller than other sediments
D) stream volume increased

118) An increase in the velocity of a stream is most likely due to

A) a decrease in the slope of the stream channel
B) a decrease in the amount of material held in suspension
C) an increase in stream discharge
D) an increase in the width of the riverbed

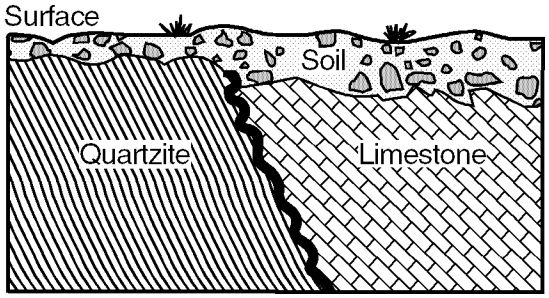
119) According to the *Earth Science Reference Tables*, which material would most likely be carried by a stream traveling at a rate of 40 centimeters per second?

A) boulders, cobbles, and pebbles
B) clay, only
C) boulders, only
D) sand, silt, and clay

120) Which set of conditions would produce the *most* runoff of precipitation?

A) gentle slope and impermeable surface
B) steep slope and impermeable surface
C) steep slope and permeable surface
D) gentle slope and permeable surface

121) The cross section below shows residual soils that developed on rock outcrops of metamorphic quartzite and sedimentary limestone.



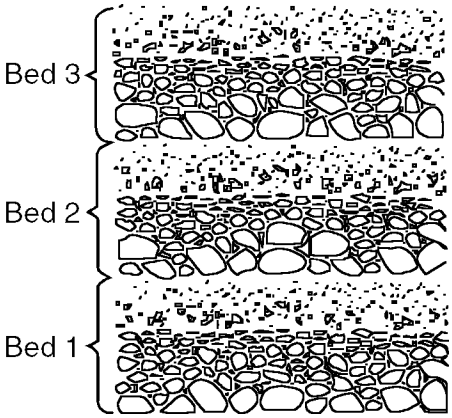
Which statement *best* explains why the soil is thicker above the limestone than it is above the quartzite?

A) The quartzite is older than the limestone.
B) The quartzite formed from molten magma.
C) The limestone is thicker than the quartzite.
D) The limestone is less resistant to weathering than the quartzite.

122) When minerals are dissolved, how are the resulting ions carried by rivers?

A) by precipitation
B) in suspension
C) in solution
D) by tumbling and rolling

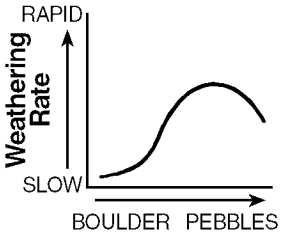
123) The diagram below shows three beds of sediment deposited at different times in a quiet body of water.

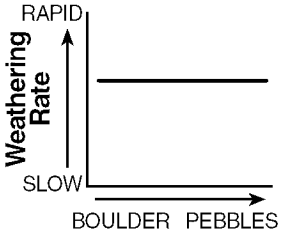


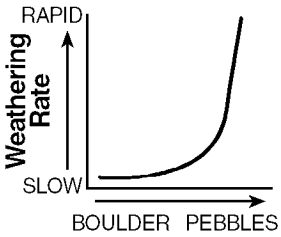
The sediment deposited in each bed is *best* described as

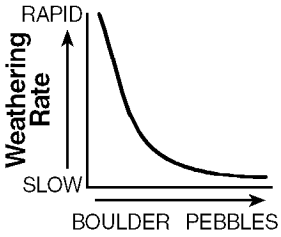
A) sorted mainly according to particle size
B) showing no evidence of sorting
C) sorted mainly according to particle shape
D) a mixture of sorted and unsorted particles

124) Which graph *best* represents the chemical weathering rate of a limestone boulder as the boulder is broken into pebble-sized particles?

A)


B)


C)


D)


125) In summer, a small stream has a depth of 3 meters and a velocity of 0.5 meter per second. In spring, the same stream has a depth of 5 meters. The velocity of the stream in spring is most likely *closest* to

A) 0.5 m/sec
B) 0.2 m/sec
C) 0.1 m/sec
D) 0.8 m/sec

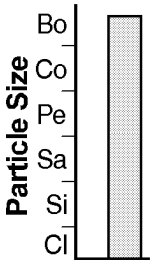
126) Surface runoff is most likely to occur when

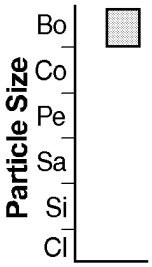
A) the land is flat
B) the soil is unsaturated
C) little capillary action occurs
D) rainfall exceeds the permeability rate

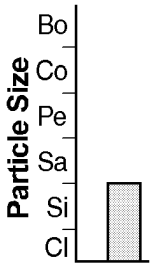
127) Which graph *best* represents the range of particle sizes that can be carried by a glacier?

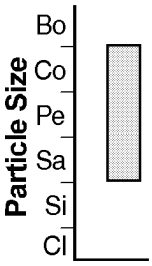
KEY:

Cl = clay	Sa = sand	Co = cobbles
Si = silt	Pe = pebbles	Bo = boulders

A)


C)


B)


D)


128) According to the *Earth Science Reference Tables*, a stream flowing at a velocity of 100 centimeters per second can transport

A) silt and sand, but not pebbles or cobbles
B) silt, but not sand, pebbles, or cobbles
C) silt, sand, and pebbles, but not cobbles
D) silt, sand, pebbles, and cobbles

129) The *best* evidence that erosion has taken place would be provided by

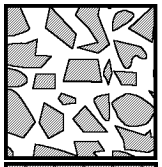
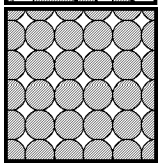
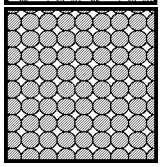
A) tilted rock layers observed on a mountain
B) sediment observed at the bottom of a cliff
C) deep residual soil observed on a hillside
D) faulted rock layers observed on a plateau

130) Based on the diagrams of rock fragments below, which shows the *least* evidence in erosion?

A) 
C) 
B) 
D) 

131) Which diagram represents the soil with the *greatest* permeability?

KEY:
Soil particles
Pore space (air)

A) 
C) 
B) 
D) 

132) What are the *largest* particles that a stream can transport when its velocity is 200 centimeters per second?

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

133) Landscapes will undergo the *most* chemical weathering if the climate is

A) cool and dry
B) cool and wet
C) warm and wet
D) warm and dry

134) The long, sandy islands along the south shore of Long Island are composed mostly of sand and rounded pebbles arranged in sorted layers. The agent of erosion that most likely shaped and sorted the sand and pebbles while transporting them to their island location was

A) glaciers
B) landslides
C) wind
D) ocean waves

135) Stream *A* has a steeper slope than stream *B*. However, the average water velocity of stream *B* is greater than that of stream *A*. Which is the most reasonable explanation for this?

A) Stream *B* has a curved streambed.
B) Stream *B* has more friction to overcome along its banks.
C) Stream *B* has a greater volume of water.
D) Stream *B* has a higher average temperature.

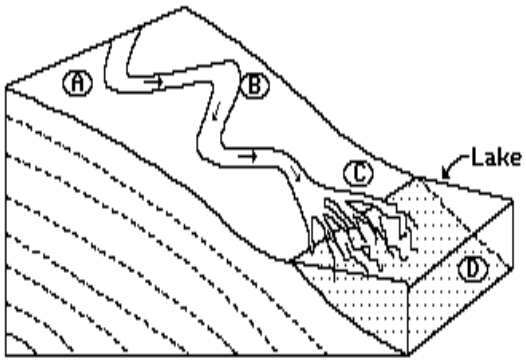
136) The four particles shown in the table below are of equal volume and are dropped into a column filled with water.

Particle	Shape	Density
A	flat	2.5 g/cm^3
B	flat	3.0 g/cm^3
C	round	2.5 g/cm^3
D	round	3.0 g/cm^3

Which particle would usually settle most rapidly?

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

137) The diagram below represents a stream flowing into a lake. Identical particles are at positions *A*, *B*, *C*, and *D*. At which location do the particles have the *least* amount of combined potential and kinetic energy?



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

138) Which factor has the *least* effect on the weathering of a rock?

A) the number of fossils found in the rock
B) climatic conditions
C) exposure of the rock to the atmosphere
D) composition of the rock

139) Which condition is most likely to cause surface runoff during a rainstorm?

A) The porosity of the soil is greater than the amount of rainfall.
B) The permeability of the soil is greater than the rate of rainfall.
C) The surface slope allows for maximum infiltration.
D) The surface soil is saturated.

140) Which characteristic exists at an erosional-depositional interface in a stream where equilibrium occurs?

A) The composition of the sediments deposited is the same as the composition of the sediments eroded.
B) The rate of deposition equals the rate of erosion.
C) The downstream profile is the same as the across-stream profile.
D) The volume of streamflow equals the volume of deposition.

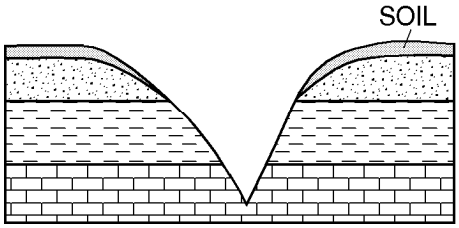
141) How are dissolved materials carried in a river?

A) in suspension
B) by precipitation
C) by bouncing and rolling
D) in solution

142) Waves that erode the shore of Lake Ontario are caused primarily by

A) winds blowing over the lake surface
B) the rotation of the Earth
C) density variations within the lake
D) differences in temperature of the lake water along the shore

143) The cross section below shows a V-shaped valley and the bedrock beneath the valley.



Which agent of erosion is responsible for cutting *most* V-shaped valleys into bedrock?

A) glacial ice
B) surface winds
C) running water
D) ocean waves

144) When the soil is saturated in a gently sloping area, any additional rainfall in the area will most likely

A) become ground water
B) become surface runoff
C) cause a moisture deficit
D) cause a higher potential evapotranspiration

145) A deposit of rock particles that are angular, scratched, and unsorted has most likely been transported and deposited by

A) wind
B) ocean waves
C) running water
D) a glacier

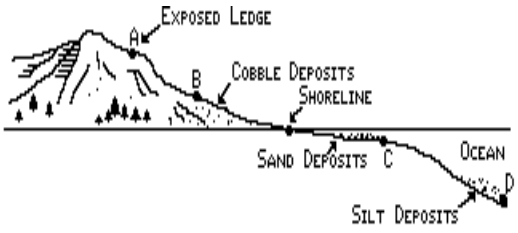
146) When rainfall occurs, the water will most likely become surface runoff if the surface of the soil is

A) covered with trees
B) highly permeable
C) steeply sloped
D) loose and sandy

147) Which change would cause the topsoil in New York State to increase in thickness?

A) an increase in slope
B) an increase in biological activity
C) a decrease in rainfall
D) a decrease in air temperature

148) In the diagram below, those features represented at *A*, *B*, *C*, and *D* are being formed. At which location is erosion greater than deposition?

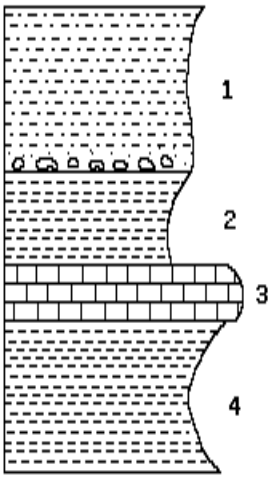


A) *A*
B) *B*
C) *D*
D) *C*

149) When small particles settle through water faster than large particles, the small particles are probably

A) flatter
B) better sorted
C) lighter
D) more dense

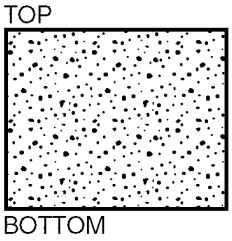
150) The diagram below represents a sedimentary rock outcrop.

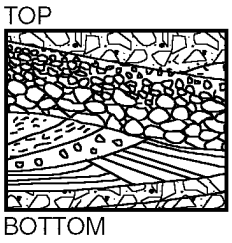


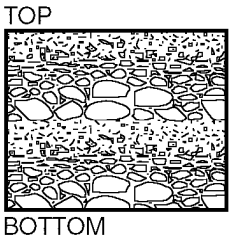
Which rock layer is the most resistant to weathering?

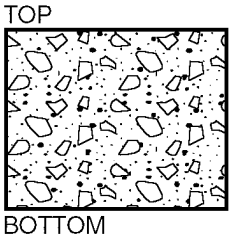
A) 4
B) 3
C) 1
D) 2

151) Which soil profile diagram *best* represents a deposit formed by a stream that repeatedly changed its direction of flow?

A)


B)


C)


D)


152) Particles of soil often differ greatly from the underlying bedrock in color, mineral composition, and organic content. Which conclusion about these soil particles is best made from this evidence?

A) They are soluble in water.
B) They are residual-sediments.
C) They are uniformly large-grained.
D) They are transported sediments.

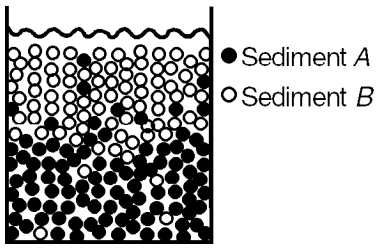
153) What is the source of most of the water vapor that enters the atmosphere?

A) soil
B) plants
C) lakes
D) oceans

154) Which landscape features are primarily the result of wind erosion and deposition?

A) terraces of gravel containing unsorted layers of sediment
B) U-shaped valleys containing unsorted layers of sediment
C) cross-bedded sand deposits containing finely sorted layers of sediment
D) V-shaped valleys containing well-sorted layers of sediment

155) Particles of sediment *A* and sediment *B* were mixed in a container of water. They settled in the pattern shown in the diagram below.



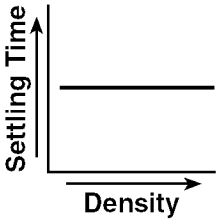
The pattern indicates that, compared to particles of sediment *B*, particles of sediment *A* have a

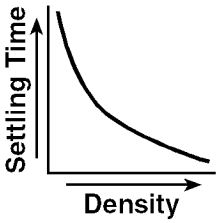
A) smaller volume
B) greater density
C) rougher texture
D) greater solubility

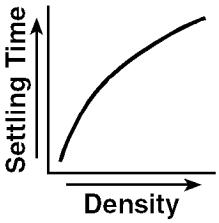
156) In which sediments is the capillary action of water *greatest*?

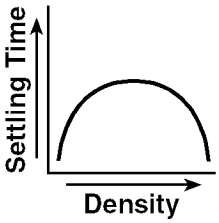
A) pebbles and cobbles
B) sand and pebbles
C) silt and sand
D) cobbles and boulders

157) Which graph shows the relationship between the density of particles and their settling time in still water? [Assume that the particles have the same size and shape.]

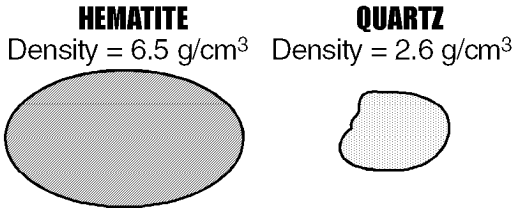
A) 

B) 

C) 

D) 

158) The two pebbles shown below are dropped into a tank of water 1 meter deep.



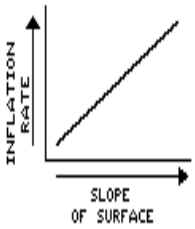
Why does the hematite pebble settle *faster* than the quartz pebble?

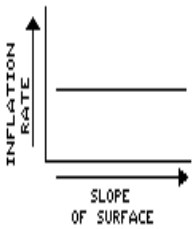
A) Objects with higher density settle faster than objects with lower density.
B) Flat objects settle faster than round objects.
C) Spherical objects have less gravitational attraction than flat objects.
D) Smaller objects settle faster than larger objects.

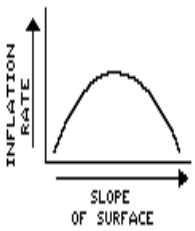
159) Most infiltration of precipitation will occur when the Earth's soil is

A) saturated and impermeable
B) saturated and permeable
C) unsaturated and permeable
D) unsaturated and impermeable

160) Which graph best represents the relationship between the surface slope of a dry, sandy soil and the infiltration rate of rain?

A) 

B) 

C) 

D) 

161) Which rock particles will remain suspended in water for the longest time?

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

162) Which is most important in determining the amount of ground water that can be stored within a rock?

A) the rock's color
B) the rock's hardness
C) the rock's geologic age
D) the rock's porosity

163) Where is the most deposition likely to occur?

A) at the mouth of a river, where it enters an ocean
B) on the side of a sand dune facing the wind
C) at a site where glacial ice scrapes bedrock
D) at the top of a steep slope in a streambed

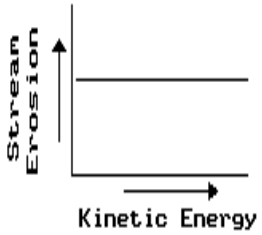
164) The upward movement of water through tiny spaces in soil or rock is called

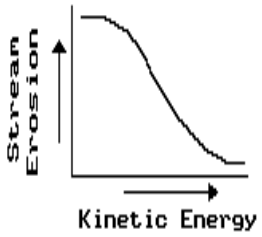
A) water retention
B) permeability
C) porosity
D) capillary action

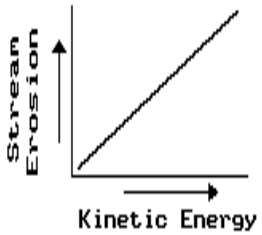
165) Solid bedrock is changed to soil primarily by the process of

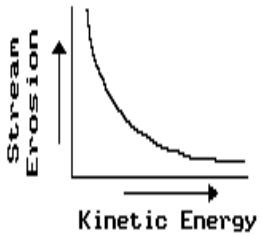
A) infiltration
B) weathering
C) erosion
D) transpiration

166) Which graph best represents the relationship between stream erosion and the kinetic energy of a stream?

A)


B)


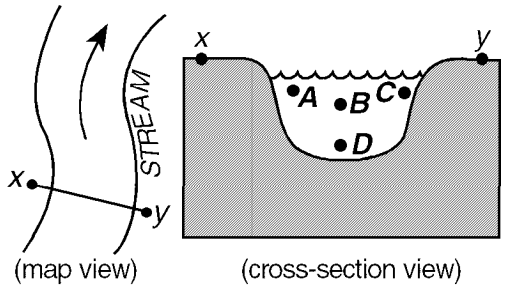
C)


D)


167) Which property of loose earth materials most likely increases as particle size decreases?

A) permeability
B) porosity
C) infiltration
D) capillarity

168) The diagrams below represent the map view of a stream and the cross section of the stream at line *XY*. Letters *A*, *B*, *C*, and *D* identify four locations within the stream.



At which location is the water moving *fastest*?

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

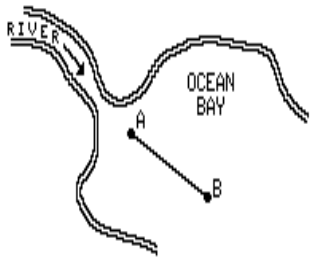
169) What will happen to the average elevation of an area if a state of dynamic equilibrium exists?

A) The average elevation will increase.
B) The average elevation will decrease.
C) The average elevation will stay the same.

170) Which erosional agent typically deposits hills of unsorted sediments?

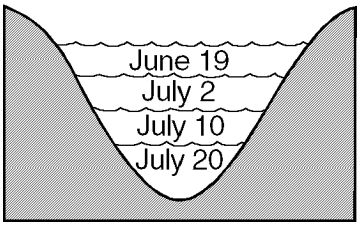
A) glaciers
B) winds
C) streams
D) ocean waves

171) The diagram below represents a top view of a river emptying into an ocean bay. *A-B* is a reference line along the bottom of the bay. Which characteristic would most likely decrease along the reference line from A to B?



A) the depth of the water
B) the amount of salt in solution
C) the size of the sediments
D) the density of the water

172) The diagram below shows the cross section of a stream channel and the height of the stream surface on various dates of the year.



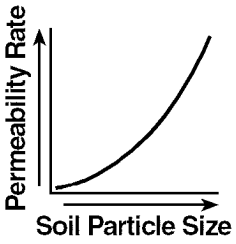
The stream's velocity from June 19 to July 20 at this section of the stream most likely

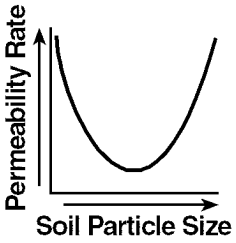
A) decreased, only
B) remained constant
C) increased, only
D) decreased, then increased

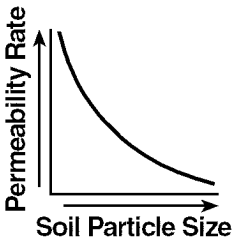
173) What change will a pebble usually undergo when it is transported a great distance by streams?

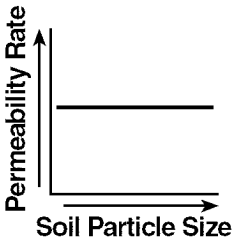
A) It will become jagged and its volume will increase.
B) It will become rounded and its volume will decrease.
C) It will become jagged and its mass will decrease.
D) It will become rounded and its mass will increase.

174) Which graph *best* represents the general relationship between soil particle size and the permeability rate of infiltrating rainwater?

