

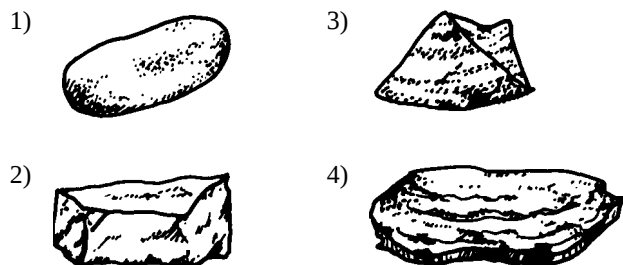
1. On the Earth's surface, transported materials are more common than residual materials. This condition is mainly the result of

- 1) subduction
- 2) erosion
- 3) folding
- 4) recrystallization

2. Which rock material was most likely transported to its present location by a glacier?

- 1) rounded sand grains found in a river delta
- 2) rounded grains found in a sand dune
- 3) residual soil found on a flat plain
- 4) unsorted loose gravel found in hills

3. Which quartz sample has probably undergone abrasion in a stream for the longest period of time?



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

- 1) It will become jagged and its mass will decrease.
- 2) It will become jagged and its volume will increase.
- 3) It will become rounded and its mass will increase.
- 4) It will become rounded and its volume will decrease.

5. Unsorted, angular, rough-surfaced cobbles and boulders are found at the base of a cliff. What most likely transported these cobbles and boulders?

- 1) running water
- 2) wind
- 3) gravity
- 4) ocean currents

6. An increase in the velocity of a stream is most likely due to

- 1) an increase in stream discharge
- 2) an increase in the width of the riverbed
- 3) a decrease in the slope of the stream channel
- 4) a decrease in the amount of material held in suspension

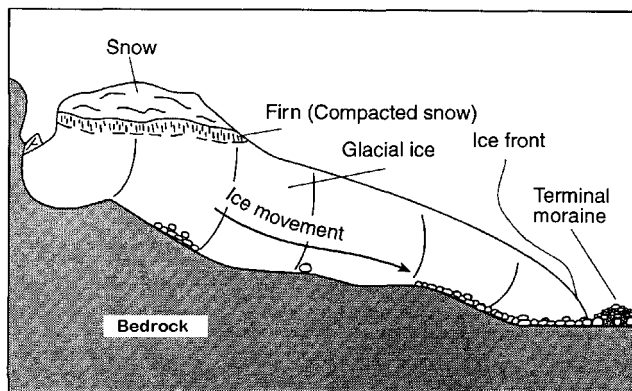
7. Two streams begin at the same elevation and have equal volumes. Which statement best explains why one stream could be flowing faster than the other stream?

- 1) The faster stream contains more dissolved minerals.
- 2) The faster stream has a much steeper gradient.
- 3) The streams are flowing in different directions.
- 4) The faster stream has a temperature of 10°C, and the slower stream has a temperature of 20°C.

8. Which rock particles will remain suspended in water for the longest time?

- 1) pebbles
- 2) sand
- 3) silt
- 4) clay

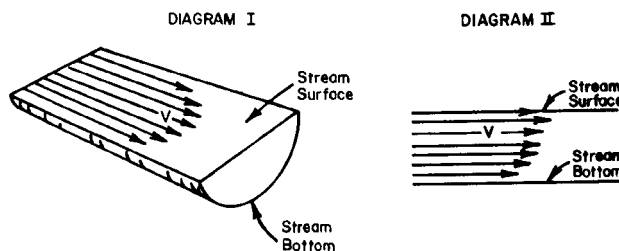
9. Base your answer to the following question on the diagram which represents a profile of a mountain glacier in the northern United States.



The downhill movement of mountain glaciers such as the one shown in the diagram is primarily caused by

- 1) evaporation of ice directly from the glacier
- 2) snow blowing across the top of the glacier
- 3) the force of gravity pulling on the glacier
- 4) water flowing over the glacier

10. 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?

