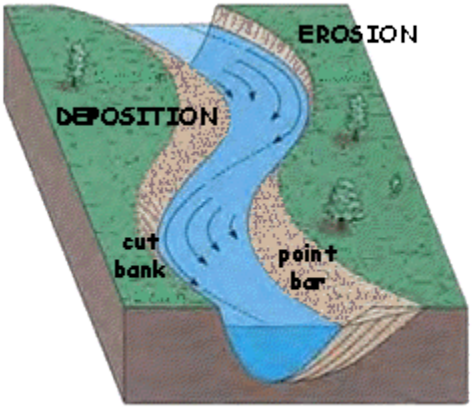
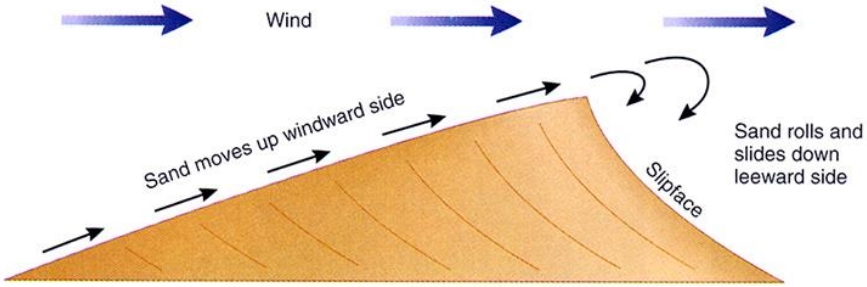
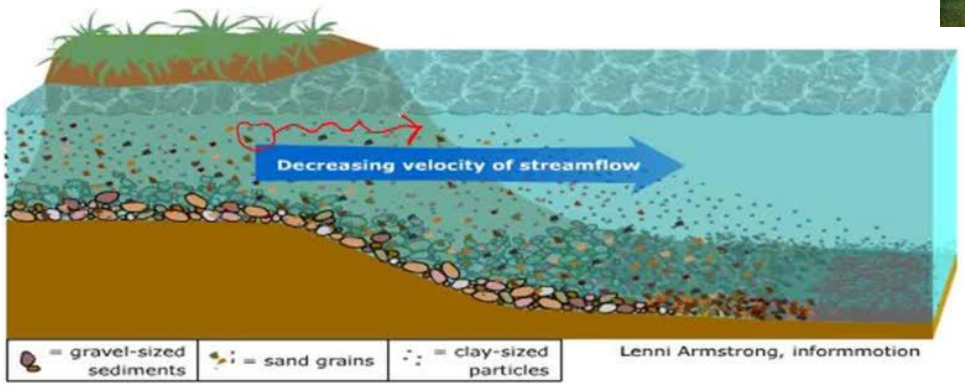
Practice Packet

Topic 5: Deposition





How Deposition Works



Vocabulary: _____

Lesson 1: _____

Lesson 2: _____

Lesson 3: _____

Name: _____

PRACTICE PACKET: TOPIC 5 Surface Processes & Landscapes: Water & Ground

VOCABULARY

For each word, provide a short but specific definition from YOUR OWN BRAIN! No boring textbook definitions. Write something to help you remember the word. Explain the word as if you were explaining it to an elementary school student. Give an example if you can. Don't use the words given in your definition!

Gradient:_____

Discharge: _____

Meander: _____

Graded Bedding: _____

Horizontal Sorting: _____

Oxbow Lake: _____

V-Shaped Valley: _____

Delta: _____

Glacier: _____

Till: _____

Striations: _____

U-Shaped Valley: _____

Moraine: _____

Outwash Plain: _____

Kettle Lakes: _____

Erratic: _____

Drumlin: _____

Mass Movement: _____

Deflation: _____

Sand Dunes: _____

Barrier Islands: _____

PRACTICE PACKET: TOPIC 5 Surface Processes & Landscapes: Water & Ground

Lesson 1 –Erosion & Deposition by Running Water

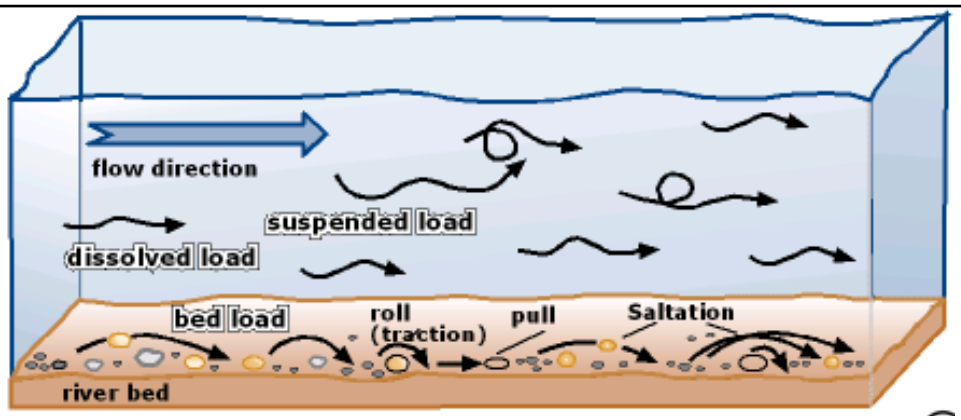
Objective:

- I can explain how running water transports sediment
- I can describe stream velocity
- I can illustrate where erosion & deposition takes place on a meandering river
- I can describe the two main ways running water sorts sediments
- I can define features made by a river

A stream is any body of water with a current. It includes brooks, creeks, tributaries and rivers. Running water is the most erosive agent. Gravity causes water to flow downhill. Sediments are weathered by abrasion and become smaller, rounder and smoother. The faster the water moves, the larger the particles it can transport. As the water slows down, the larger, rounder, more dense particles settle out first. Sediments carried in a stream move slower than the water.