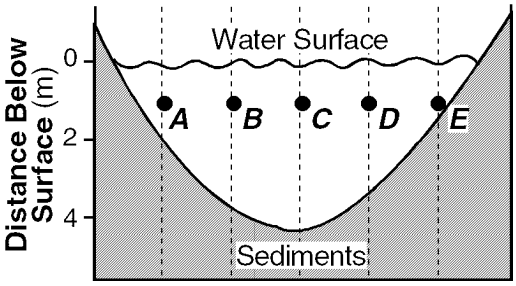
A)


B)


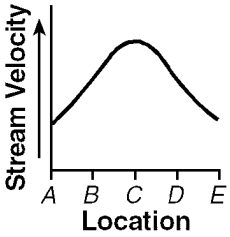
C)


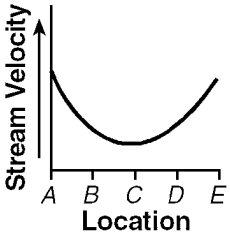
D)


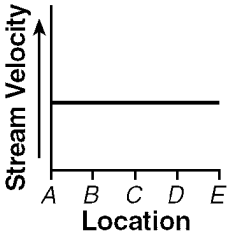
175) The diagram below represents a cross section of a stream. Points *A*, *B*, *C*, *D,* and *E* are locations within the stream channel.

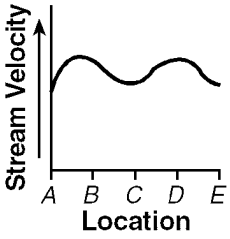


Which graph *best* represents stream velocity at locations *A* through *E*?

A)


B)


C)


D)


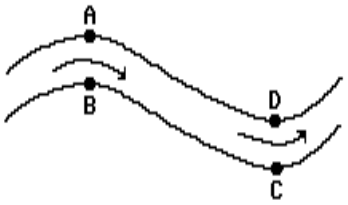
176) As a particle of sediment in a stream breaks into several smaller pieces, the rate of weathering of the sediment will

A) decrease due to an increase in surface area
B) increase due to an increase in surface area
C) decrease due to a decrease in surface area
D) increase due to a decrease in surface area

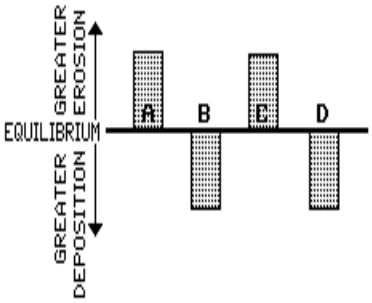
177) The direct cause of ground water supplies becoming unfit for human use is usually

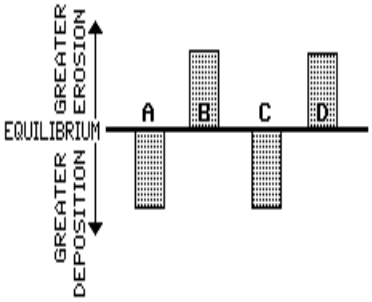
A) very heavy precipitation
B) excessive surface runoff
C) an uncontrollable moisture deficit
D) contamination of the saturated zone

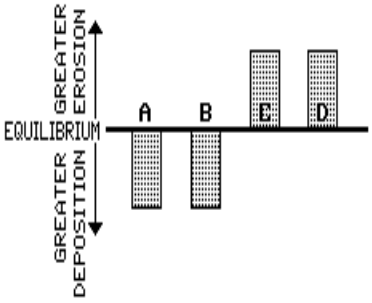
178) The diagram below represents a stream flowing in the direction indicated by the arrows.

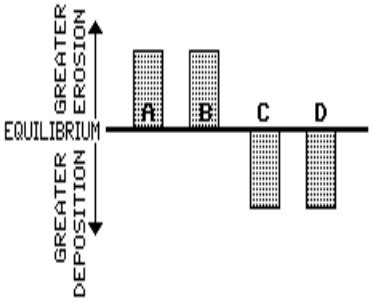


Which bar graph best represents the relative amounts of erosion and deposition at locations *A*, *B*, *C*, and *D* in the streambed?

A)


B)


C)


D)


179) As the temperature of the soil decreases from 10DC to -5DC, the infiltration rate of ground water through this soil will most likely

A) remain the same
B) decrease
C) increase

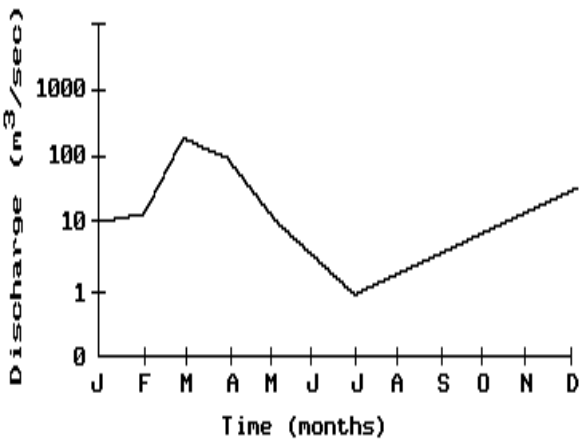
180) What is the minimum stream velocity needed to maintain transport of a pebble that is 1 centimeter in diameter? [Refer to the *Earth Science Reference Tables*.]

A) 23 cm/sec
B) 50 cm/sec
C) 75 cm/sec
D) 100 cm/sec

181) A stream with a water velocity of 150 centimeters per second decreases to a velocity of 100 centimeters per second. Which sediment size will most likely be deposited?

A) cobbles
B) pebbles
C) boulders
D) sand

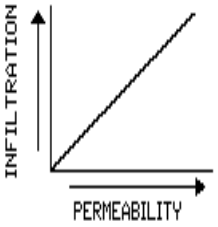
182) The graph below represents the relationship between the time of year and the average monthly discharge of a stream located in New York State.

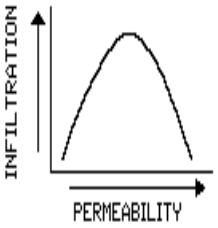


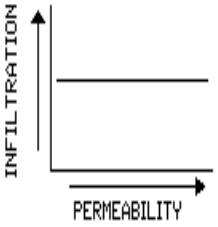
According to the graph, when will maximum surface runoff occur?

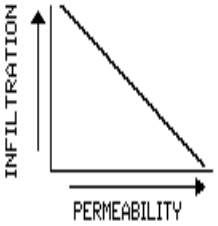
A) April through June
B) February through April
C) June through August
D) October through December

183) Which graph best represents the relationship between soil permeability rate and infiltration when all other conditions are the same?

A)


B)


C)


D)


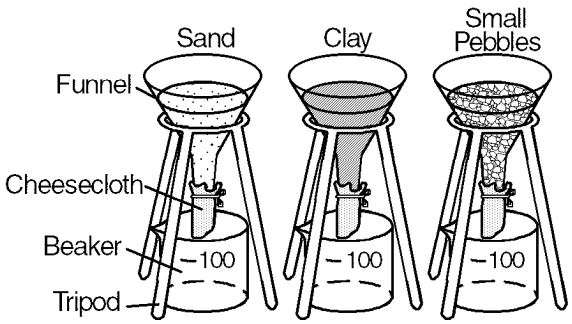
184) In which climate would chemical weathering occur at the *greatest* rate?

A) warm and dry
B) cold and humid
C) cold and dry
D) warm and humid

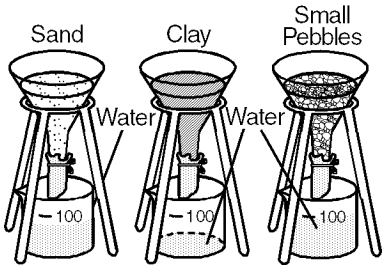
185) What is the minimum rate of flow at which a stream can maintain transport of boulders?

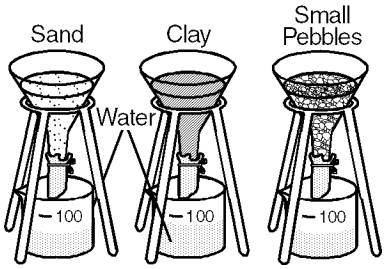
A) 200 cm/sec
B) 300 cm/sec
C) 400 cm/sec
D) 100 cm/sec

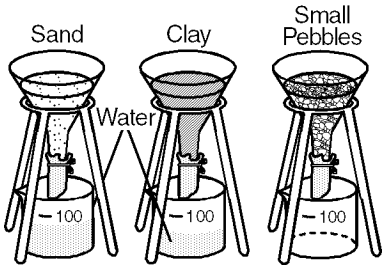
186) The diagram below shows equal volumes of loosely packed sand, clay, and small pebbles placed in identical funnels. The soils are dry, and the beakers are empty. A 100-milliliter sample of water is poured into each funnel at the same time and allowed to seep through for 15 minutes.



Which diagram *best* shows the amount of water that passes through each funnel into the beakers?

A)


B)


C)


187) Runoff is usually greater than infiltration when the

A) temperature is high
B) soil is porous
C) slope is steep
D) rainfall is low

188) Through which sediment does water infiltrate most slowly? [Refer to the *Earth Science Reference Tables*.]

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

189) Large igneous boulders have been found on surface sedimentary bedrock in Syracuse, New York. Which statement *best* explains the presence of these boulders?

A) The area was once part of a large mountain range.
B) The area has had recent volcanic activity.
C) Boulders were transported to the area by ice.
D) Sedimentary bedrock is composed of igneous boulders.

190) On the Earth's surface, transported materials are more common than residual materials. This condition is mainly the result of

A) folding
B) subduction
C) recrystallization
D) erosion

191) Which characteristic of a transported rock would be most helpful in determining its agent of erosion?

A) density
B) physical appearance
C) composition
D) age

192) Why does water move very slowly downward through clay soil?

A) Clay soil has very small particles.
B) Clay soil has large pore spaces.
C) Clay soil is composed of low-density minerals.
D) Clay soil is composed of very hard particles.

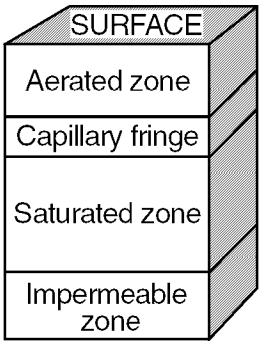
193) What is the approximate minimum water velocity needed to maintain movement of a sediment particle with a diameter of 5.0 centimeters?

A) 75 cm/sec
B) 100 cm/sec
C) 200 cm/sec
D) 150 cm/sec

194) In which type of climate does chemical weathering usually occur most rapidly?

A) cold and wet
B) hot and dry
C) hot and wet
D) cold and dry

195) The diagram below represents zones within soil and rock. The zones are determined by the kinds of movement or lack of movement of water occurring within them.



What is the deepest zone into which water can be pulled by gravity?

A) impermeable zone
B) saturated zone
C) aerated zone
D) capillary fringe

196) At high elevations in New York State, which is the most common form of physical weathering?

A) abrasion of rocks by the wind
B) alternate freezing and melting of water
C) oxidation by oxygen in the atmosphere
D) dissolving of minerals into solution

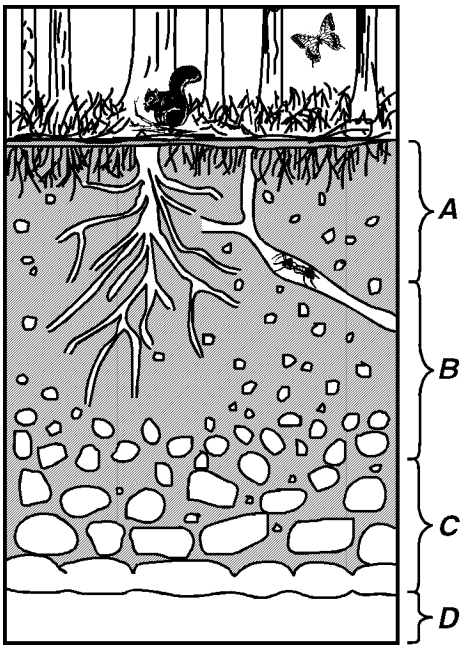
197) Immediately after a moderate rainfall, the stream discharge is greater from a stream that drains a clay soil area than from a stream that drains a sand-and-gravel soil area. This discharge differs because the clay soil is

A) less porous, and allows less runoff
B) more porous, and allows more runoff
C) more permeable, and allows less runoff
D) less permeable, and allows more runoff

198) A river transports material by suspension, rolling, and

A) transpiration
B) solution
C) sublimation
D) evaporation

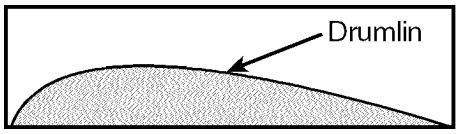
199) The diagram below shows a residual soil profile formed in an area of granite bedrock. Four different soil horizons, *A*, *B*, *C*, and *D*, are shown.



Which soil horizon contains the *greatest* amount of material formed by biological activity?

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

200) The diagram below represents a side view of a hill (drumlin) that was deposited by a glacier in central New York.



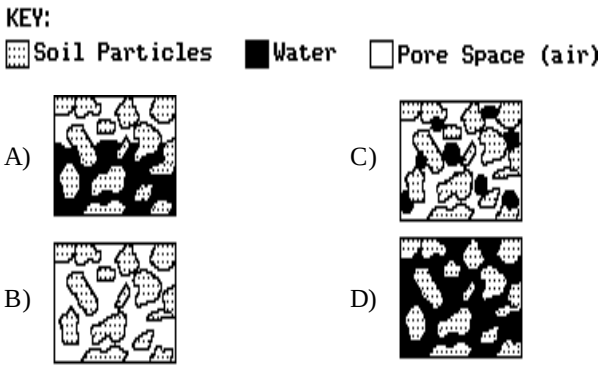
This hill is most likely composed of

A) cemented sediments
B) vertically layered sediments
C) horizontally layered sediments
D) unsorted sediments

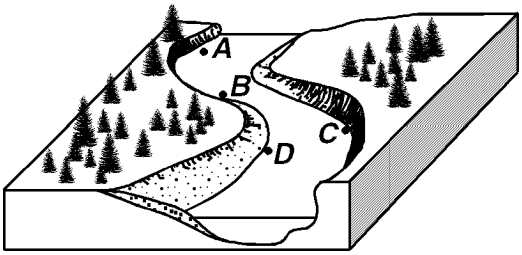
201) A state of dynamic equilibrium exists in an erosional-depositional system when

A) the rate of erosion is the same as the rate of deposition
B) all sediments are transported to the sea and erosion stops
C) the rate of erosion exceeds the rate of deposition
D) the amounts of kinetic energy and potential energy both equal zero

202) Which diagram best illustrates the condition of the soil below the water table?



203) The diagram below shows points *A*, *B*, *C*, and *D* on a meandering stream.



At which point is the amount of deposition more than the amount of erosion?

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

204) A large rock is broken into several smaller pieces. Compared to the rate of weathering of the large rock, the rate of weathering of the smaller pieces is

A) less
B) greater
C) the same

205) Apartment buildings and parking lots completely cover an area that was once an open, grass-covered field. What factor most likely increased because of this construction?

A) capillarity
B) the level of the local water table
C) infiltration into the ground
D) runoff

206) A landscape having which climate would be influenced by the fewest types of weathering and erosional agents?

A) humid tropical
B) glacial
C) arid
D) subarctic

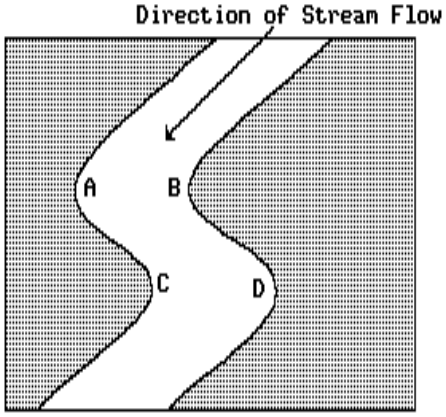
207) The data table below contains data taken at locations *A* through *E* in a stream. The volume of the stream is the same at all locations.

Location in the System	Average Velocity (cm/sec)	Elevation Above Sea Level (m)	Distance From Source (km)
A	10	640	10
B	130	570	20
C	210	200	80
D	100	100	130
E	70	40	200

The velocity of the stream at a particular location is controlled mainly by the

A) elevation of the stream at the location
B) slope of the streambed at the location
C) distance of the location from the source
D) amount of sediments carried at the location

208) The map below represents a view of a flowing stream. The letters identify locations in the stream near the interface between land and water. At which two locations is erosion due to flowing water likely to be *greatest*?



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

209) In which type of climate does the *greatest* amount of chemical weathering of rock occur?

A) cold and moist
B) warm and moist
C) warm and dry
D) cold and dry

210) Water is a major agent of chemical weathering because water

A) has the highest specific heat of all common earth materials
B) cools the surroundings when it evaporates
C) has a density of about one gram per cubic centimeter
D) dissolves many of the minerals that make up rocks

211) The bedrock at a certain location is deeply scratched, and in some places is covered by a layer of unsorted sediment. Which erosional agent was probably responsible for these features?

A) glaciers
B) ocean waves
C) wind
D) running water

Questions 212 through 214 refer to the following:

The notes below were written by a student during field trips to three different locations in New York State.

NOTES:

Location *A*

Good view from this hilltop; chilly and windy. We rested to catch our breath, then collected samples. Rocks are visible everywhere. There are boulders, cobbles, and pebbles of many sizes and shapes mixed together. These surface rock fragments are composed of metamorphic rock sitting on the limestone bedrock. The teacher showed us parallel scratches in the bedrock. I saw almost no soil.

Location *B*

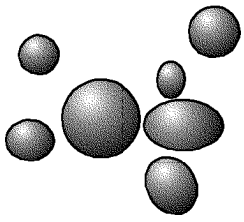
It is rocky and the stream-bank is steep. Where we are standing, we can see a waterfall and rapids. It is cool by the water. From the streambed we collected some pebbles and cobbles ‡‡ some red, some white, others a mixture of many colors. The streambed is full of rocks of all sizes. The teacher warned us to be careful of the strong stream current.

Location *C*

It is cool in the shade, and the rock cliff above us still has some ice on it from winter. The rocks we are sitting on have sharp edges. Rock fragments at the bottom of the cliff are the same color as the cliff. Our teacher warned us to watch out for falling rocks.

212) Explain how ice in cracks on the cliff at location *C* may have helped cause weathering of the bedrock on the face of the cliff.

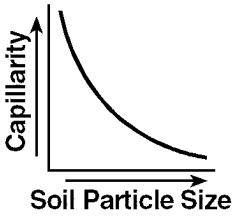
213) Some samples of sediment collected from the streambed at location *B* are shown below.

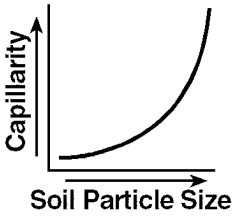


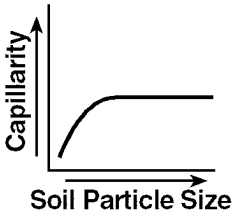
Explain why these samples are smooth and have rounded shapes.

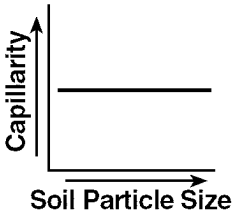
214) (a) State the agent of erosion that deposited most of the sediment found at location *A*.
(b) State *one* observation recorded by the student that supports this conclusion.

215) Which graph *best* represents the general relationship between soil particle size and capillarity?

A)


B)


C)


D)


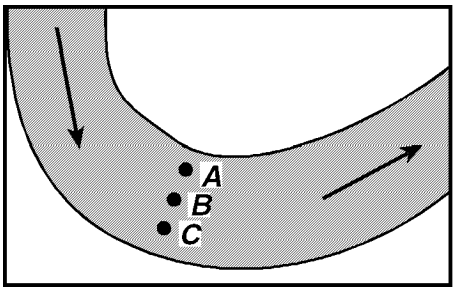
216) Which geologic feature is caused primarily by chemical weathering?

A) large caves in limestone bedrock
B) blocks of basalt at the base of a steep slope
C) a pattern of parallel cracks in a granite mountain
D) the smooth, polished surface of a rock in a dry, sandy area

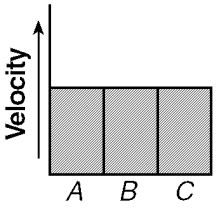
217) For which movement of earth materials is gravity *not* the main force?

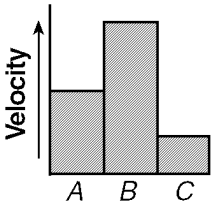
A) boulders carried by a glacier
B) moisture evaporating from an ocean
C) snow tumbling in an avalanche
D) sediments flowing in a river

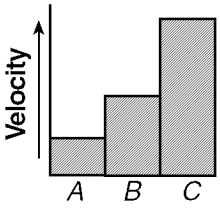
218) The map below represents a large stream meander (bend). The arrows show the direction of stream flow. Stream velocity was measured at surface locations *A*, *B*, and *C*.

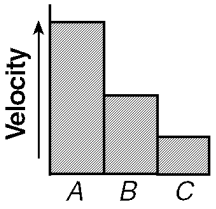


Which graph *best* represents the relative velocities of the stream at locations *A*, *B*, and *C*?

A)


B)


C)


D)


219) According to the *Earth Science Reference Tables*, which is the *largest* sediment that could be carried by a stream flowing at a velocity of 75 centimeters per second?

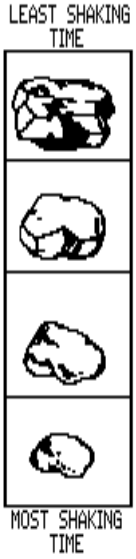
A) pebbles
B) silt
C) sand
D) cobbles

220) To investigate the effects of weathering on limestone rock chips, students placed rock chips of uniform size and shape in jars half-filled with water and shook them for different lengths of time. One rock chip was collected for each length of shaking time and these chips were arranged in a display. Which column shows the rock chips arranged from top to bottom in order of *least* to *most* shaking time?