- 1) at the center along the bottom
- 2) at the center near the surface
- 3) at the sides along the bottom
- 4) at the sides near the surface

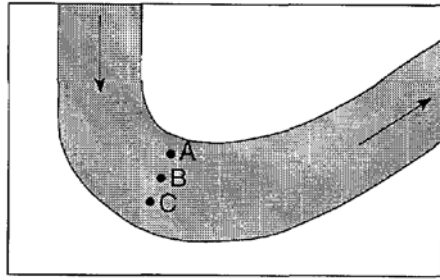
11. At the present time, glaciers occur mostly in areas of

- 1) high latitude or high altitude
- 2) low latitude or low altitude
- 3) middle latitude and high altitude
- 4) middle latitude and low altitude

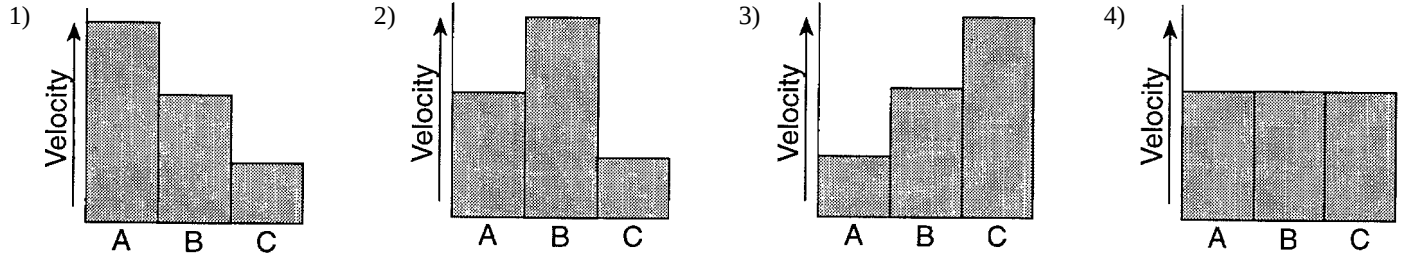
12. The particles in a sand dune deposit are small and very well-sorted and have surface pits that give them a frosted appearance. This deposit most likely was transported by

- 1) ocean currents
- 2) glacial ice
- 3) gravity
- 4) wind

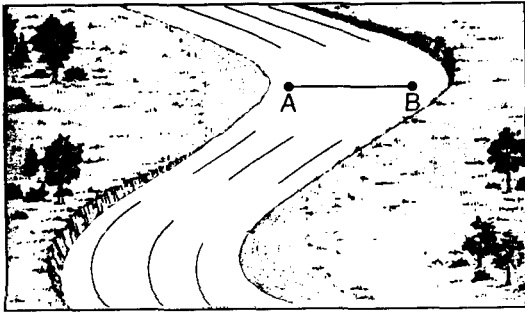
13. The map below represents a large stream meander (bend). The arrows show the direction of stream flow. Stream velocity was measured at surface locations A, B, and C.



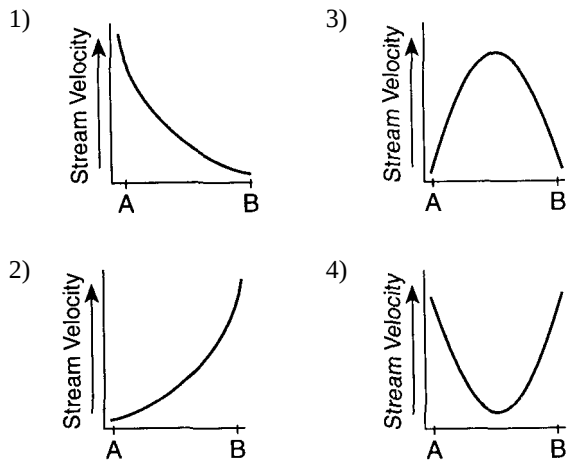
Which graph best represents the relative velocities of the stream at locations A, B, and C?