Transportation of sediment in a stream

- Floatation - Materials that float on the water (ex. branches)
- Solution - Sediments are dissolved in the water (ex. Salt)
- Suspension - Sediments that remain mixed within the water (ex. clay and silt)
- Bedload - Sediments that bounce(saltation) and roll (traction) on the stream bed (ex. pebbles and sand)



1. What is a stream? _____
2. How does gravity affect running water? _____
3. What type of physical weathering occurs as sediments are transported by a stream? _____

   _____
4. What happens to the size, shape, and texture of a sediment as it is transported by a stream?

   _____, _____, _____

   size shape texture
5. What is VELOCITY? _____
6. What is GRADIENT (slope) and how is it calculated (see reference tables)?

   Definition: Formula:

7. What is stream DISCHARGE? _____
8. How does gradient affect the velocity of a stream? _____
9. How does gradient affect the amount of material a stream can transport? _____

   _____
10. How does discharge change after a heavy rainfall or snow melt? _____
11. How does discharge affect the velocity of a stream? _____

    _____
12. How does discharge affect the amount of material a stream can transport? _____

    _____

ES Reference Tables page 6 "Relationship of Transported Particle Size to Water Velocity"

The graph below shows the water velocity needed keep different sized particles moving in a stream. This same graph is in your Earth Science Reference tables. Four thin lines have been added to illustrate the increase in particle size able to be transported.

13. What page is this chart located on, in the Earth Science Reference Tables? _____
14. For each of the following particle sizes, write the minimum stream velocity needed to maintain movement.
    a. Clay < 0.02 cm/s
    b. Silt _____ cm/s
    c. Sand _____ cm/s
    d. Pebbles _____ cm/s
    e. Cobbles _____ cm/s
    f. Boulders _____ cm/s
15. State the relationship between stream velocity and particle size moved by the stream. Write it out completely.
16. Name the largest particles (sediments) that will be carried by water at the following velocities:
    a. 500 cm/sec _____
    b. 100 cm/sec _____
    c. 200 cm/sec _____
    d. 50 cm/sec _____
17. Name the particle(s) that will be deposited if a stream moving at 700 cm/sec suddenly decreases in velocity to 225 cm/sec?
18. State the water velocity necessary to maintain the transport of the following sized particles.
    a. 0.1 cm diameter: _____
    b. 25.6 cm diameter: _____
    c. .001 cm diameter: _____
    d. 10 cm diameter: _____
19. Why do you think particle size diameters appear on BOTH the left and right sides of the chart?

20. As soon as water velocity decreases even slightly, what occurs? _____

21. Name the particle(s) that **cannot** be transported by a stream moving at 150 cm/sec. _____

_____

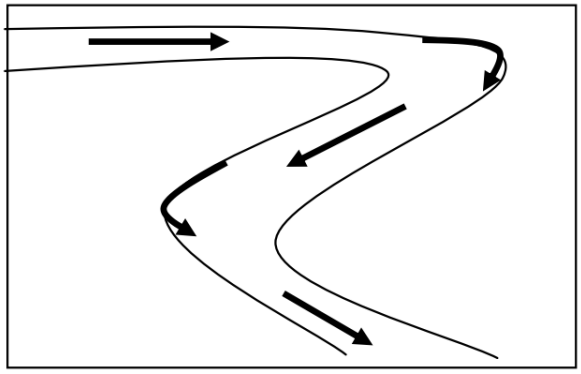
22. State the range of particle sizes for a "cobble". _____

23. At approximately what speed will the stream no longer be able to transport pebbles. _____

Velocity of a stream is influenced by gradient (slope), the amount of water in the stream - volume (discharge), shape of the channel and amount of sediment in the stream.

24. Complete the statements below by **circling the correct word or words** that describes the conditions necessary for the stream to flow faster.
    a. Gradient : The **[** steeper / gentler **]** the slope, the faster the water flows.
    b. Volume: (discharge – the amount of water flowing past a fixed point each second) The **[** less water / greater the amount of water **]** in the stream, the faster the water flows.
    c. Amount of sediment in the stream:
        i. A stream with a lot of sediment in it will flow **[** faster / slower **]** than a stream without a lot of sediment.
        ii. The sediment in the stream will always flow **[** faster / slower / at the same rate **]** as the water that carries it.
    d. Shape of stream channel The arrows shown in the diagram below illustrates where the velocity of the stream is the greatest. The curves in a stream are called meanders.