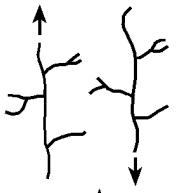
A)

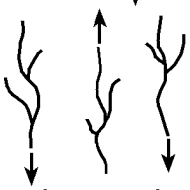

C)

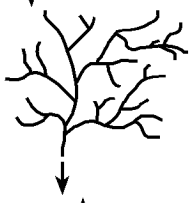

B)

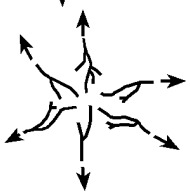

D)


221) Which stream-drainage pattern most likely developed on the surface of a newly formed volcanic mountain?

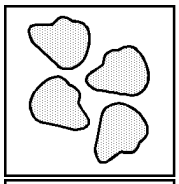
A) 

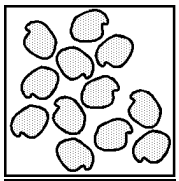
B) 

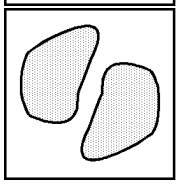
C) 

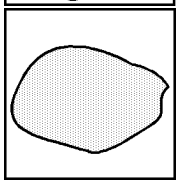
D) 

222) The four limestone samples illustrated below have the same composition, mass, and volume. Under the same climatic conditions, which sample will weather *fastest*?

A) 

C) 

B) 

D) 

223) Two streams begin at the same elevation and have equal volumes. Which statement *best* explains why one stream could be flowing faster than the other stream?

A) The faster stream has a temperature of 10DC, and the slower stream has a temperature of 20DC.
B) The faster stream has a much steeper gradient.
C) The streams are flowing in different directions.
D) The faster stream contains more dissolved minerals.

224) A stream is carrying sediment particles ranging from 0.0004 to 25.6 centimeters. According to the *Earth Science Reference Tables*, when the stream's velocity decreases from 300 to 100 centimeters per second, the stream will most probably deposit

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

225) During a heavy rainfall, runoff will be *greatest* on a soil that has an infiltration (permeability) rate of

A) 1.2 cm/sec
B) 0.1 cm/sec
C) 0.2 cm/sec
D) 0.3 cm/sec

226) Which condition would cause surface runoff to increase in a particular location?

A) having a decrease in the annual rainfall
B) planting grasses and shrubs on a hillside
C) reducing the gradient of a steep hill
D) covering a dirt road with pavement

227) Soil with the *lowest* porosity is composed of particles that are *all*

A) large and angular
B) large and rounded
C) small and rounded
D) different sizes and shapes

228) When rain falls on a soil surface, flooding at that location would most likely occur if the

A) soil surface is permeable
B) infiltration rate exceeds the precipitation rate
C) soil pore spaces are filled to capacity
D) soil surface is covered with vegetation

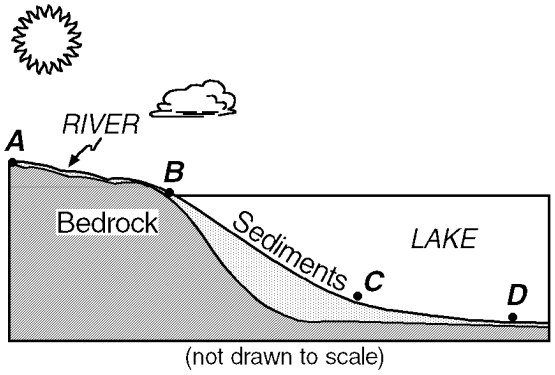
229) Water will enter the soil if the ground surface is

A) permeable and unsaturated
B) impermeable and saturated
C) impermeable and unsaturated
D) permeable and saturated

230) Rainfall is most likely to infiltrate into soil that is

A) impermeable and saturated
B) impermeable and unsaturated
C) permeable and unsaturated
D) permeable and saturated

231) The diagram below represents a river flowing into a large lake on a hot, sunny afternoon in July in New York State. The river is carrying particles ranging in size from cobbles to clay.



At which location would sediments have the most potential energy?

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

232) Glaciers often form parallel scratches and grooves in bedrock because glaciers

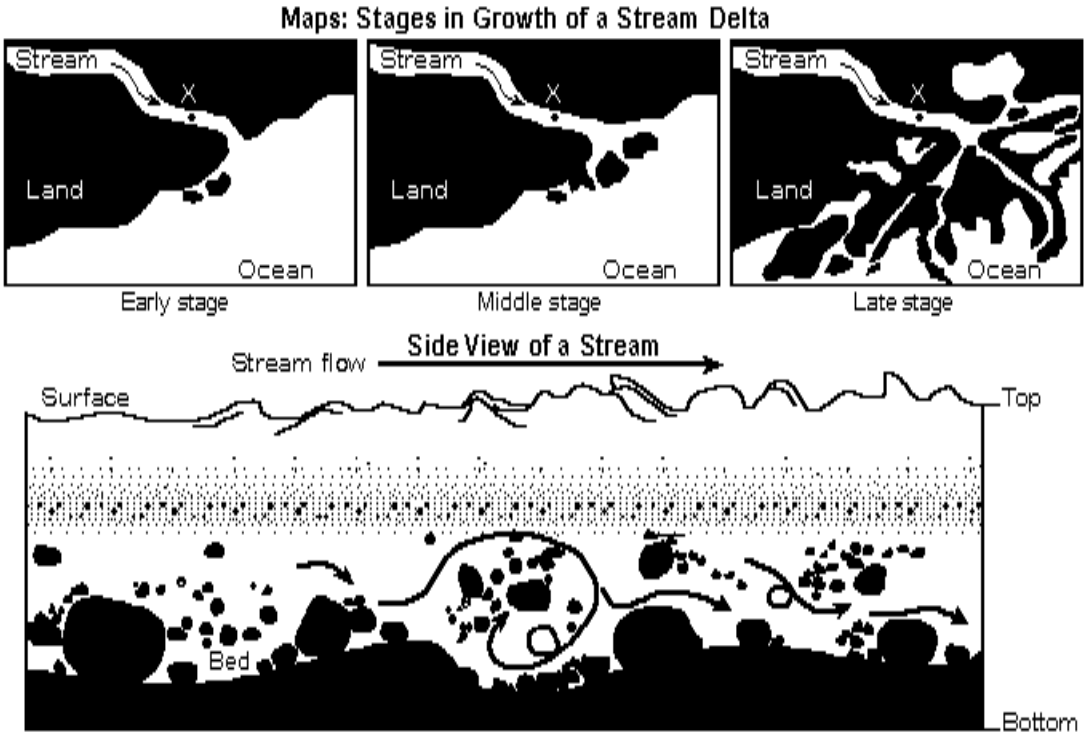
A) drag loose rocks over Earth's surface
B) deposit sediment in unsorted piles
C) deposit rounded sand in V-shaped valleys
D) continually melt and refreeze

233) Chemical weathering of rocks occurs most rapidly in a climate that is

A) hot and arid
B) cold and arid
C) cold and humid
D) hot and humid

Questions 234 through 238 refer to the following:

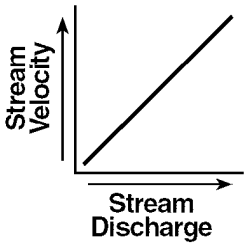
The maps below show the stages in the growth of a stream delta. Point *X* represents a location in the stream channel. The cross section of a stream shows rock particles transported in the stream at a point close to its source.

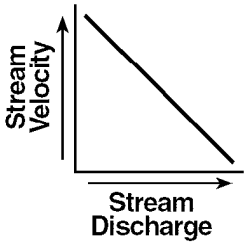


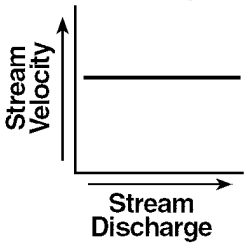
234) A decrease in the velocity of the stream at location *X* will usually cause an increase in

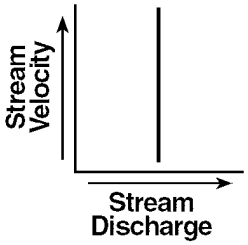
A) downcutting by the stream
B) the size of the particles carried by the stream
C) the amount of material carried by the stream
D) deposition within the stream channel

235) Which graph *best* illustrates the effect that changes in stream discharge have on stream velocity at location *X*?

A) 

B) 

C) 

D) 

236) Which characteristics are most likely shown by the sediments in the delta?

A) unsorted mixed sizes deposited in scattered piles
B) round grains deposited in layers
C) jagged fragments deposited in elongated hills
D) large cobbles deposited in parallel lines

237) The velocity of the stream at location *X* is controlled primarily by the

A) slope of the stream at location *X*
B) amount of sediment carried at location *X*
C) distance from location *X* to the stream source
D) temperature of the stream at location *X*

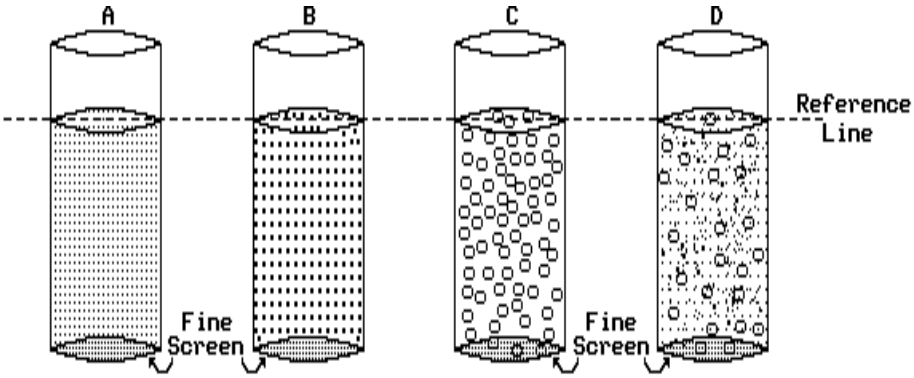
238) The rock materials transported in the stream are most likely transported by which methods?

A) in solution and in suspension, only
B) in suspension, only
C) in solution, only
D) in solution, in suspension, and by rolling

Questions 239 through 243 refer to the following:

The diagrams below which describe an investigation with soils.

Three similar tubes, each containing a specific soil of uniform particle size and shape were used to study the effect that different particle size has on porosity, capillarity, and permeability. A fourth tube containing soil which was a mixture of the same sizes found in the other tubes was also studied and its data are recorded in the table. [Assume that the soils were perfectly dry between each part of the investigation.]



Tube	Paricle Size (diameter in cm)	Porosity (%)	Capillarity (mm)	Permeability (sec)
A	Fine (0.025 cm)	40	20	14
B	Medium (0.1 cm)	40	15	8
C	Coarse (0.3 cm)	40	7	6
D	Mixed (0.025 to 0.3 cm)	20	12	20

239) A handful of material from tube *D* was dropped into a fifth tube filled with water only. In which order would the particle sizes of this soil probably settle in the tube from the bottom of the tube upward?

A) coarse on the bottom, then medium, then fine
B) fine on the bottom, then coarse, then medium
C) fine on the bottom, then medium, then coarse
D) coarse on the bottom, then fine, then medium

240) Each tube was placed in a shallow pan of water. In which tube did the water rise the highest?

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

241) When water was poured into the top of each tube at the same time, which tube allowed the water to pass through most quickly?

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

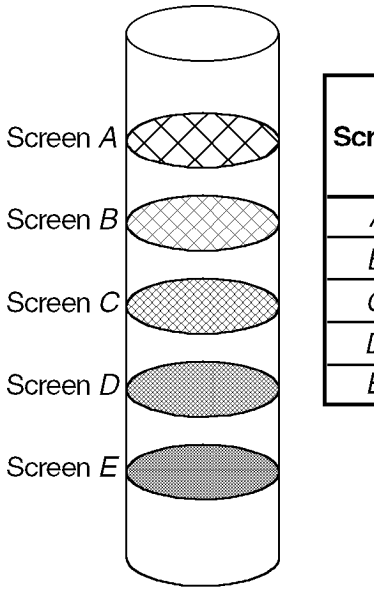
242) According to the *Earth Science Reference Tables*, the soil in tube *C* would be classified as

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

243) The bottom of each tube was closed and water was slowly poured into each tube until the water level reached the dotted line. Which statement best describes the amount of water held by the tubes?

A) Tube *A*, *B* and *C* held the same amount of water and tube *D* half as much.
B) Tube *C* held more water than any other tube and tube *D* the least.
C) Tube *A* and *D* held the same amount of water and twice as much as tubes *B* and *C*.
D) Tube *D* held more water than any other tube and tube *A* the least.

244) To sort a quartz sediment sample by particle size, a student shook the sample through a column containing screens *A* through *E*. The mesh of the screens (the open spaces between the wires) had different-sized openings, as represented by the diagram. The results of the sorting are given in the student's data table below.



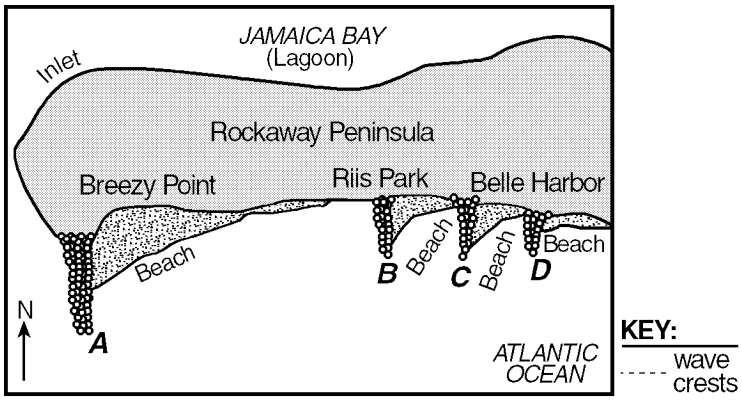
(screen mesh not drawn to scale)

Student Data Table

Screen	Screen Mesh Opening Size (cm)	Percentage of Particles Trapped by the Screen (%)
A	0.1	0
B	0.05	30
C	0.025	45
D	0.0125	15
E	0.00625	10

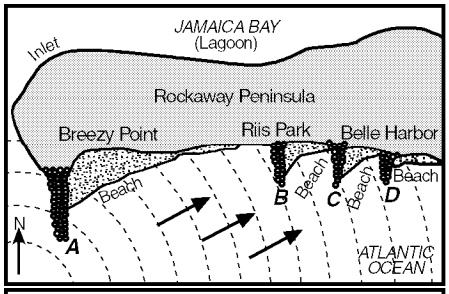
Explain why screens *B* through *E* must be arranged in the order shown in the given diagram to separate the sediments as shown in the student data table.

245) The map below shows Rockaway Peninsula, part of Long Island's south shore, and the location of several stone barriers, *A*, *B*, *C*, and *D*, that were built to trap sand being transported along the coast by wave action.

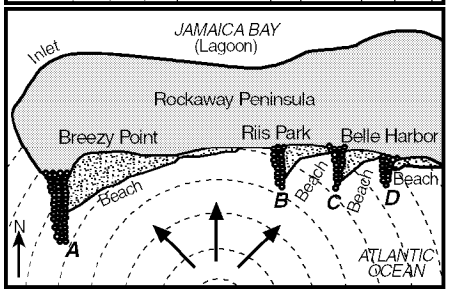


On which one of the following maps do the arrows *best* show the direction of wave movement that created the beaches in this area?

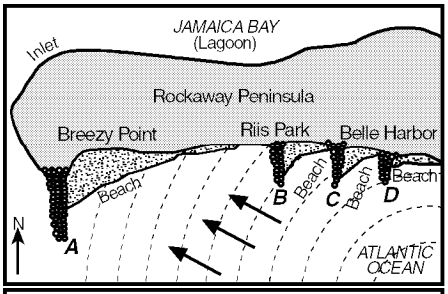
A)



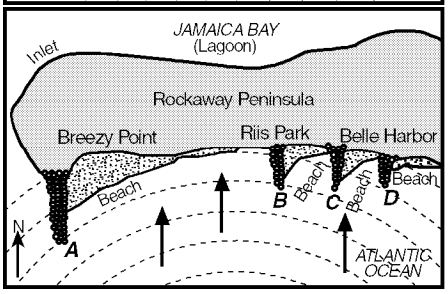
B)



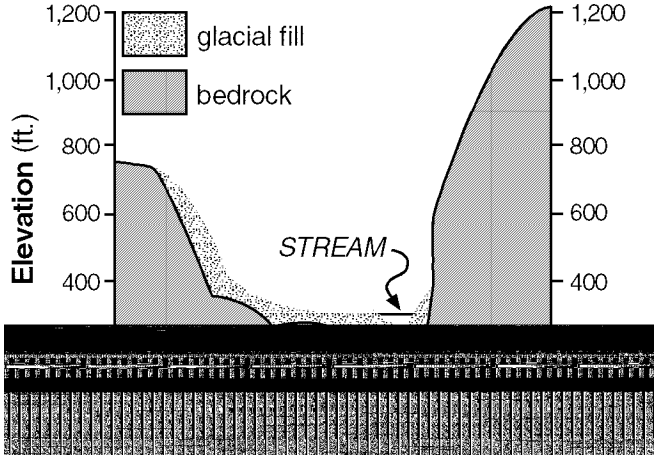
C)



D)



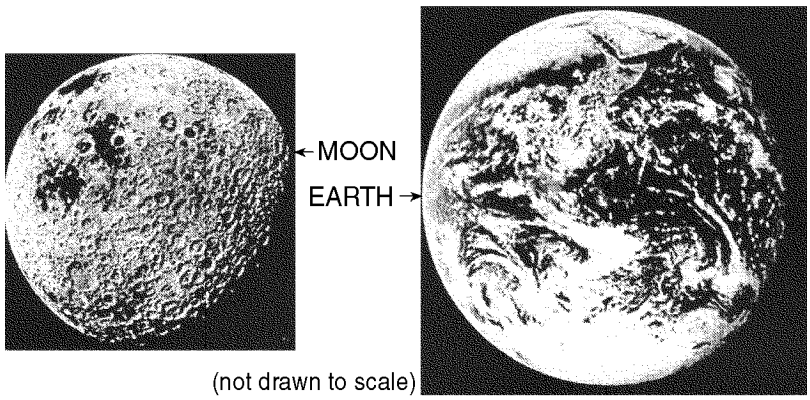
246) The diagram below represents a cross section showing glacial deposition on top of solid bedrock.



The evidence suggests that the maximum elevation of glacial deposition prior to erosion by the stream was

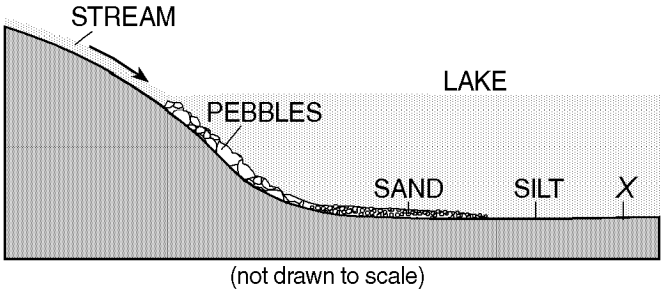
A) 300 ft B) 700 ft C) 100 ft D) 200 ft

247) The photographs below show the Moon and Earth as viewed from space. It is inferred that Earth had many impact craters similar to those shown on the Moon.



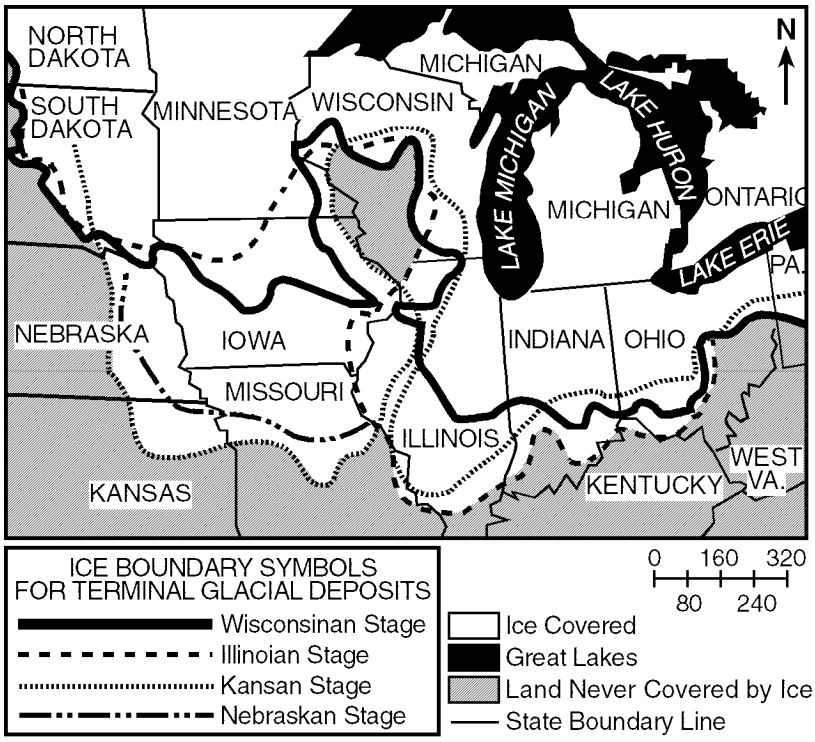
Describe *one* process that has destroyed many of the impact craters that once existed on Earth.

248) The cross section below illustrates the normal pattern of sediments deposited where a stream enters a lake. Letter *X* represents a particular type of sediment.



(a) Briefly explain why deposition of sediment usually occurs where a stream enters a lake.
(b) Name the type of sediment most likely represented by letter *X*.