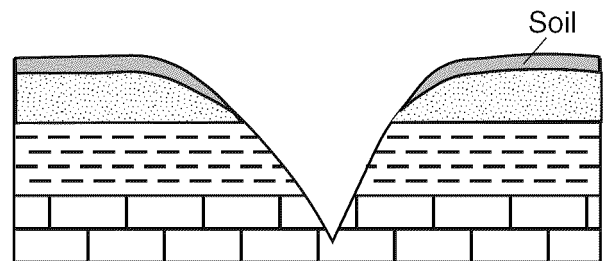
14. The diagram below shows a meandering stream. Measurements of stream velocity were taken along straight line AB.



Which graph best shows the relative stream velocities across the stream from A to B?



15. 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?

- 1) surface winds 3) glacial ice
2) running water 4) ocean waves
16. The four particles shown in the table below are of equal volume and are dropped into a column filled with water.

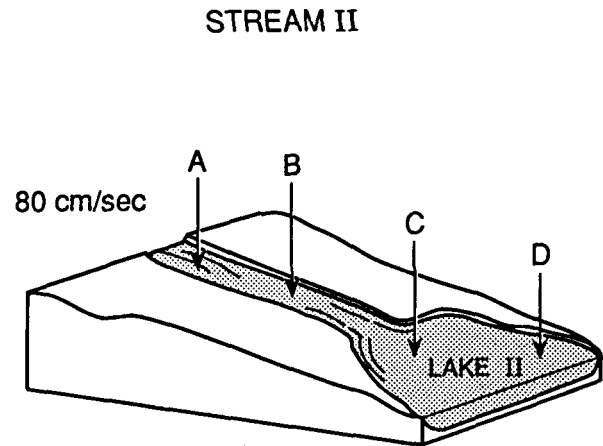
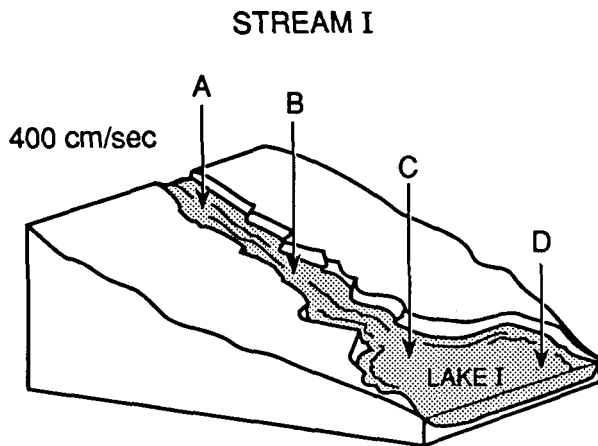
Particle	Shape	Density
A	flat	2.5 g/cm ³
B	flat	3.0 g/cm ³
C	round	2.5 g/cm ³
D	round	3.0 g/cm ³

Which particle would usually settle most rapidly?

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

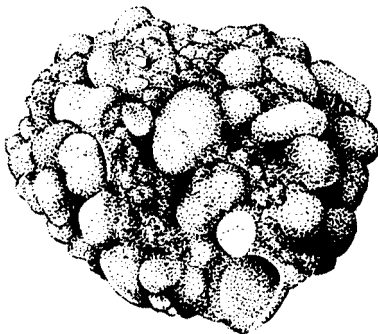
Base your answers to questions 17 through 19 on the information and diagrams below.

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.



17. Which statement best describes what happens when the particles are placed in the streams?
- 1) Stream I will move all particles that are added at point A.
 - 2) Stream II will move all particles that are added at point A.
 - 3) Stream I cannot move sand.
 - 4) Stream II cannot move sand.
18. Which statement is the most accurate description of conditions in both streams?
- 1) The greatest deposition occurs at point B.
 - 2) Particles are carried in suspension and by bouncing along the bottom.
 - 3) The particles will have a greater velocity than the water in the stream.
 - 4) The velocity of the stream is the same at point B as at point C.
19. If a sudden rainstorm occurs at both streams above point A, the erosion rate will
- 1) increase for stream I, but not for stream II
 - 2) increase for stream II, but not for stream I
 - 3) increase for both streams
 - 4) not change for either stream

20. The diagram below shows a sedimentary rock sample.

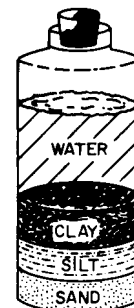


(Shown actual size)

Which agent of erosion was most likely responsible for shaping the particles forming this rock?

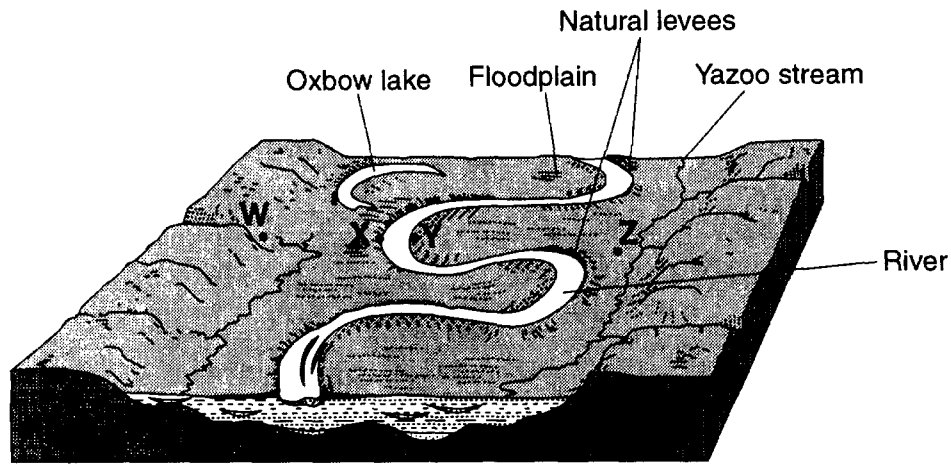
- 1) mass movement
- 2) wind
- 3) glacial ice
- 4) running water

21. Clay, silt, and sand are added to a jar of water. The jar is shaken and then allowed to stand quietly for a number of hours. The result of this demonstration could be best used as a model to show that



- 1) particles with the lowest density settle the fastest
- 2) particles with the largest diameter settle the fastest
- 3) water has a higher specific gravity than clay, silt, and sand
- 4) the bottom layer of a series of sediments is the youngest

22. Base your answer to the following question on the diagram below, which represents the landscape features associated with a meandering river. Letters W, X, Y, and Z represent locations on the floodplain.



The choices below represent stages in the formation of a meandering river. Which sequence best represents the usual changes over time?

- 1) A → B → C
- 2) A → C → B
- 3) C → A → B
- 4) C → B → A

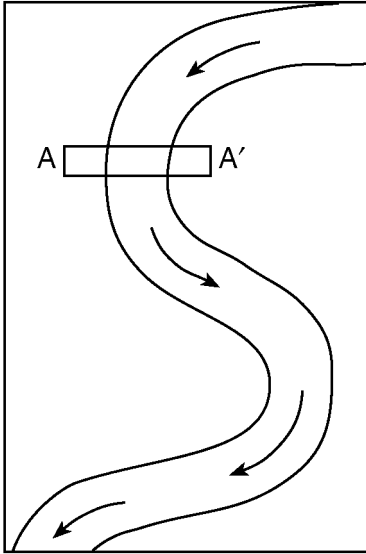
23. Why do the particles carried by a river settle to the bottom as the river enters the ocean?

- 1) The density of the ocean water is greater than the density of the river water.
- 2) The kinetic energy of the particles increases as the particles enter the ocean.
- 3) The velocity of the river water decreases as it enters the ocean.
- 4) The large particles have a greater surface area than the small particles.