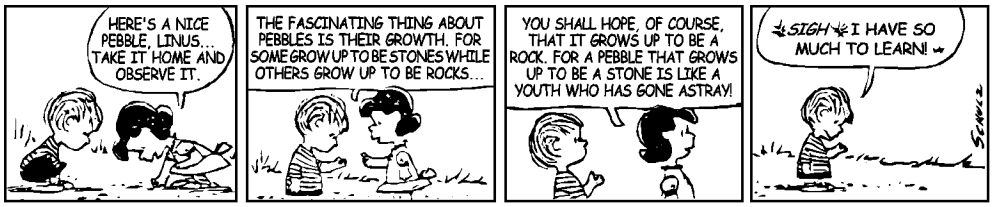
249) The map below shows the southernmost advance of four major stages of continental glaciation in the central United States. White areas represent land once covered by glacial ice. The general direction of ice movement was from north to south.



What evidence found on the former ice-covered areas would *best* show the direction of continental glacial movement?

A) high-temperature igneous and volcanic bed rock
B) bedrock containing fossils of animals that lived in cold water
C) parallel scratches and grooves in the bedrock
D) resistant folded metamorphic bedrock

250) In the cartoon below, Lucy gives Linus incorrect information about pebbles.



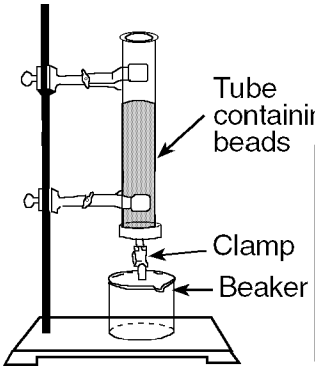
If Lucy wanted to give Linus correct information about pebbles, which statement would be *most* accurate?

A) Any large rock that weathers could become a pebble.
B) Pebble is the name given to the smallest-size sediment.
C) Pebbles can become cemented together to form a rock called gabbro.
D) Magma is composed of pebbles.

Questions 251 through 253 refer to the following:

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 (only one example is shown), 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.)

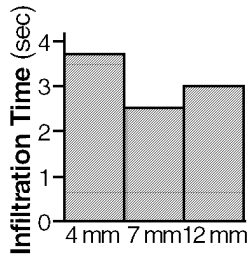


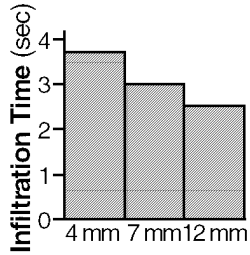
	PARTICLE SIZE		
	4 mm beads	7 mm beads	12 mm beads
Infiltration time (seconds)	3.7	3.0	2.4
Amount of water needed to cover all beads (ml)	147	145	147
Water recovered from tube after clamp was removed (ml)	111	123	135
Water retained on beads (ml)	36		12

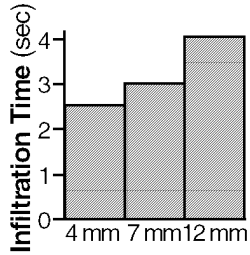
251) What was the total amount of water retained on the 7-millimeter beads after the tubing was unclamped and the water flowed out?

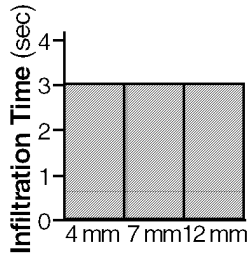
A) 8 mL
B) 22 mL
C) 12 mL
D) 36 mL

252) Which graph *best* represents the infiltration times for these three particle sizes?

A)


B)


C)


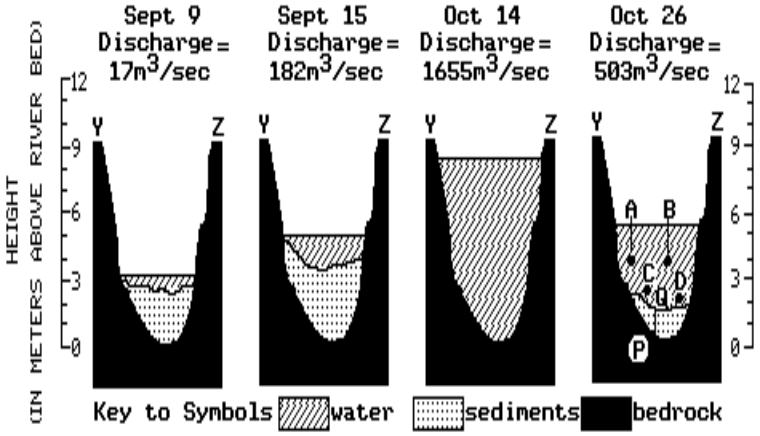
D)


253) The data table shows that all three tubes of beads had approximately the same

A) porosity
B) capillarity
C) permeability time
D) water retention

Questions 254 through 258 refer to the following:

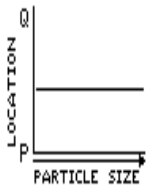
The diagrams below represent the same stream cross section showing the variations in water level and water discharge measured at the same location *YZ* in a river valley at four different times during a certain year.

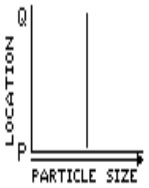


254) The height of the water surface of the river on October 26 was closest to

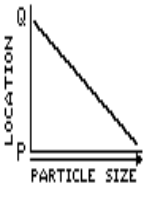
A) 5.9 m
B) 2.3 m
C) 5.3 m
D) 2.9 m

255) If the stream had been slowing down at a constant rate from October 14 through October 26, which graph would best represent the relationship between the average particle size and the location of sediments along line *PQ* in the cross section for October 26?

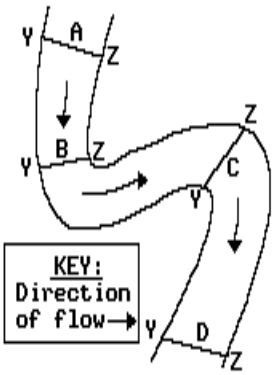
A)


B)


C)


D)


256) Based on the erosional and depositional evidence shown in the four stream cross sections, which line on the map below most nearly represents the correct position of the cross section *YZ*?



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

257) The *greatest* water velocity in the river was probably recorded on

A) September 15
B) October 26
C) October 14
D) September 9

258) In the diagram for October 26, which location in the river probably experienced the *greatest* average current velocity?

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

Questions 259 through 261 refer to the following:

The table below shows the results of an investigation of four different types of rocks, weathering over a period of 30 minutes. Equal masses of similar-sized samples of rocks *A*, *B*, *C*, and *D* were placed in identical containers half-filled with water. Each container was shaken uniformly for 5 minutes and the remaining samples of rocks were removed from the water. Their masses were determined and recorded in the data table. The remaining samples of rocks were put back into the containers half-filled with water and the procedure was repeated five times.

DATA TABLE

	Mass of Rock Samples Remaining (grams)			
Time (min)	A	B	C	D
0	200	200	200	200
5	160	200	120	200
10	125	200	60	195
15	100	190	20	170
20	75	180	0	150
25	55	175	0	135
30	50	175	0	125

259) Which rock sample was most resistant to the abrasive action caused by the shaking of the containers?

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

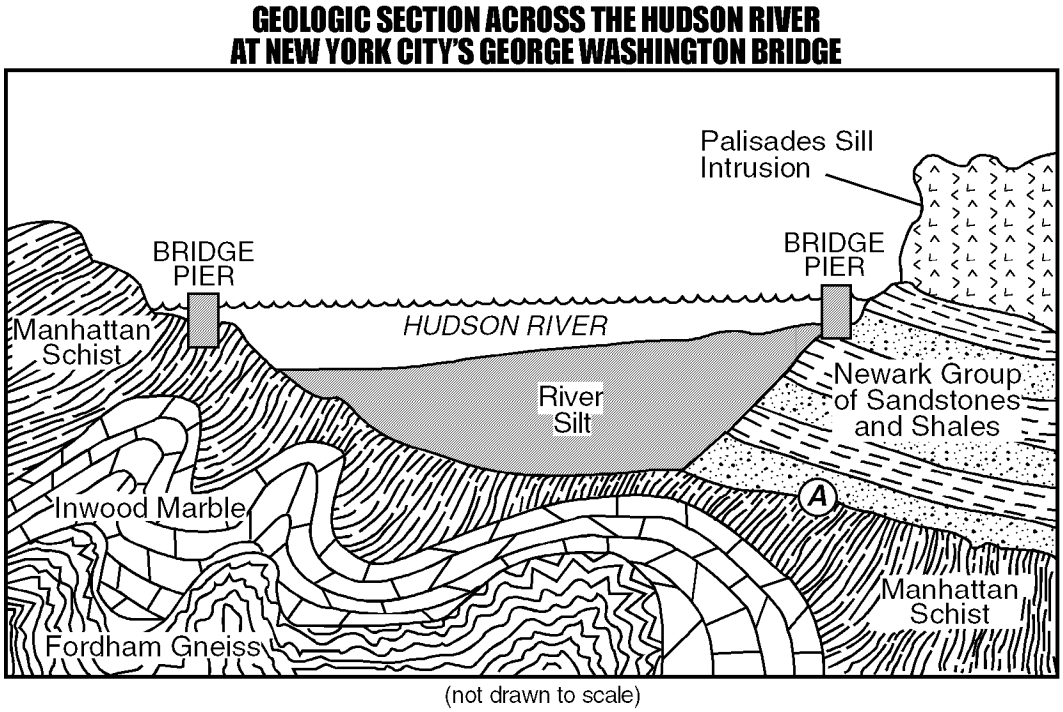
260) According to the data table, the mass of rock samples remaining at the end of 30 minutes was different for each sample. The best inference to be made is that the mass differences were the result of different

A) rates of shaking of the containers
B) rock sample composition
C) masses of rock samples being used
D) containers being used for shaking

261) After 20 minutes, the rate of abrasion decreased for all rock samples. A major factor that explains this is the

A) hardening of the minerals
B) smoothing of the rock samples
C) compacting of the rock samples
D) sharpening of the edges of the rock samples

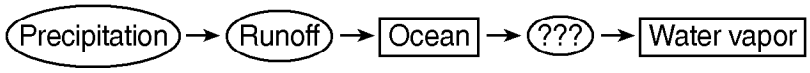
262) Letter *A* represents a location in the area of the geologic cross section below.



Particles taken from the bed of the Hudson River at this location would most likely have an average diameter of

A) 0.1 cm B) 0.01 cm C) 0.00001 cm D) 0.001 cm

263) The flowchart below shows part of Earth's water cycle. The question marks indicate a part of the flowchart that has been deliberately left blank.

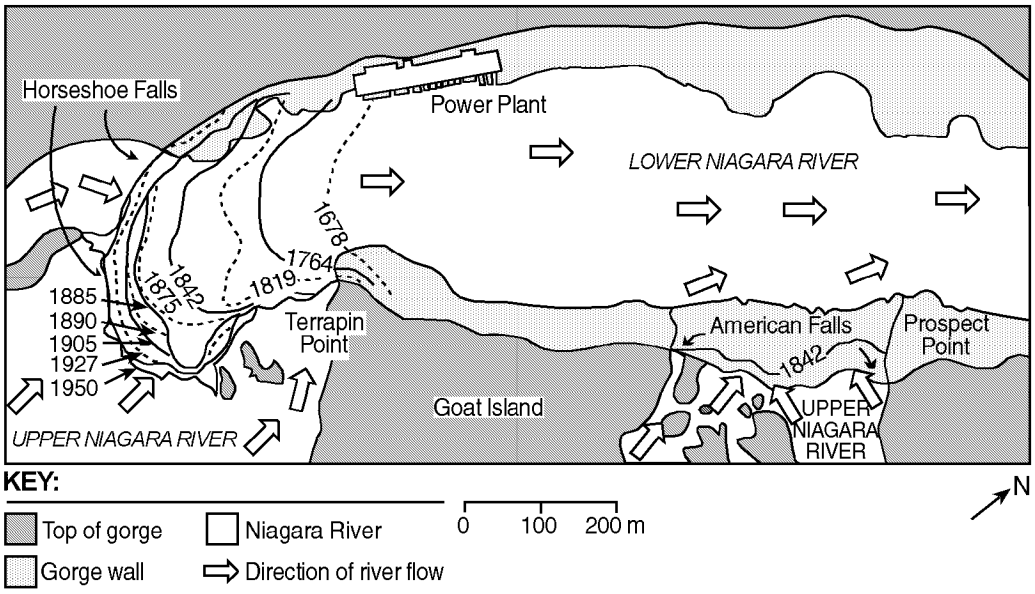


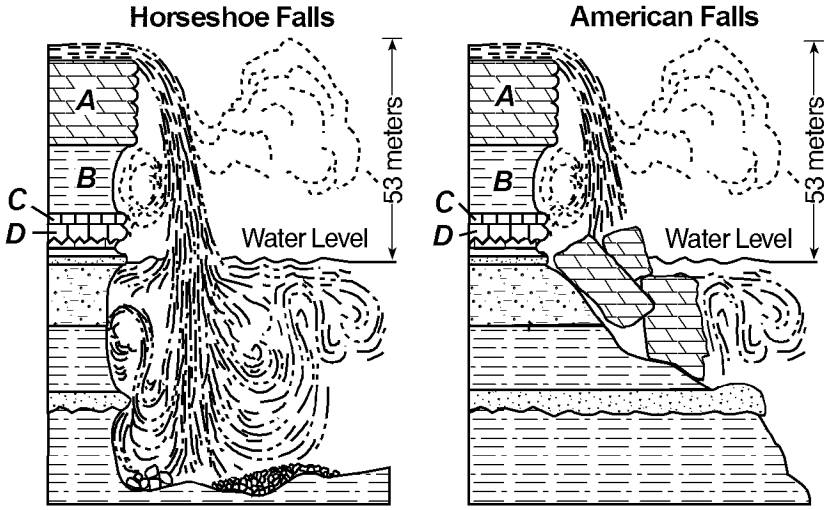
Which process should be shown in place of the question marks to *best* complete the flowchart?

A) deposition B) condensation C) infiltration D) evaporation

Questions 264 and 265 refer to the following:

The map below shows measured changes in the position of Niagara Falls since 1678. The cross sections show the two parts of Niagara Falls: Horseshoe Falls and American Falls. Letters *A* through *D* represent the same rock layers at both locations.





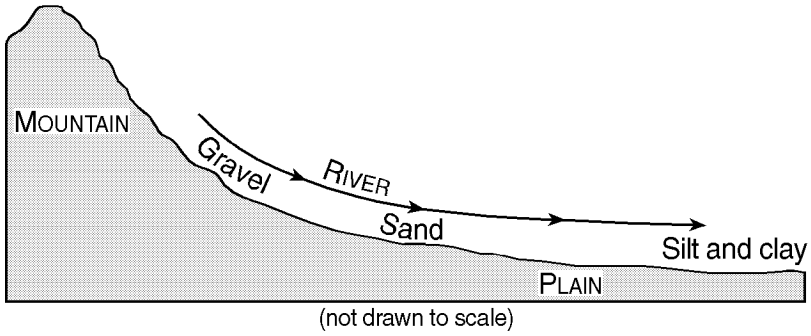
264) What rock layer in the given map shows the *most* resistance to weathering and erosion at Horseshoe Falls?

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

265) Which one of the following statements *best* explains why Horseshoe Falls has eroded back more than American Falls since 1842?

A) Dolostone is the top rock layer at American Falls.
B) More water flows over American Falls.
C) More water flows over Horseshoe Falls.
D) Dolostone is the top rock layer at Horseshoe Falls.

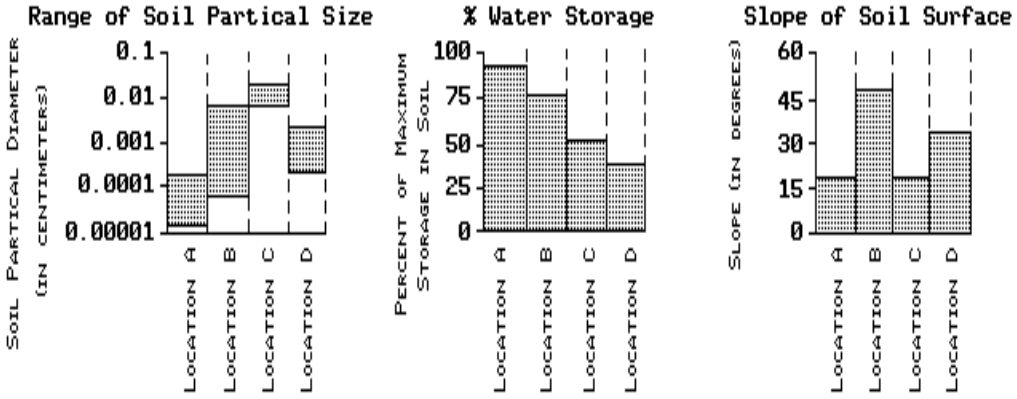
266) The cross section below illustrates the general sorting of sediment by a river as it flows from a mountain to a plain.



Which factor most likely caused the sediment to be sorted in the pattern shown?

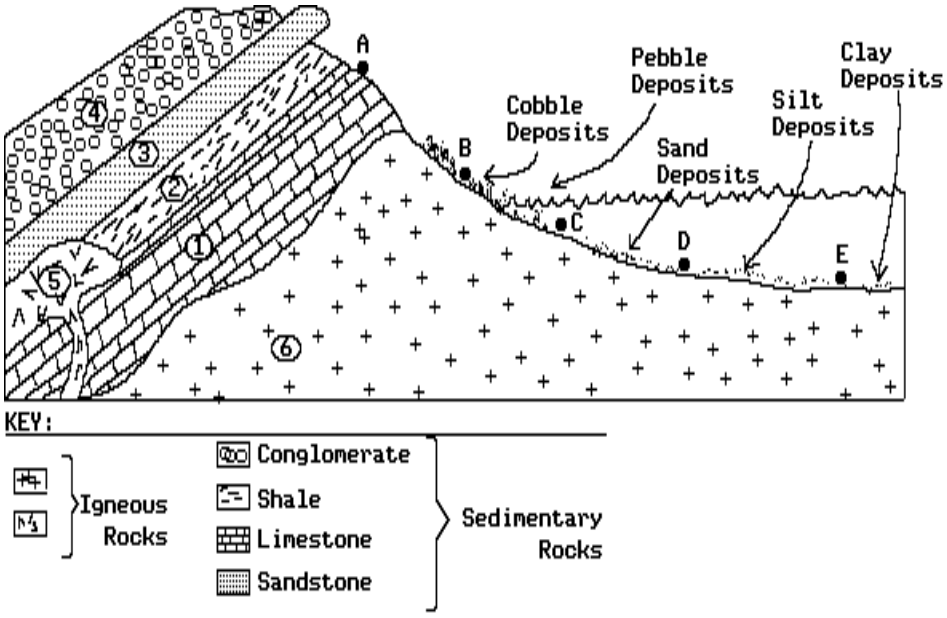
A) velocity of the river water
B) hardness of the surface bedrock
C) temperature of the water
D) mineral composition of the sediment

267) The three graphs below show information about the soil characteristics of four locations in a river valley in western New York State. Which location would probably experience the *greatest* rate of water infiltration at the start of the next rainstorm?



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

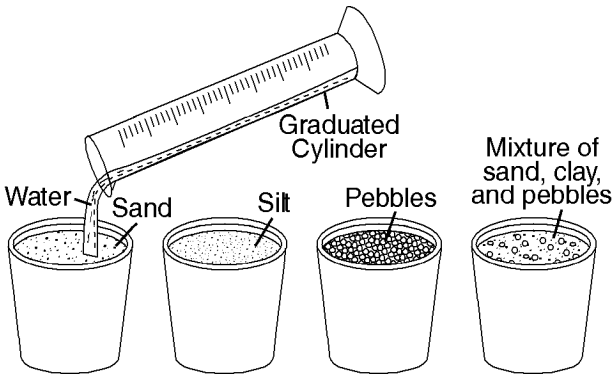
268) The diagram below represents a cross section of a portion of the Earth's crust. The letters indicate points on the Earth's surface. The numbers identify specific rock units.



Which rock unit appears to be the most resistant to weathering and erosion?

A) 1 B) 3 C) 2 D) 4

269) A student performed a laboratory activity in which water was poured slowly into four cups containing equal volumes of loosely packed sediment samples, as shown in the diagram below. All particles were spherical in shape and uniform in size within a container. After the water level reached the surface of each sample, the student determined the amount of water that had been added.

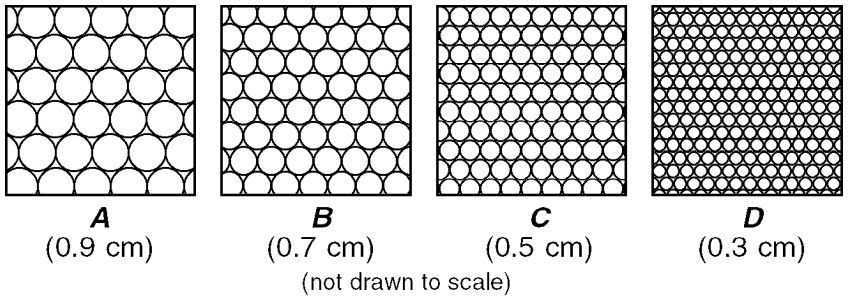


The results of the activity should have indicated that approximately equal amounts of water were added to the cups of

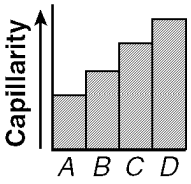
A) sand, pebbles, and the mixture, only
B) sand, silt, and pebbles, only
C) silt and pebbles, only
D) pebbles and the mixture, only

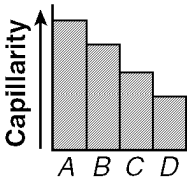
Questions 270 through 273 refer to the following:

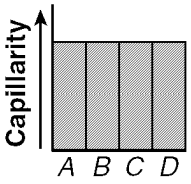
The diagrams below represent cross sections of four samples of loosely packed, uniformly sorted soil particles. The diameter of the particles is given below each diagram. All soil samples consist of solid spherical particles.