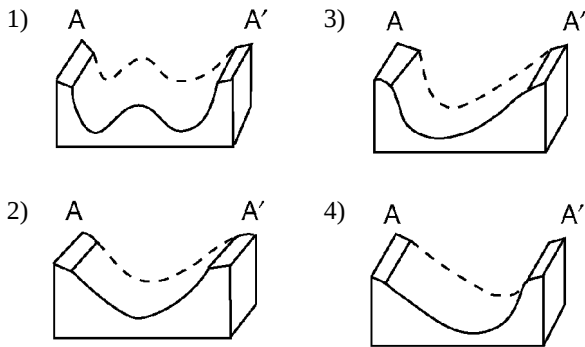
24. As the gradient of a stream increases, the stream's ability to carry sediment

- 1) decreases
- 2) increases
- 3) remains the same

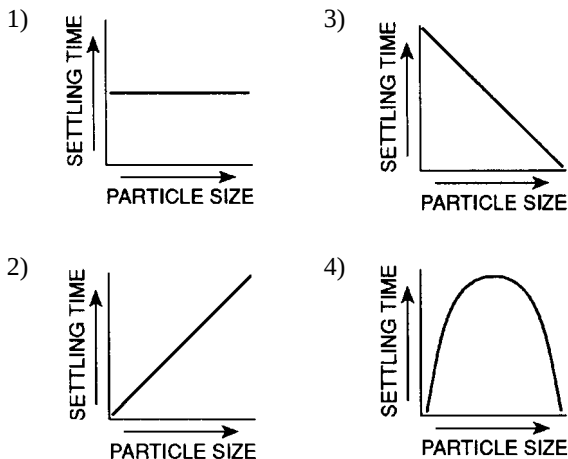
25. The map below shows a meandering river. A–A' is the location of a cross section. The arrows show the direction of the riverflow.



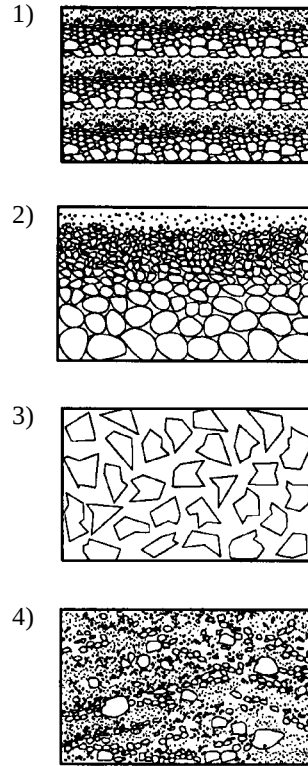
Which cross section best represents the shape of the river bottom at A–A'?



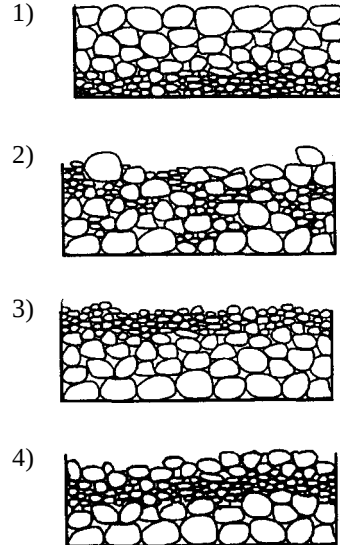
26. In a soil sample, the particles have the same shape but different sizes. Which graph best represents the relationship between particle size and settling time when these particles are deposited in a quiet body of water?



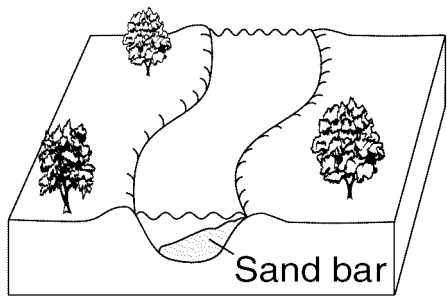
27. Which diagram best illustrates a cross section of sediments that were transported and deposited by a glacier?



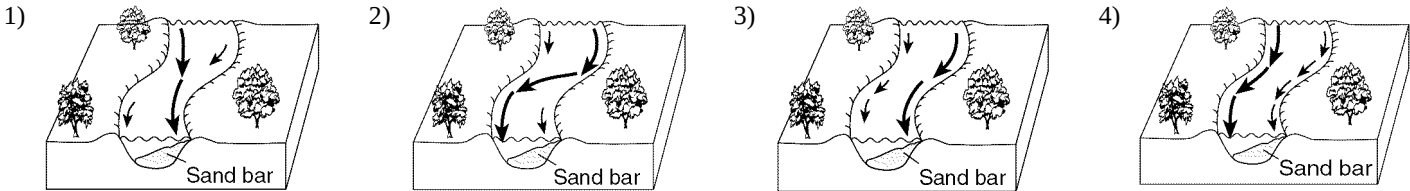
28. Quartz particles of varying sizes are dropped at the same time into deep, calm water. Which cross section best represents the settling pattern of these particles?



29. The diagram below shows a meandering stream flowing across nearly flat topography and over loose sediments.



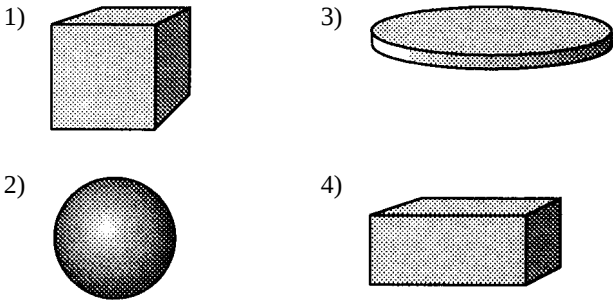
If arrow length represents stream velocity, which diagram best shows the relative stream velocities in this section of the stream?



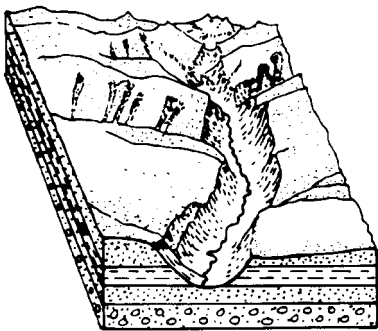
30. Four samples of aluminum, A, B, C, and D, have identical volumes and densities, but different shapes. Each piece is dropped into a long tube filled with water. The time each sample takes to settle to the bottom of the tube is shown in the table below.

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?



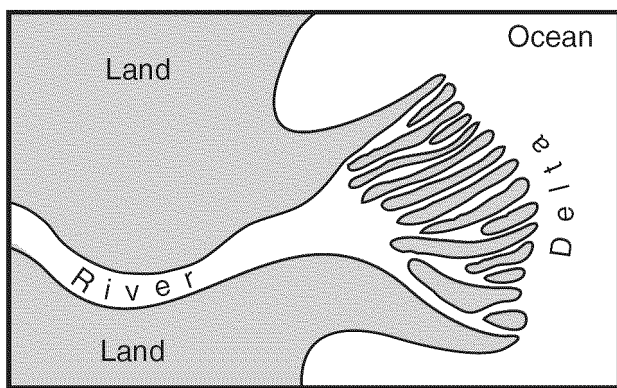
31. The diagram below represents a section of the Earth's crust.



This surface landscape was most likely caused by

- 1) folding of the crust
- 2) sinking of rock layers
- 3) erosion by valley glaciers
- 4) deposition of stream sediments

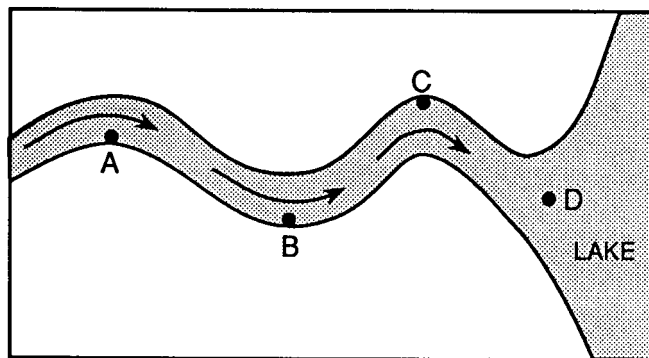
32. The map below shows a river emptying into an ocean, producing a delta.