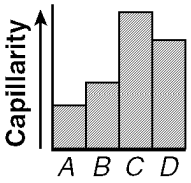


270) Which graph *best* represents the capillarity of these soil samples?

A)


B)


C)


D)


271) Water can infiltrate these soils if they are

A) unsaturated and permeable
B) unsaturated and impermeable
C) saturated and permeable
D) saturated and impermeable

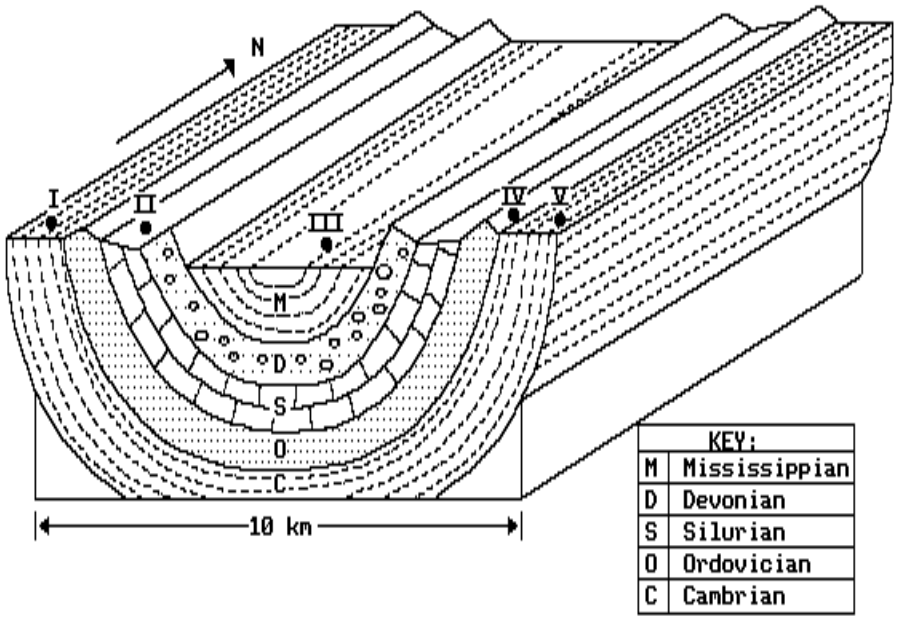
272) Some particles from sample *D* are mixed with particles from sample *A*. Compared to the original porosity of sample *A*, the porosity of the resulting mixture will be

A) the same
B) less
C) greater

273) Which sample has the *greatest* permeability?

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

274) The block diagram below shows a section of the Earth's crust. The rock layers have not been overturned. **I**, **II**, **III**, **IV**, and **V** are locations on the Earth's surface.

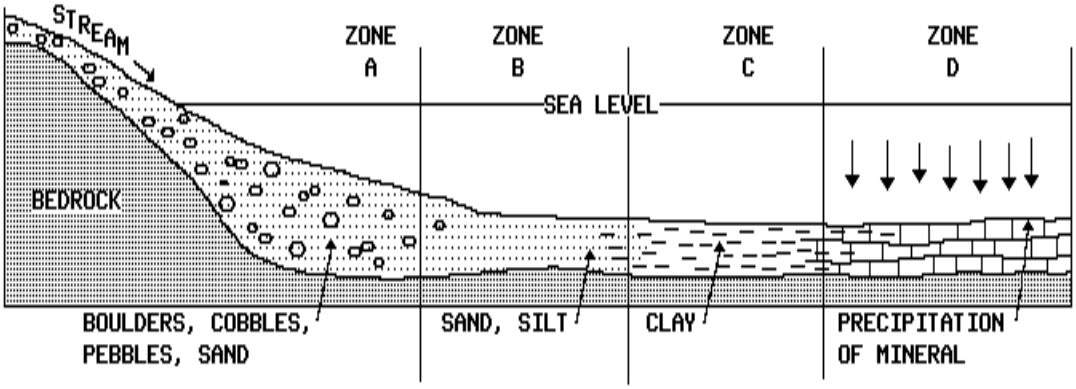


Which rock layer appears to be the most resistant to weathering?

A) Cambrian shale
B) Silurian limestone
C) Mississippian shale
D) Ordovician sandstone

Questions 275 through 278 refer to the following:

The cross-sectional diagram below shows a sediment-laden stream entering the ocean. The ocean is divided into four zones *A*, *B*, *C*, and *D*.



275) Which material would most likely be held in suspension in zone *D*?

A) sand
B) cobbles
C) colloids
D) silt

276) In which zone would the stream normally deposit particles of *largest* size?

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

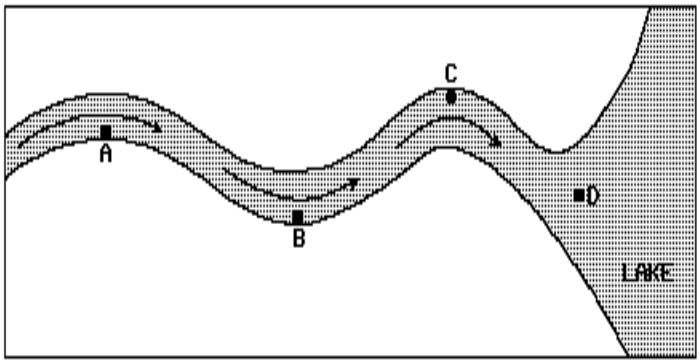
277) Which zone would contain particles mostly in the range of 0.05 to 0.10 centimeter in diameter? [Refer to the *Earth Science Reference Tables*.]

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

278) Which change in the stream system would most likely cause the deposition of larger particles to be farther offshore?

A) an increase in the stream's velocity
B) a decrease in the stream's gradient
C) an increase in the density of large particles
D) a decrease in the quantity of large particles

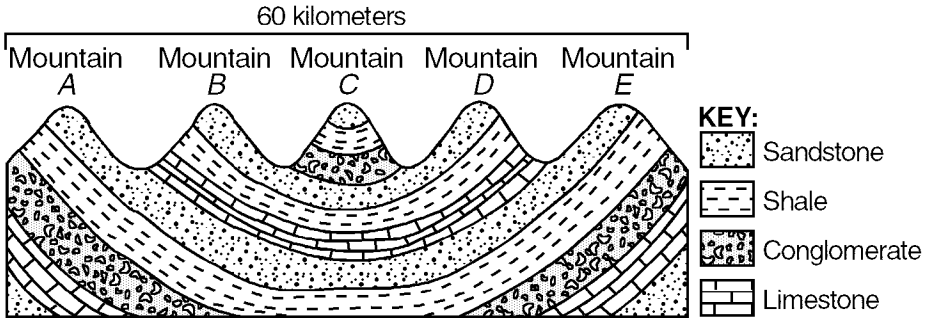
279) The map below shows the top view of a meandering stream as it enters a lake.



At which points along the stream are erosion and deposition dominant?

A) Erosion is dominant at *A* and *D*, and deposition is dominant at *B* and *C*.
B) Erosion is dominant at *A* and *C*, and deposition is dominant at *B* and *D*.
C) Erosion is dominant at *B* and *D*, and deposition is dominant at *A* and *C*.
D) Erosion is dominant at *B* and *C*, and deposition is dominant at *A* and *D*.

280) The diagram below represents a geologic cross section of a portion of the Earth's crust. The rock layers have not been overturned.

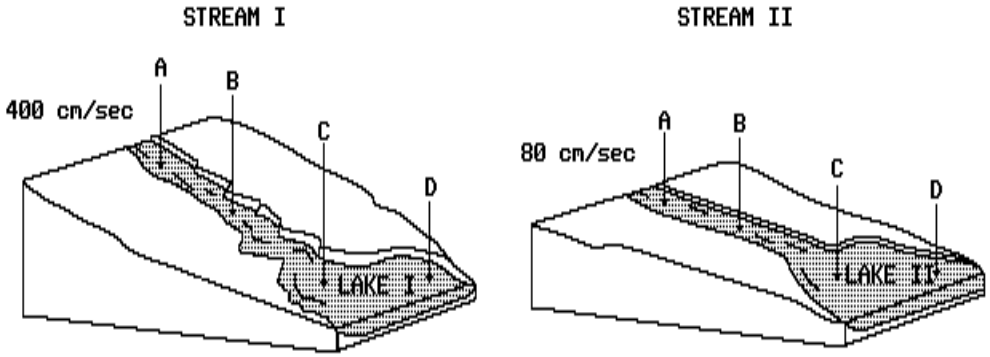


Which type of rock appears to be most resistant to weathering?

A) sandstone B) conglomerate C) shale D) limestone

Questions 281 through 285 refer to the following:

A mixture of colloids, clay, silt, sand, pebbles, and cobbles is put into stream *I* at point *A*. The water velocity at point *A* is 400 centimeters per second. A similar mixture of particles is put into stream *II* at point *A*. The water velocity in stream *II* at point *A* is 80 centimeters per second.



281) Which statement best describes what happens when the particles are placed in the streams? [Refer to the *Earth* Science Reference Tables.*]*

A) Stream *I* cannot move sand.
B) Stream *I* will move all particles that are added at point *A*.
C) Stream *II* will move all particles that are added at point *A*.
D) Stream *II* cannot move sand.

282) What will most likely occur when the transported sediment reaches lake *II*?

A) The particles will be deposited in sorted layers.
B) The largest particles will be carried farthest into the lake.
C) Clay particles will settle first.
D) The sediment will become more angular because of abrasion.

283) In lake *I*, as the stream water moves from point *C* to point *D*, its velocity

A) decreases
B) remains the same
C) increases

284) Which statement is the most accurate description of conditions in *both* streams?

A) The greatest deposition occurs at point *B*.
B) The particles will have a greater velocity than the water in the stream.
C) Particles are carried in suspension and by bouncing along the bottom.
D) The velocity of the stream is the same at point *B* as at point *C*.

285) If a sudden rainstorm occurs at *both* streams above point *A*, the erosion rate will

A) increase for stream *I*, but not for stream *II*
B) increase for stream *II*, but not for stream *I*
C) increase for both streams
D) not change for either stream

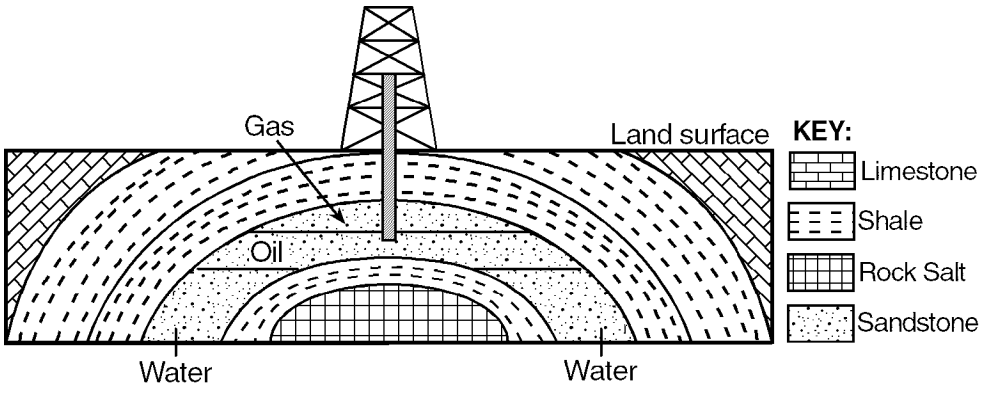
286) The table below shows the rate of erosion and the rate of deposition at four stream locations.

Location	Rate of Erosion (tons/year)	Rate of Deposition (tons/year)
A	3.00	3.25
B	4.00	4.00
C	4.50	4.65
D	5.60	5.20

A state of dynamic equilibrium exists at location

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

287) The diagram below represents a geologic cross section of a location in Texas where an oil well has been drilled into the bedrock.

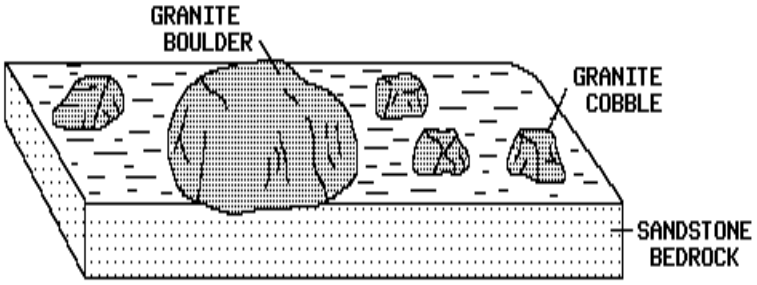


Oil, water, and natural gas can collect and stay in the sandstone layer because sandstone often

A) has a grain size ranging from fine to coarse (0.006 to 0.2 cm)
B) is composed mainly of grains of quartz
C) contains air spaces, making it porous and permeable
D) metamorphoses to quartzite

Questions 288 through 291 refer to the following:

The diagram below represents a surface and cross-sectional view of a portion of the Earth 15 kilometers from a mountain range.



288) The granite boulder and the granite cobbles have similar chemical compositions. Compared to the rate of weathering of the boulder, the rate of weathering of an equal mass of cobbles is probably

A) faster due to particle size
B) faster due to location
C) slower due to location
D) slower due to particle size

289) According to the *Earth Science Reference Tables*, what must be the size of the boulder?

A) 0.2 to 6.4 cm in diameter
B) less than 0.2 cm in diameter
C) 6.4 to 25.6 cm in diameter
D) greater than 25.6 cm in diameter

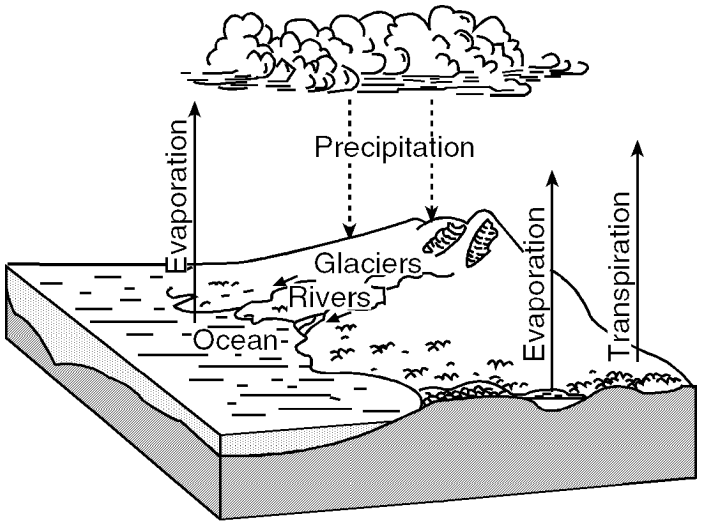
290) The best explanation for the presence of an isolated boulder in this location is that the boulder was

A) transported there by a glacier
B) eroded from a limestone cliff
C) placed there by a volcanic eruption
D) deposited there by a slow-moving stream

291) The processes that change the boulder and cobbles to soil are weathering and

A) metamorphism
B) cementation of sediments
C) biological activity
D) melting of rock material

292) The diagram below represents the water cycle.

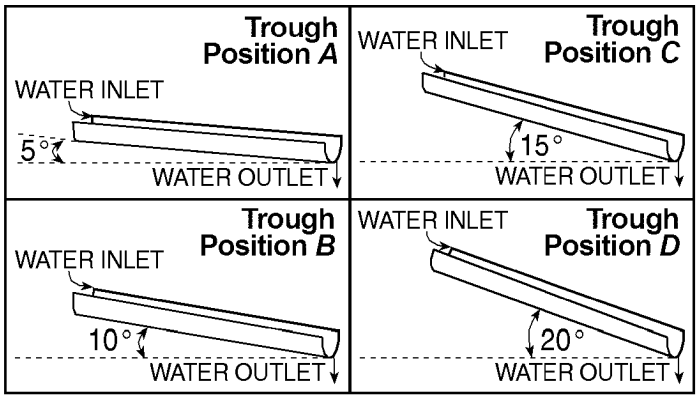


The small arrows drawn near the rivers represent the direction of

A) capillarity B) absorption C) runoff D) infiltration

Questions 293 and 294 refer to the following:

A student used water, a trough, a timer, a Ping-Pong ball, and a metric ruler to investigate waterflow. The trough was set at different angles to compile the data in the data table below.



DATA TABLE

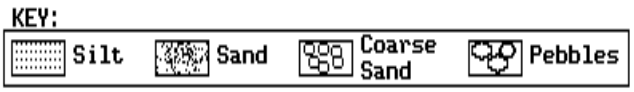
Trough Position	Slope (degrees)	Length of Trough (meters)	Time (seconds)	Velocity (meters/second)
A	5	1.5	4.4	
B	10	1.5	3.5	
C	15	1.5	2.7	
D	20	1.5	2.3	

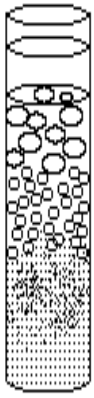
293) State the purpose of the student's investigation shown.

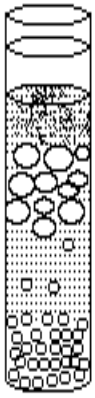
294) (a) Calculate the average velocity of the water flowing down the trough in each position shown in the diagram, *A*, *B*, *C*, and *D*. Record your answers in the given data table. [*Express your answers to the nearest tenth.*]

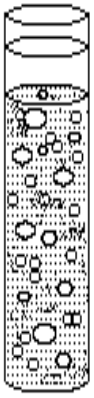
(b) Based on the data and the values you calculated for average stream velocity, state an appropriate conclusion to this investigation.

295) A large glass cylinder containing a mixture of sediments of the same density and water is shaken. Which drawing below best represents the result after settling?



A) 

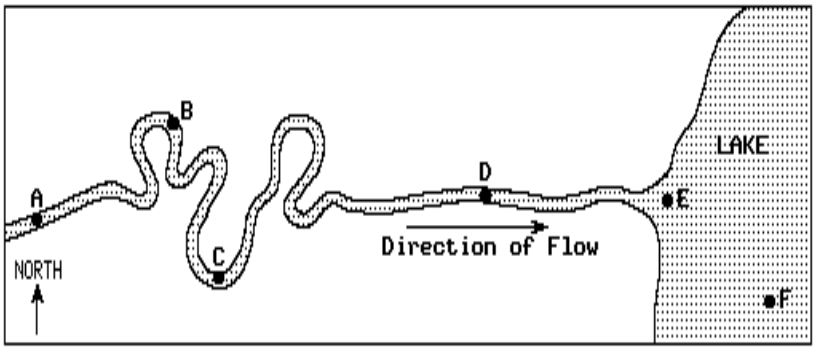
B) 

C) 

D) 

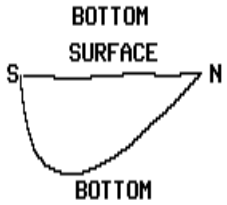
Questions 296 through 300 refer to the following:

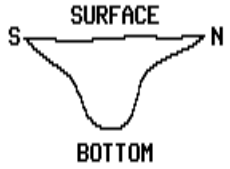
The map below shows a stream flowing into a lake. Letters *A* through *F* represent locations in the stream and lake.

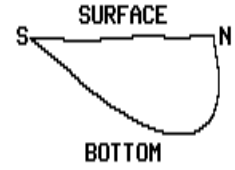


296) Which diagram best represents the cross section of the stream at location *C*.? [Note that letters *N* and *S* represent the north and south sides of the stream.]

A) 

B) 

C) 

D) 

297) The velocity of this stream at point *B* depends on the stream's

A) slope and discharge, only
B) discharge, only
C) slope, discharge, and channel shape
D) slope, only

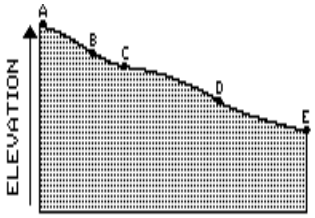
298) Where would the *greatest* amount of sediments most likely be deposited in this system?

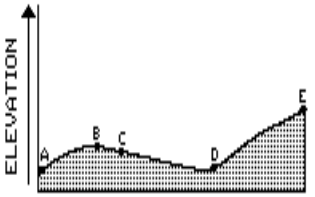
A) *F*
B) *D*
C) *B*
D) *E*

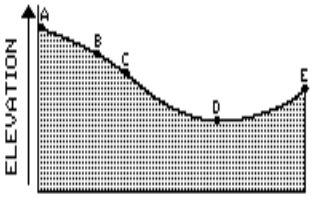
299) Which kind of sediment would probably be deposited farthest out in the lake? [Refer to the *Earth Science Reference Tables*.]

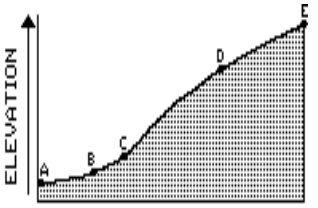
A) clay
B) pebbles
C) silt
D) sand

300) Which diagram best represents the change in the stream's elevation from location *A* to location *E*?

A) 

B) 

C) 

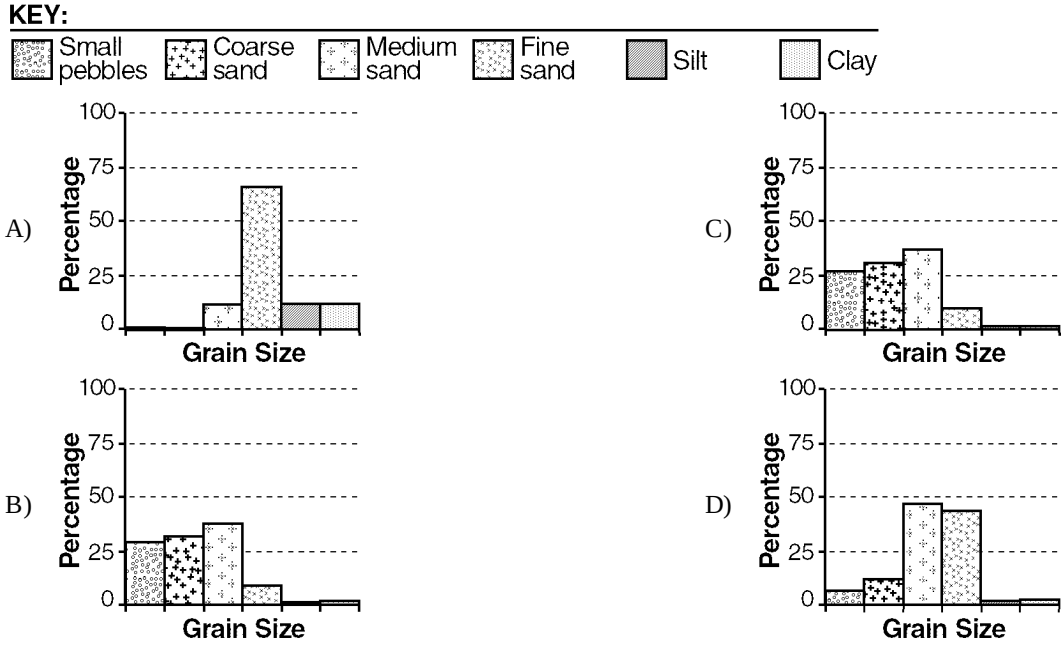
D) 

301) The table below shows the percentages of different grain sizes deposited as sediment in the Mississippi River 100 miles to 1,000 miles downstream from Cairo, Illinois. The river's mouth empties into the Gulf of Mexico 1,000 miles from Cairo.

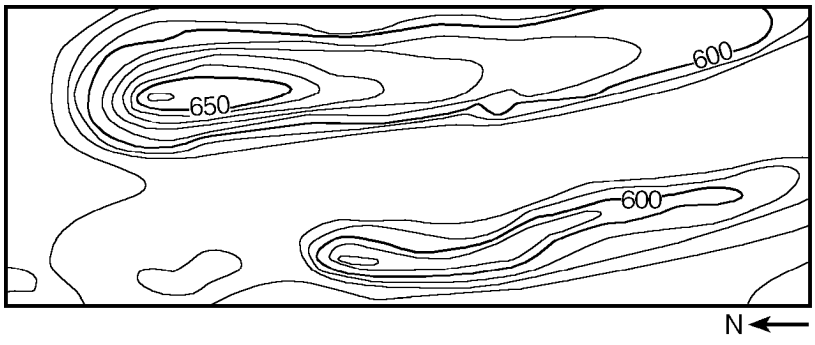
GRAIN SIZE PERCENTAGES

Grain Size	Miles Downstream from Cairo					
	100 mi	300 mi	500 mi	700 mi	900 mi	1,000 mi
Small Pebbles	29%	8%	14%	5%	none	none
Coarse Sand	30%	22%	9%	8%	1%	none
Medium Sand	32%	50%	46%	44%	26%	9%
Fine Sand	8%	19%	28%	41%	70%	69%
Silt	trace	trace	2%	1%	2%	10%
Clay	trace	trace	1%	trace	1%	10%

Which graph *best* shows the percentage of each grain size found at a location 300 miles downstream from Cairo?



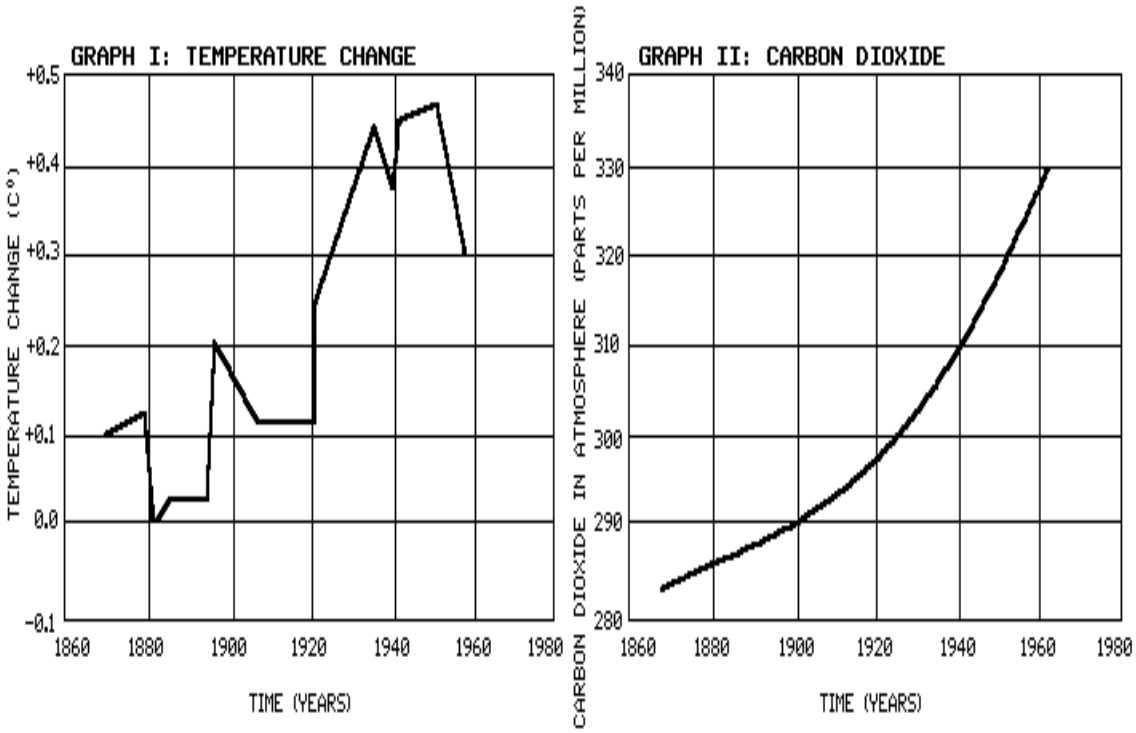
302) The map below shows a portion of a drumlin field near Palmyra, New York. Elevations are in feet.



The drumlins in the given map are composed of sediments transported and deposited directly by glacial ice. These sediments are likely to be

A) unsorted and not in layers
B) well sorted in horizontal layers
C) well-rounded, sand-sized particles
D) found underwater, mixed with organic materials

303) Graph *I* below shows the average temperature change on the Earth between the years 1870 and 1955. Graph *II* shows the amount of carbon dioxide in the atmosphere between the years 1870 and 1962.

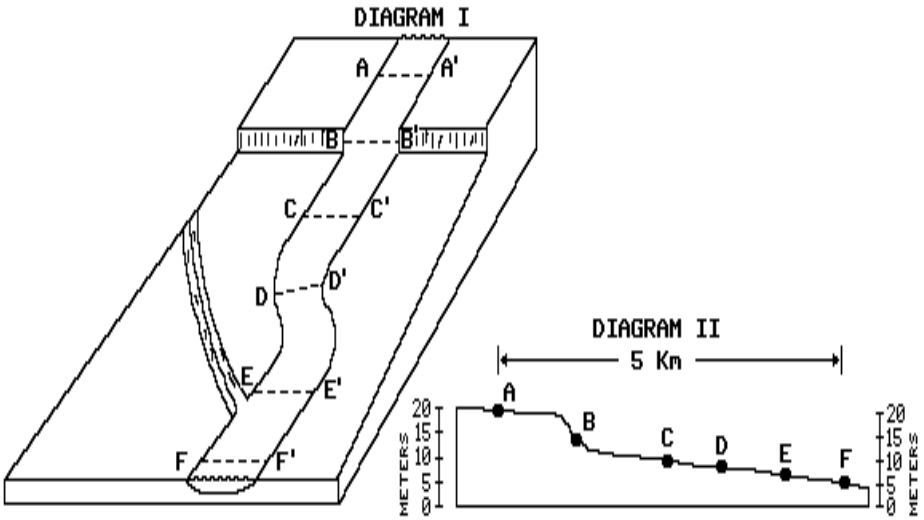


As a result of the changes in temperature and amount of carbon dioxide, what probably happened to the Earth's overall rate of chemical weathering during this time?

A) The rate of chemical weathering decreased.
B) The rate of chemical weathering remained the same.
C) The rate of chemical weathering increased.

Questions 304 through 307 refer to the following:

Diagram *I* below shows the paths of two streams over the Earth's surface. Diagram *II* shows the longitudinal profile of the major stream.



304) At which location would the water in the stream have the *greatest* potential energy?

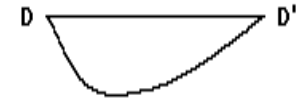
A) *C*
B) *A*
C) *B*
D) *E*

305) Which cross section best represents the shape of the stream at *D*‡‡*D*1?

A) 

B) 

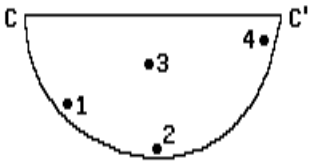
C) 

D) 

306) The *greatest* volume of water would most likely be moving past which location?

A) *B*‡‡*B*1
B) *F*‡‡*F*1
C) *D*‡‡*D*1
D) *C*‡‡*C*1

307) The diagram below shows the cross section of the stream at *C*‡‡*C*1. At which position in the stream channel would the velocity of the water be *greatest*?



A) 3
B) 2
C) 1
D) 4

Questions 308 through 311 refer to the following:

A group of students collected rounded, well-sorted mineral particles from a stream that flowed over only coarse-grained igneous bedrock. They sorted the particles by mineral type and then mixed equal volumes of all four minerals together and poured the mixture into a tube of water. The data table below lists the minerals. Figure *A* shows the deposit formed on the bottom of the tube as a result of the deposition of the particles.

DATA TABLE

MINERAL	AVERAGE PARTICLE DIAMETER
Plagioclase feldspar	0.2 cm
Quartz	0.2 cm
Hornblende (Amphibole)	0.2 cm
Olivine	0.2 cm

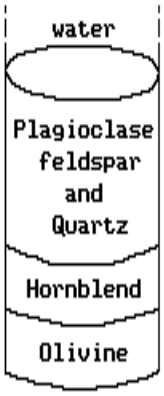


Figure A

308) The experiment was repeated using a second plagioclase sample with the original samples of the other minerals. What difference between the first and second samples of plagioclase would best explain the change in the pattern of deposition shown in figure *B*?

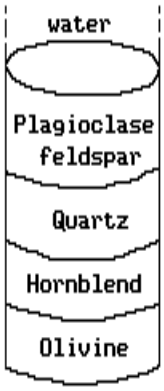


Figure B

A) Particles from the second sample of plagioclase had flatter shapes.
B) Particles from the second sample of plagioclase had greater density.
C) Particles from the second sample of plagioclase had greater total volume.
D) Particles from the second sample of plagioclase were larger.

309) According to the *Earth Science Reference Tables*, when the mineral particles were collected from deposits on the stream bed, the stream velocity at the time of deposition was approximately

A) 150 cm/s
B) 50 cm/s
C) 100 cm/s
D) 200 cm/s

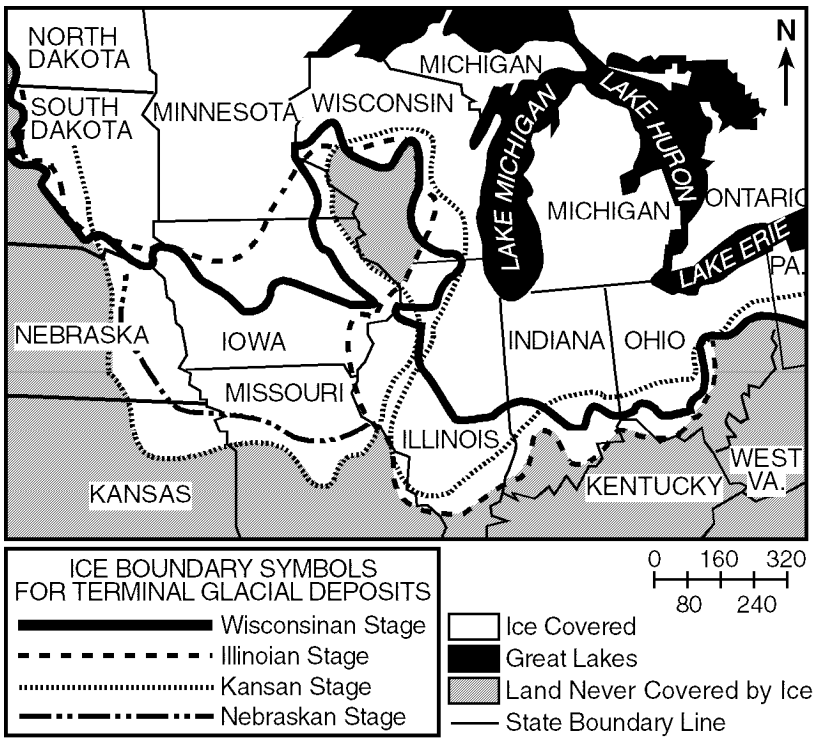
310) The pattern resulting from the deposition of the mineral particles, as shown in figure *A*, is best explained by the fact that the particles have different

A) surface areas
B) circumferences
C) volumes
D) densities

311) As shown in figure *A*, which mineral appears to have the fastest settling rate?

A) quartz
B) hornblende
C) olivine
D) plagioclase

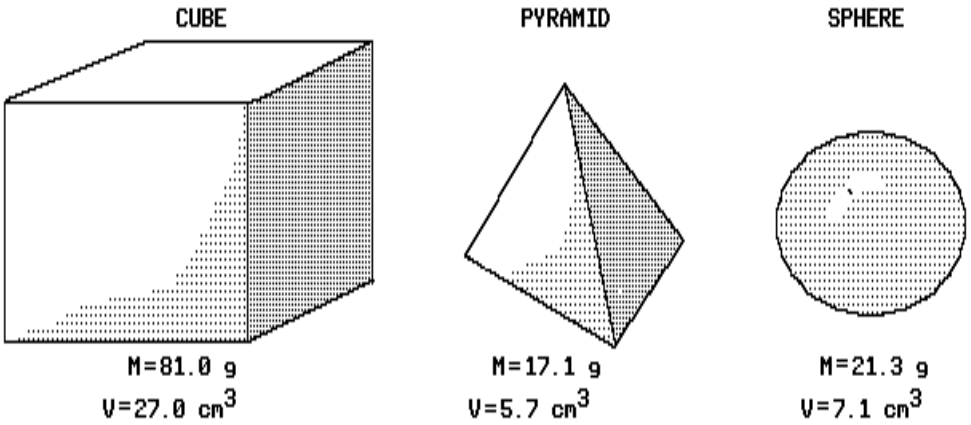
312) The map below shows the southernmost advance of four major stages of continental glaciation in the central United States. White areas represent land once covered by glacial ice. The general direction of ice movement was from north to south.



The landforms that mark the terminal glacial boundaries are made up of

A) residual soil particles resting on a flat plain
B) rounded grains in a sand dune
C) unsorted gravel in low hills
D) layered clay particles on a flat plain

313) The diagrams below represent three solid objects made of the same uniform material. The name of each shape is shown, along with its mass (*M*) and volume (*V*).

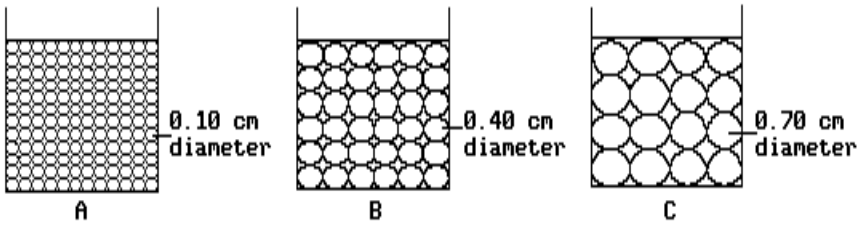


If the pyramid is ground into a powder, the rate at which the powder would chemically weather, compared to the original pyramid, would be

A) faster because the surface area will be less
B) slower because the surface area will be less
C) slower because the surface area will be greater
D) faster because the surface area will be greater

Questions 314 through 318 refer to the following:

The diagrams below represent three identical beakers, *A*, *B*, and *C*. Each beaker contains solid plastic spheres. The diameter of the spheres in each beaker is shown.



314) A mixture of 0.10-centimeter spheres and 0.70-centimeter spheres is placed in a fourth beaker, *D*. Beaker *D* is filled to the same level as beaker *C*. Compared to the porosity of *C*, the porosity of *D* is

A) the same
B) less
C) greater

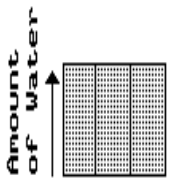
315) Which beaker contains material with the *greatest* capillarity?

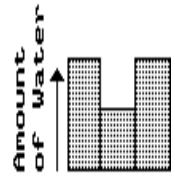
A) *B* B) *C* C) *A*

316) Which beaker contains material with the *greatest* permeability?

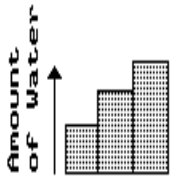
A) *A* B) *C* C) *B*

317) If water is added to each beaker to the level of the line, which graph best shows the amount of water added to each beaker?

A) 

B) 

C) 

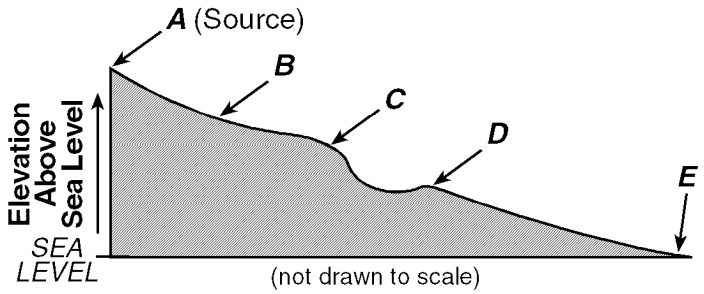
D) 

318) According to the *Earth Science Reference Tables*, the size of the spheres in beaker *C* would classify them as

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

Questions 319 through 321 refer to the following:

The diagram below represents a profile of a stream. Points *A* through *E* are locations along the stream.



319) The primary force responsible for the flow of water in this stream is

A) wind
B) gravity
C) solar energy
D) magnetic fields

320) In what way would a sediment particle most likely change while it is being transported by the stream?

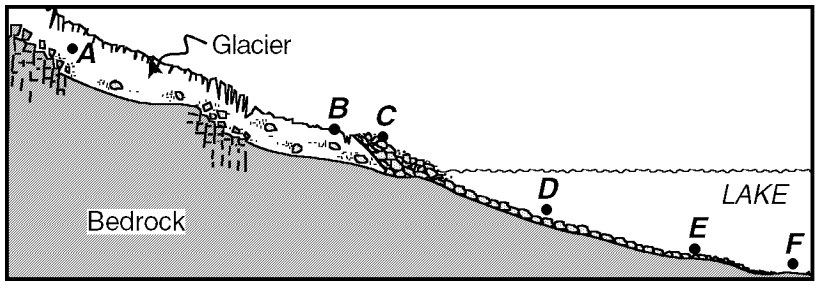
A) Its hardness will increase.
B) It will become more dense.
C) It will become more angular.
D) Its size will decrease.

321) The largest particles of sediment transported by the stream at location *C* are sand particles. According to the *Earth Science Reference Tables*, what is the approximate velocity of the stream at location *C*?

A) 50 cm/sec
B) 600 cm/sec
C) 300 cm/sec
D) 200 cm/sec

Questions 322 and 323 refer to the following:

The diagram below represents a glacier moving out of a mountain valley. The water from the melting glacier is flowing into a lake. Letters *A* through *F* identify points within the erosional/depositional system.



322) Colloidal-sized sediment particles carried by water are most probably being deposited at point

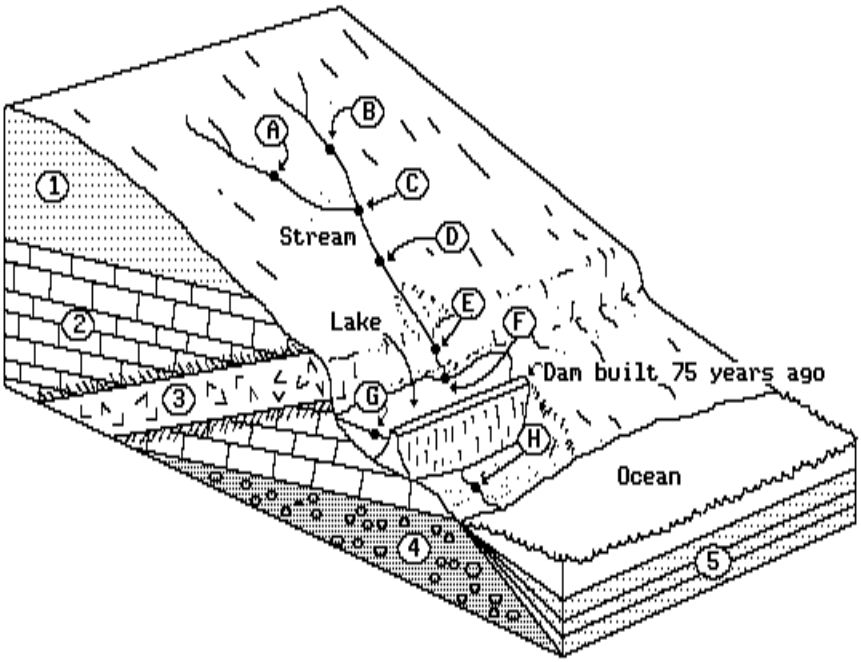
A) *D*
B) *C*
C) *F*
D) *B*

323) Deposits of unsorted sediments would probably be found at location

A) *E*
B) *C*
C) *D*
D) *F*

Questions 324 through 327 refer to the following:

The block diagram below illustrates a portion of the Earth's surface. Numbers 1 through 5 indicate layers of earth material and letters *A* through *H* indicate locations on the surface.



324) Which earth material represented appears most resistant to weathering and erosion?