Which graph best represents the relationship between the distance from the river delta into the ocean and the average size of sediments deposited on the ocean floor?

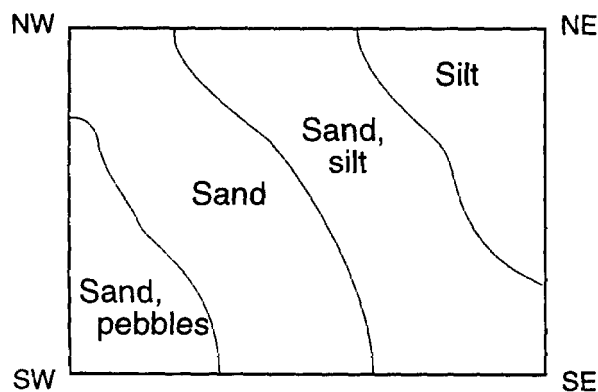
- 1)
- 2)
- 3)
- 4)

33. 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?

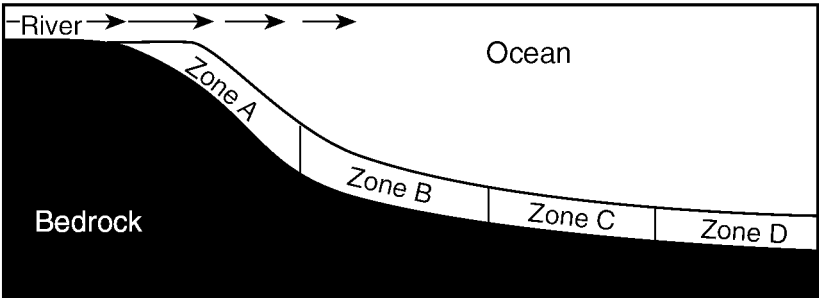
- 1) Erosion is dominant at A and D, and deposition is dominant at B and C.
 - 2) Erosion is dominant at B and C, and deposition is dominant at A and D.
 - 3) Erosion is dominant at A and C, and deposition is dominant at B and D.
 - 4) Erosion is dominant at B and D, and deposition is dominant at A and C.
34. A stream entering a lake deposits sediments on the lake bottom in the pattern shown on the map below.



Which corner of the map is nearest to the point where the stream flows into the lake?

- 1) northeast (NE)
- 2) northwest (NW)
- 3) southeast (SE)
- 4) southwest (SW)

35. Base your answer to the following question on the cross section and data table shown below. The cross section shows a sediment-laden river flowing into the ocean. The arrows show the direction of river flow. Different zones of sorted sediments, A, B, C, and D, have been labeled. Sediments have been taken from these zones and measured. The data table shows the range of sediment sizes in each zone.



Data Table	
Zone	Major Sediment Sizes
A	0.04 cm to 6 cm
B	0.006 cm to 0.1 cm
C	0.0004 cm to 0.006 cm
D	Less than 0.0004 cm

How is this pattern of horizontal sorting produced?

- 1) High-density materials generally settle more slowly.
- 2) Rounded sediments generally settle more slowly.
- 3) Dissolved minerals are generally deposited first.
- 4) Bigger particles are generally deposited first.

Answer Key

1. 2

2. 4

3. 1

4. 4

5. 3

6. 1

7. 2

8. 4

9. 3

10. 2

11. 1

12. 4

13. 3

14. 2

15. 2

16. 4

17. 1

18. 2

19. 3

20. 4

21. 2

22. 1

23. 3

24. 2

25. 3

26. 3

27. 4

28. 3

29. 2

30. 2

31. 3

32. 1

33. 2

34. 4

35. 4