A) 1
B) 4
C) 3
D) 2

325) Particles from the stream are being deposited in the lake. How does the average size of the particles deposited beneath location *F* most likely compare to the average size of the particles deposited beneath location *G*?

A) The average size of the particles at both locations is equal.
B) The average size of a particle at *F* is greater.
C) The average size of a particle at *G* is greater.

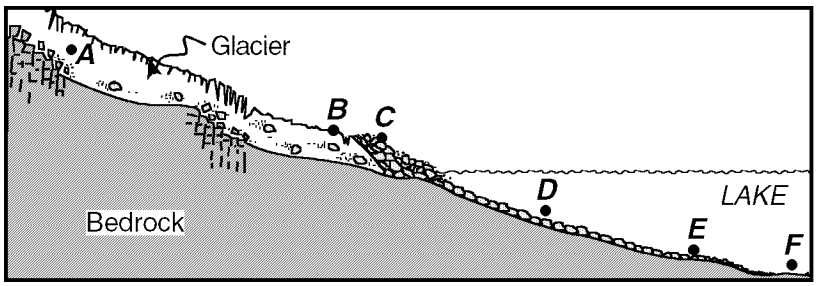
326) Compared to 75 years ago, why does the stream presently have less ability to downcut its channel at location *H*?

A) The energy of the stream is largely converted to heat from eroding the recently formed falls at location *E*.
B) Location *H* is now covered by a thick deposit of transported soil.
C) Humans have increased the discharge of water into the stream below the dam by large, sudden water releases.
D) Much of the sediment used as tools for downcutting is being deposited behind the dam.

327) At which location is the stream velocity probably the *greatest*?

A) *A*
B) *E*
C) *F*
D) *C*

328) The diagram below represents a glacier moving out of a mountain valley. The water from the melting glacier is flowing into a lake. Letters *A* through *F* identify points within the erosional/depositional system.

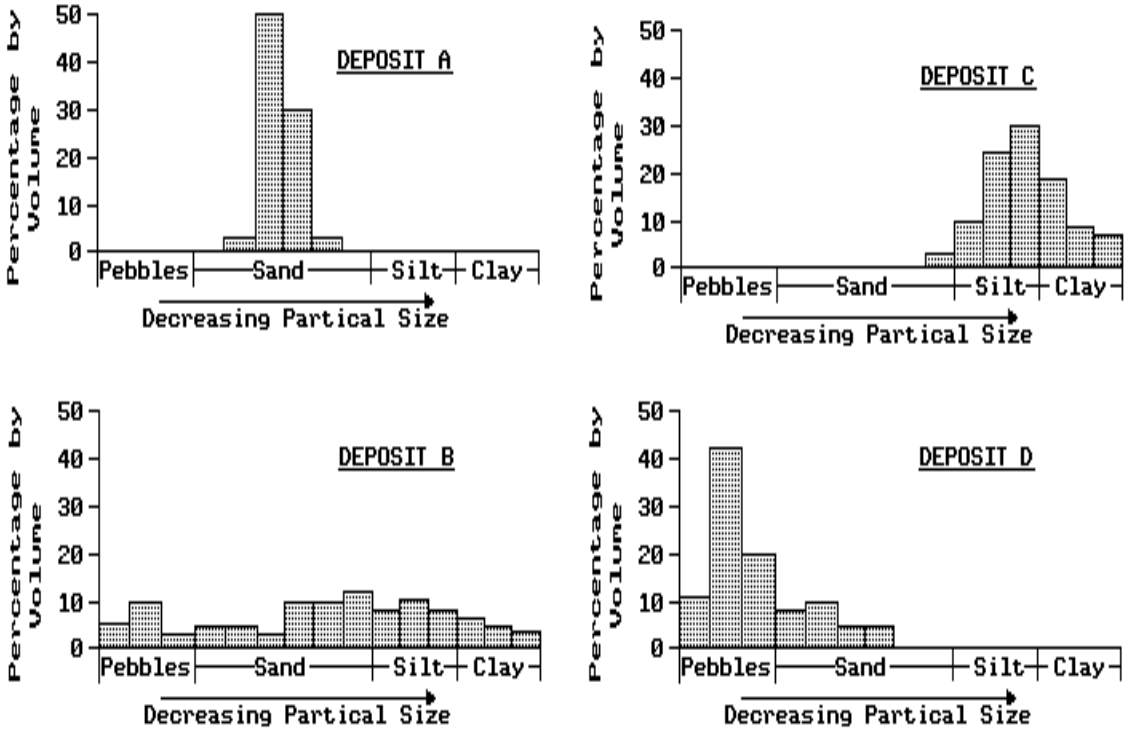


Sediments transported in the stream from location *B* to location *C* would most likely be transported by

A) solution and suspension, only
B) solution, only
C) solution, suspension, and rolling
D) suspension, only

Questions 329 through 332 refer to the following:

The bar graphs below show the percentages by volume of the sediment sizes that are found in four different sediment deposits, *A*, *B*, *C*, and *D*.



329) Which deposits contain particles 0.001 centimeter in diameter? [Refer to the *Earth Science Reference Tables*.]

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

330) Which deposit contains the highest percentage of sediments that would stay in suspension for the longest time before settling?

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

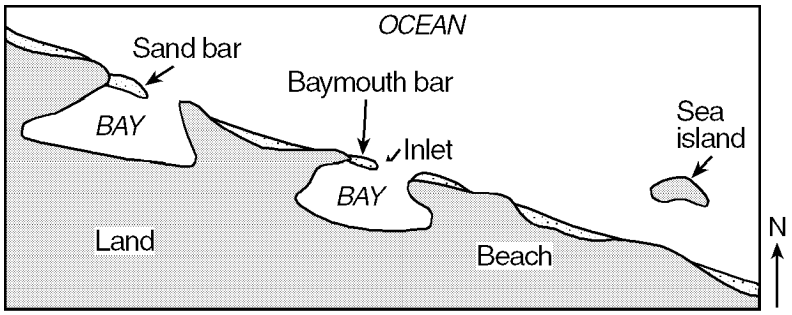
331) What is the total percentage of silt in deposit *B*?

A) 48%
B) 5%
C) 9%
D) 27%

332) What was the most probable agent of erosion that deposited the unsorted sediments in deposit *B*?

A) a glacier
B) a stream
C) ocean waters
D) wind

333) The map below shows some features along an ocean shoreline.

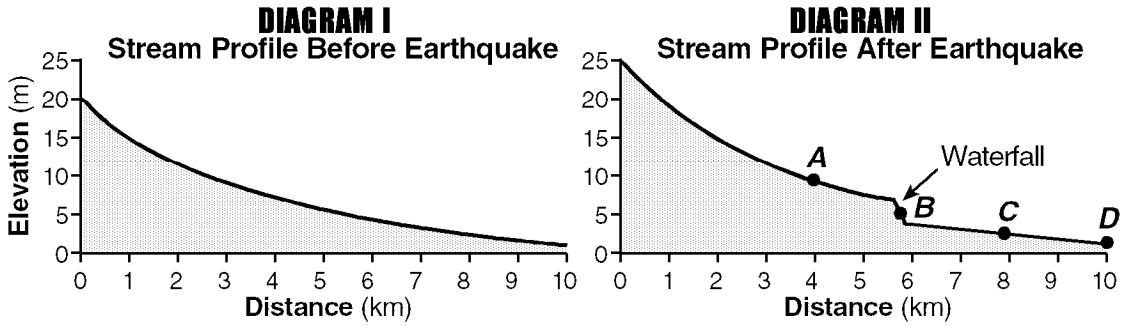


In which general direction is the sand being moved along this shoreline by ocean (long-shore) currents?

A) northeast
B) southwest
C) northwest
D) southeast

Questions 334 through 336 refer to the following:

Diagram *I* below represents a stream's profile before an earthquake. Diagram *II* represents the same stream's profile after an earthquake elevated a portion of the land and produced a waterfall.



334) After the earthquake, the maximum stream velocity was 250 centimeters per second. According to the *Earth Science Reference Tables*, the *largest* particles that could be transported by this stream are

A) boulders
B) sand
C) cobbles
D) pebbles

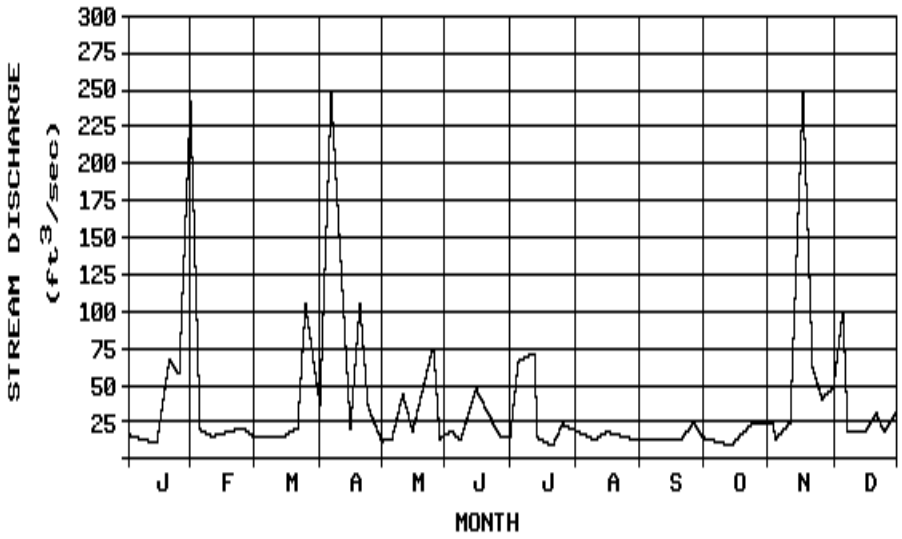
335) If no more earthquakes occur during the next several hundred years, the waterfall will most likely

A) move closer to position *A* because of erosion
B) remain at position *B* because of dynamic equilibrium
C) move closer to position *C* because of crustal movement
D) move closer to position *C* because of deposition

336) Which material is most likely to be transported in suspension during periods of *slowest* stream velocity?

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

337) The graph below represents the discharge of a stream at a location that has little temperature change throughout the year.



During which month was the *greatest* amount of sediment probably transported?

A) February B) April C) October D) May

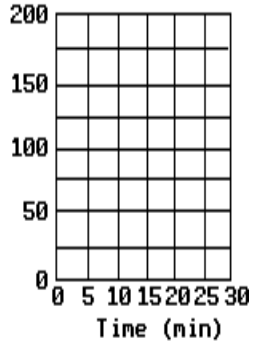
Questions 338 and 339 refer to the following:

The table below shows the results of an investigation of four different types of rocks, weathering over a period of 30 minutes. Equal masses of similar-sized samples of rocks *A, B, C,* and *D* were placed in identical containers half-filled with water. Each container was shaken uniformly for 5 minutes and the remaining samples of rocks were removed from the water. Their masses were determined and recorded in the data table. The remaining samples of rocks were put back into the containers half-filled with water and the procedure was repeated five times. The blank graph is provided for your use.

DATA TABLE

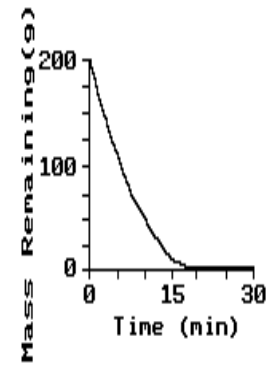
	Mass of Rock Samples Remaining (grams)			
Time (min)	A	B	C	D
0	200	200	200	200
5	160	200	120	200
10	125	200	60	195
15	100	190	20	170
20	75	180	0	150
25	55	175	0	135
30	50	175	0	125

FOR STUDENT USE

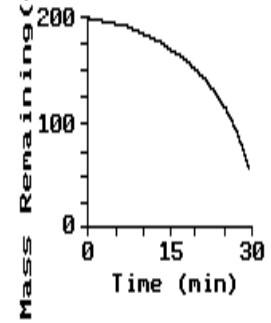


338) Which graph best represents how the remaining mass of rock sample *A* changes with time?

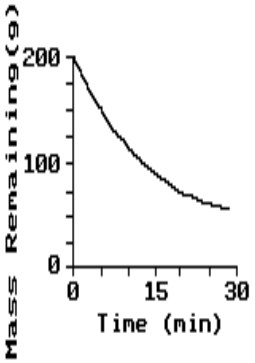
A)



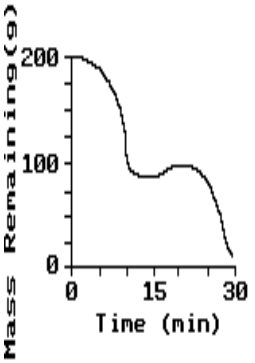
B)



C)



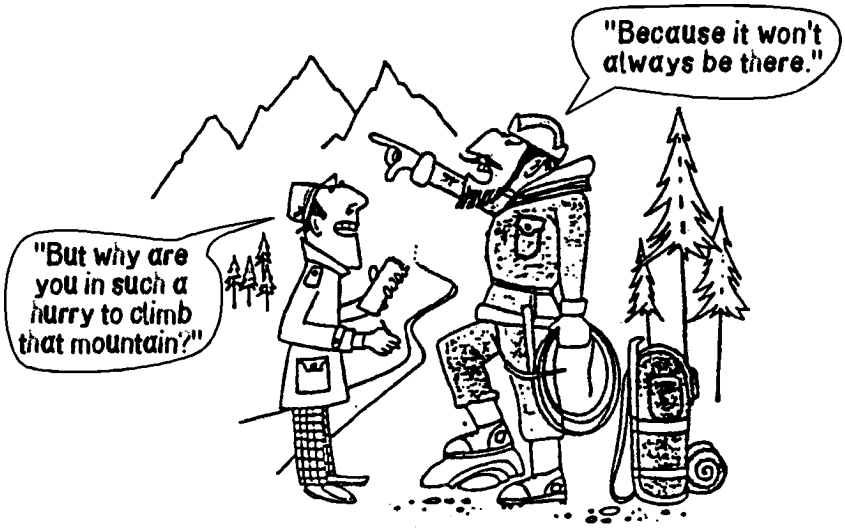
D)



339) Approximately how much of the original mass of rock sample *D* was lost after 30 minutes?

A) 120 g
B) 50 g
C) 75 g
D) 200 g

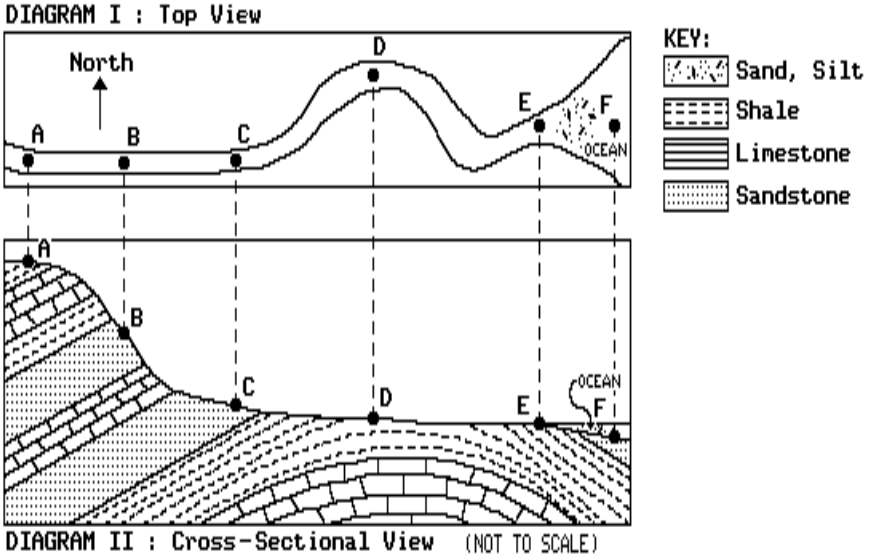
340) In the cartoon below, the mountain climber's remarks show that he is aware of which pair of Earth processes?



A) weathering and erosion
B) folding and faulting
C) compaction and uplifting
D) deposition and sedimentation

Questions 341 through 344 refer to the following:

Diagram *I* below represents a map view of a stream with reference points *A* through *F* within the stream bed. Diagram *II* represents a geologic cross section of the area over which the stream flows. [Assume that the volume of the stream is constant.]



341) Deposition in the ocean between points *E* and *F* is most likely caused by a

A) loss of potential energy by the ocean between *E* and *F*
B) gain of kinetic energy by the sediments between *E* and *F*
C) gain of potential energy by the sediments between *E* and *F*
D) loss of kinetic energy by the sediments between *E* and *F*

342) The potential energy of the stream is highest at point

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

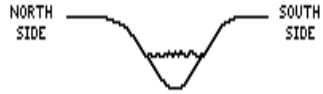
343) At which point would the stream's velocity most likely be *greatest*?

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

344) An observer looks downstream from a location just above point *D* and draws a cross section of the streambed at point *D*. Which diagram would probably best represent this cross section?

A) 

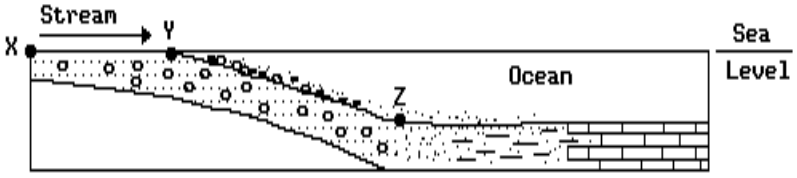
B) 

C) 

D) 

Questions 345 through 349 refer to the following:

The cross-sectional diagram below shows the pattern of deposition of stream-carried sediments on the ocean floor.



345) According to the *Earth Science Reference Tables*, the minimum velocity of the water required to keep pebbles moving between points *Y* and *Z* is closest to

A) 165 cm/sec
B) 50 cm/sec
C) 275 cm/sec
D) 15 cm/sec

346) Which statement best explains the horizontal sorting of the sediments pictured in the diagram?

A) Larger particles settle more quickly than smaller ones.
B) Rainfall increases the accumulation of limestone in deeper ocean areas.
C) Increased stream velocity carries larger particles farther into the ocean than it carries the smaller ones.
D) Suspended material and dissolved chemicals settle immediately.

347) If the stream discharge between *X* and *Y* increased, the most likely result would be

A) a decrease in the average stream velocity
B) an increase in the particle size of sediments entering the ocean
C) an increase in the deposition of sediments between *X* and *Y*
D) a decrease in the amount of erosion

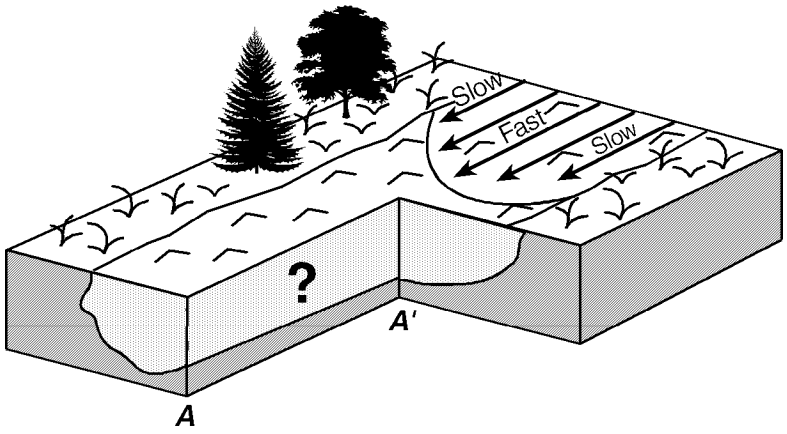
348) If point *X* were uplifted, the potential energy of the stream at point *X* would

A) remain the same
B) increase
C) decrease

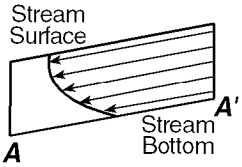
349) If the stream's erosional rate is equal to its depositional rate between points *X* and *Y*, the stream is said to be in

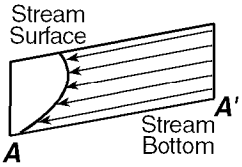
A) environmental imbalance
B) a state of uplift
C) a state of subsidence
D) dynamic equilibrium

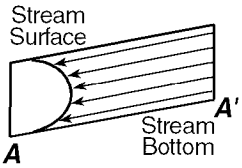
350) In the diagram below of a straight-flowing stream, the lengths of the arrows represent differences in relative stream velocity on the stream's surface.

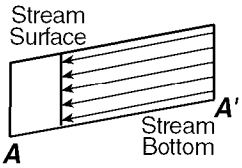


Which diagram *best* represents the relative stream velocity from the surface to the bottom of the stream for the cross section from *A* to *A*1?

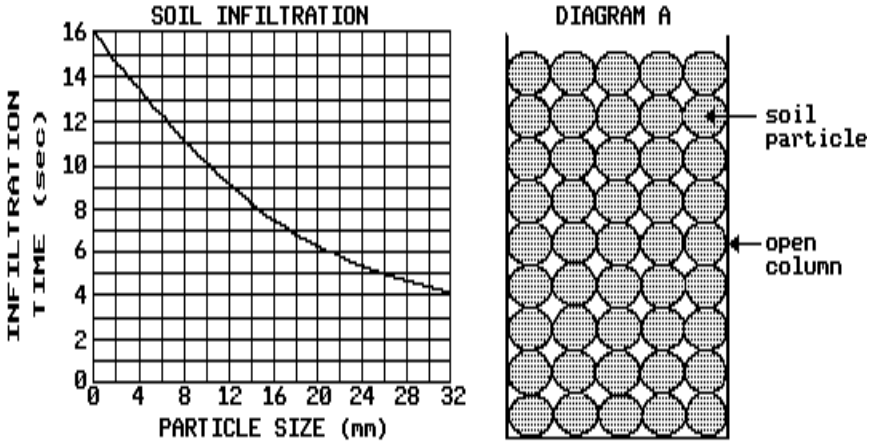
A)


C)


B)


D)


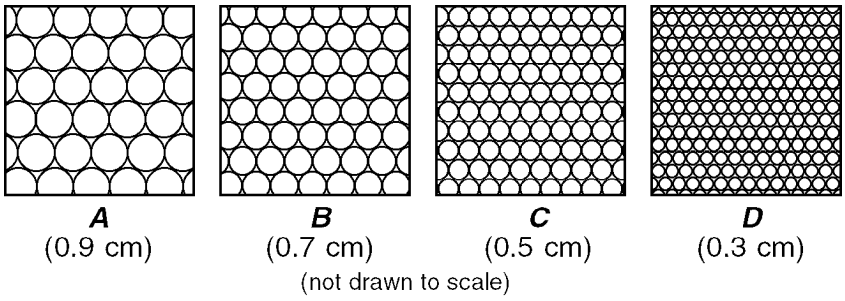
351) Particles of uniform shape and size were placed in an open column. The time required for water to infiltrate through the column from top to bottom was recorded. The procedure was repeated using several different particle sizes. The data were plotted on the graph below.



What would be the time required for water to infiltrate the soil sample shown actual size in diagram *A*?

A) 11-13 sec B) 3-5 sec C) 14-16 sec D) 20-22 sec

352) The diagrams below 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.

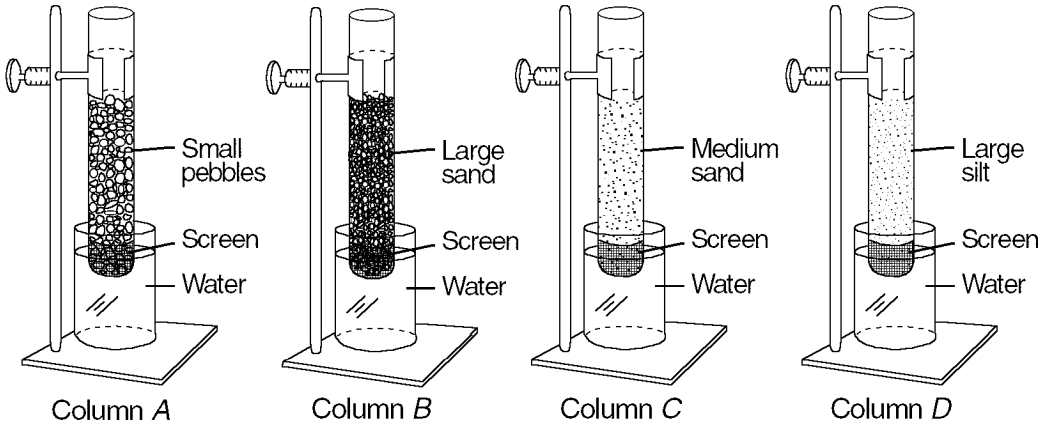


According to the *Earth Science Reference Tables*, particles of the sizes shown are classified as

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

Questions 353 through 355 refer to the following:

Columns *A*, *B*, *C*, and *D* are partially filled with different sediments. Within each column, the sediment is uniform in size. A fine wire mesh screen covers the bottom of each column to prevent the sediment from falling out. The lower part of each column has just been placed in a beaker of water. Sediment sizes are not drawn to scale.



353) In which sediment will capillary action cause the water from the beaker to rise *fastest* in the column?

A) small pebbles C) medium sand
B) large silt D) large sand

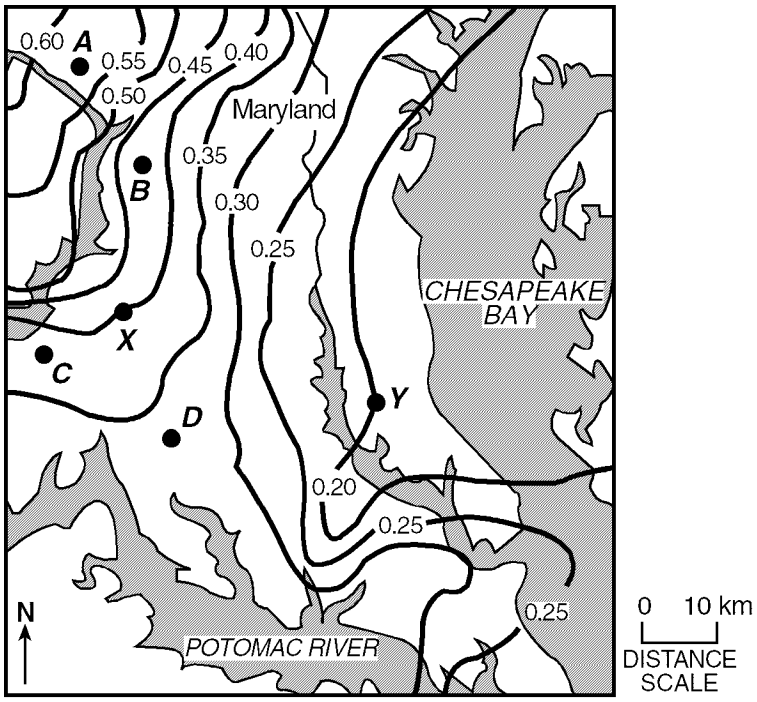
354) Which column contains sediment with an average diameter *closest* to 0.1 centimeter?

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

355) In an experiment, the beakers of water were removed and replaced with empty beakers. The sediments were allowed to dry. Then water was poured into each column to compare the permeability of the sediments. The permeability rate of the medium sand sample was shown to be

A) greater than the silt and pebble samples
B) less than the silt sample but more than the pebble sample
C) greater than the silt sample but less than the pebble sample
D) less than the silt and pebble samples

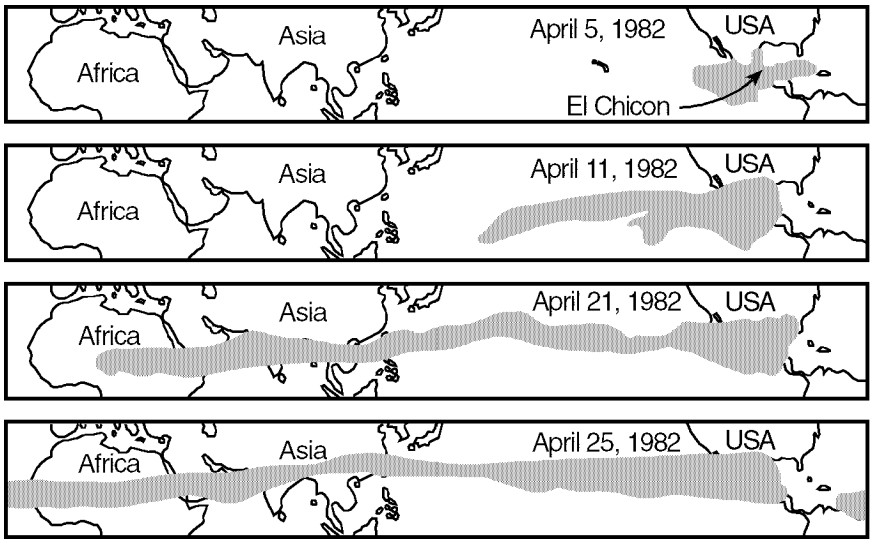
356) The field map below shows the average size of particles deposited by streams that drained an area of Maryland during the Pleistocene Epoch. The field values represent particle diameters in centimeters.



The sedimentary deposits shown on this field map would be classified as

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

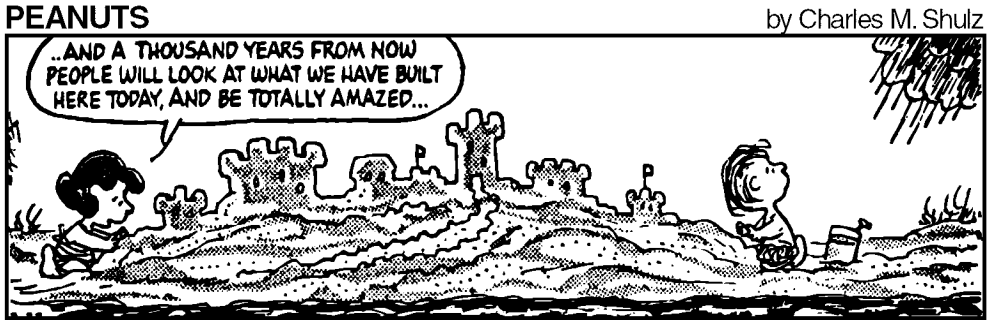
357) The maps below show the spread of a volcanic ash cloud from the 1982 eruption of El Chicon in Mexico, as seen from weather satellites.



As the ash cloud moved away from El Chichon, some ash particles fell back to Earth.

(a) Describe how the size of the particles affected the pattern of deposition.
(b) Describe how the density of the particles affected the pattern of deposition.

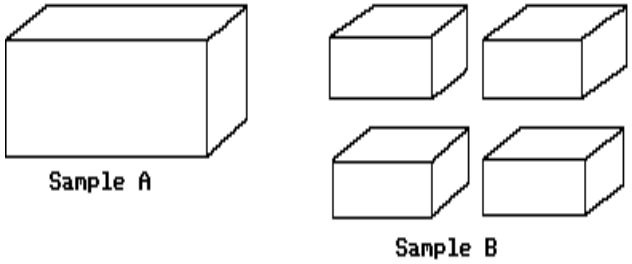
358) The cartoon below presents a humorous view of Earth science.



The cartoon character on the right realizes that the sand castle will eventually be

A) removed by agents of erosion
B) preserved as fossil evidence
C) deformed during metamorphic change
D) compacted into solid bedrock

359) The diagram below represents equal masses of two identical rock samples. Sample *A* is one large block, while sample *B* was cut into four smaller blocks of equal size.

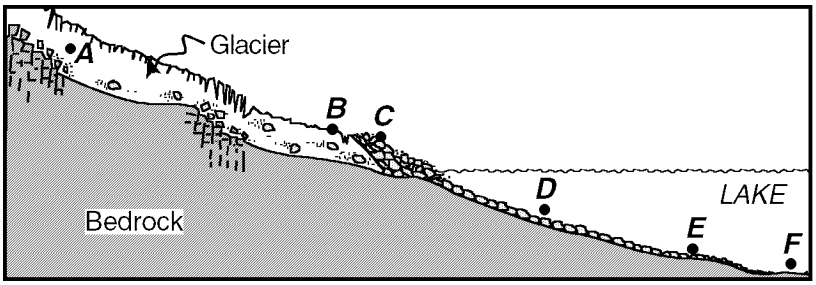


If subjected to the same environmental conditions, sample *B* will weather more quickly than sample *A*. The best explanation for this is that the

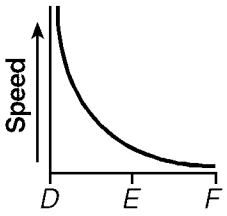
A) density of sample *A* is greater than that of sample *B*
B) hardness of sample *A* is greater than that of sample *B*
C) surface area of sample *B* is greater than that of sample *A*
D) volume of sample *B* is greater than that of sample *A*

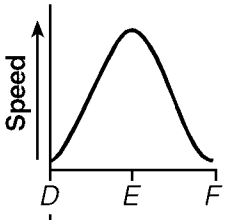
Questions 360 and 361 refer to the following:

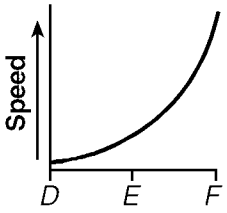
The diagram below represents a glacier moving out of a mountain valley. The water from the melting glacier is flowing into a lake. Letters *A* through *F* identify points within the erosional/depositional system.

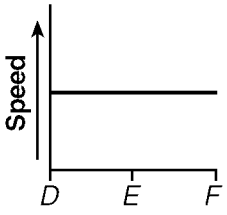


360) Which graph *best* represents the speed of a sediment particle as it moves from point *D* to point *F*?

A) 

B) 

C) 

D) 

361) An interface between erosion and deposition by the ice is most likely located between points

A) *C* and *D*
B) *A* and *B*
C) *D* and *E*
D) *B* and *C*

Questions 362 and 363 refer to the following:

The table below shows the percentages of different grain sizes deposited as sediment in the Mississippi River 100 miles to 1,000 miles downstream from Cairo, Illinois. The river's mouth empties into the Gulf of Mexico 1,000 miles from Cairo.

GRAIN SIZE PERCENTAGES

Grain Size	Miles Downstream from Cairo					
	100 mi	300 mi	500 mi	700 mi	900 mi	1,000 mi
Small Pebbles	29%	8%	14%	5%	none	none
Coarse Sand	30%	22%	9%	8%	1%	none
Medium Sand	32%	50%	46%	44%	26%	9%
Fine Sand	8%	19%	28%	41%	70%	69%
Silt	trace	trace	2%	1%	2%	10%
Clay	trace	trace	1%	trace	1%	10%

362) What was the minimum water velocity needed to transport the sediments deposited 900 miles downstream from Cairo?

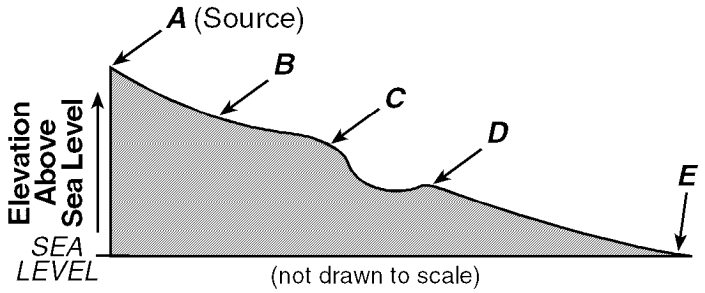
A) 50 cm/sec
B) 170 cm/sec
C) 200 cm/sec
D) 20 cm/sec

363) As a pebble travels downstream from Cairo toward the Gulf of Mexico, it most likely becomes more

A) flattened
B) dense
C) angular
D) rounded

Questions 364 and 365 refer to the following:

The diagram below represents a profile of a stream. Points *A* through *E* are locations along the stream.



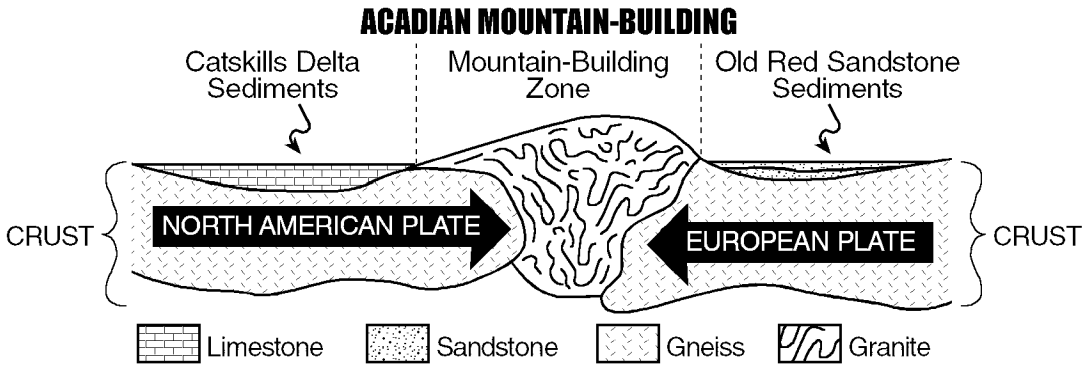
364) Between which two points is potential energy changing to kinetic energy most rapidly?

A) *B* and *C*
B) *A* and *B*
C) *C* and *D*
D) *D* and *E*

365) At which location would the amount of deposition be *greatest*?

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

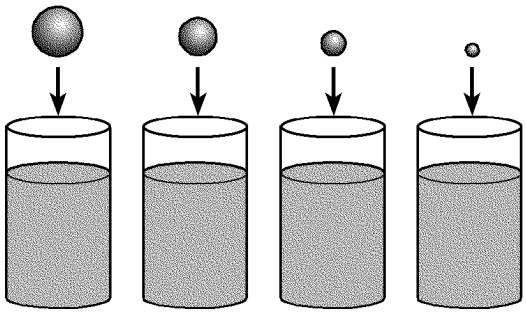
366) The diagram below represents the Acadian Orogeny (mountain- building) that resulted from a collision between the North American Plate and the European Plate.



The Catskill Delta and the Old Red Sandstone sediment layers were formed when the Acadian Mountains

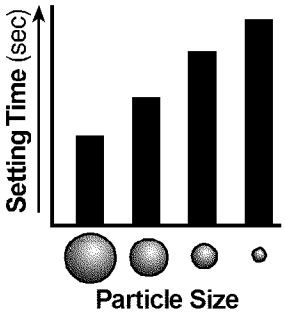
A) faulted
B) folded
C) eroded
D) melted

367) The diagram below shows four identical columns containing the same amount of water. Four different-sized spherical particles, made of the same uniform material, are dropped into the columns and settle to the bottom.

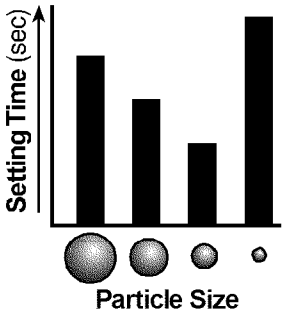


Which one of the following graphs *best* shows the relative settling times of the four particles?

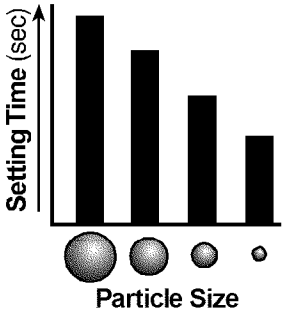
A)



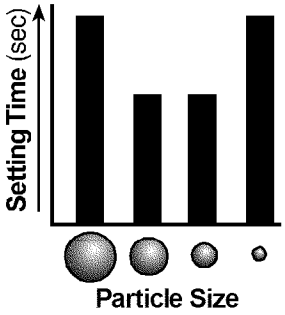
C)



B)

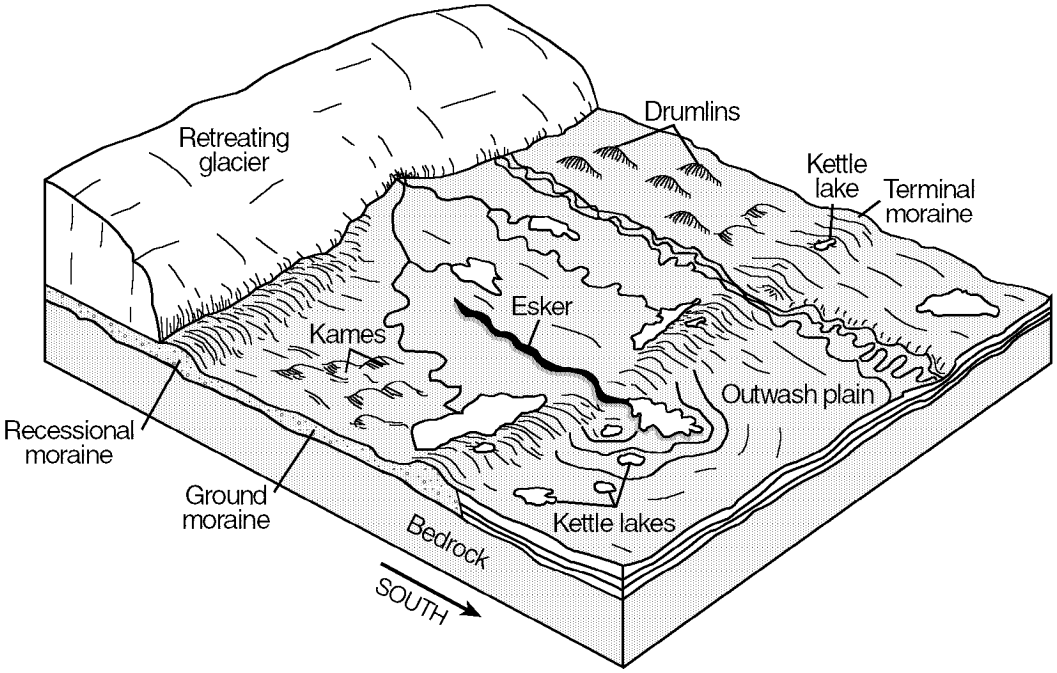


D)



Questions 368 and 369 refer to the following:

The block diagram below shows some of the landscape features formed as the *most* recent continental glacier melted and retreated across western New York State.



368) The shape of elongated hills labeled drumlins is *most* useful in determining the

A) age of the glacier
B) thickness of the glacial ice
C) direction of glacial movement
D) rate of glacial movement

369) The moraines pictured in the block diagram were deposited directly by the glacier. The sediments within these moraines are most likely

A) unsorted by size and unlayered
B) sorted by size and layered
C) sorted by size and unlayered
D) unsorted by size and layered

Questions 370 and 371 refer to the following:

The table below shows the percentages of different grain sizes deposited as sediment in the Mississippi River 100 miles to 1,000 miles downstream from Cairo, Illinois. The river's mouth empties into the Gulf of Mexico 1,000 miles from Cairo.

GRAIN SIZE PERCENTAGES

Grain Size	Miles Downstream from Cairo					
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Medium Sand	32%	50%	46%	44%	26%	9%
Fine Sand	8%	19%	28%	41%	70%	69%
Silt	trace	trace	2%	1%	2%	10%
Clay	trace	trace	1%	trace	1%	10%

370) Which statement *best* describes the changes in the velocity of the stream and the particle sizes carried by the stream between 500 and 900 miles below Cairo?

A) Velocity decreased and particle size decreased.
B) Velocity decreased and particle size increased.
C) Velocity increased and particle size decreased.
D) Velocity increased and particle size increased.

371) At the river's mouth, 1,000 miles downstream from Cairo, small pebbles and coarse sand are *not* being deposited because these particles are

A) deposited before reaching this location
B) being carried in suspension
C) dissolved in the river water
D) being rolled along the stream bottom