25. Water moves quickest through the
    a. straight smooth section of the stream
    b. meanders – curves



26. In a straight section of a stream the water moves fastest
    a. at the top of the water
    b. just below the surface
    c. at the bottom of the channel

27. Weathering and erosion takes place where the water flows the
    a. fastest b. Slowest

28. Water flows fastest on the **[** outside / inside **]** of a meander.

29. Erosion takes place primarily on the **[** outside / inside **]** of a meander.

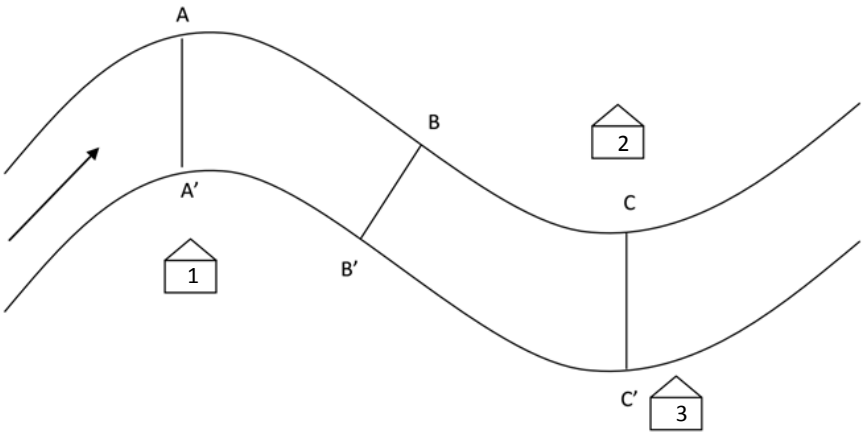
30. Water flows slowest on the **[** outside / inside **]** of a meander.

31. Deposition takes place primarily on the **[** outside / inside **]** of a meander.

32. Place the letter "**E**" next to the arrows on the outside of the meanders (curves).

33. Place the letter "**D**" (deposition) next to the inside of the meanders (curves).

Not only does erosion cut farther into the bank of the stream, it also erodes the bottom of the stream bed. Plot the data from the three tables below on to the corresponding graphs. Create a profile for each section by connecting the plotted points



A to A'

Distance (m)	0	5	10	15	20	25	30	35	40	45	50
Depth (m)	0	4.0	6.5	6.0	5.0	3.0	1.5	1.0	.75	.5	0

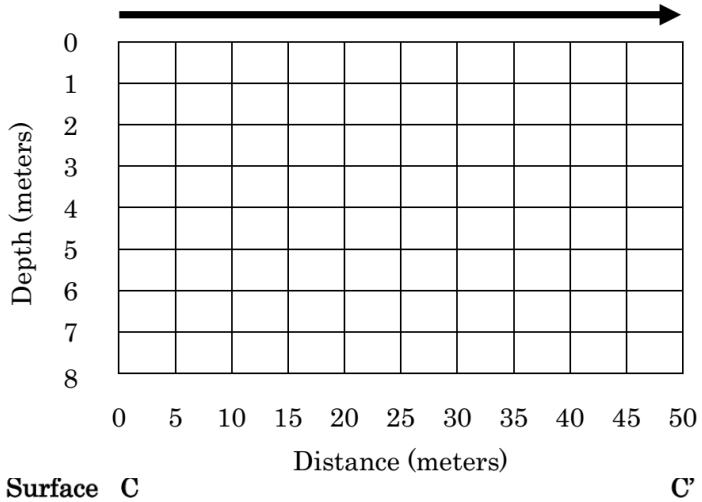
B to B'

Distance (m)	0	5	10	15	20	25	30	35	40	45	50
Depth (m)	0	2.0	4.0	5.5	6.0	6.5	6.0	5.0	4.0	2.0	0

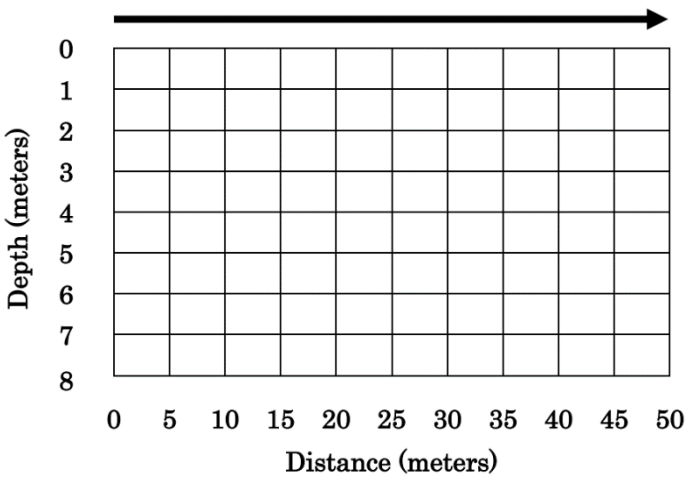
C to C'

Distance (m)	0	5	10	15	20	25	30	35	40	45	50
Depth (m)	0	.5	.75	1.0	1.5	3.0	4.5	6.0	6.5	4.5	0

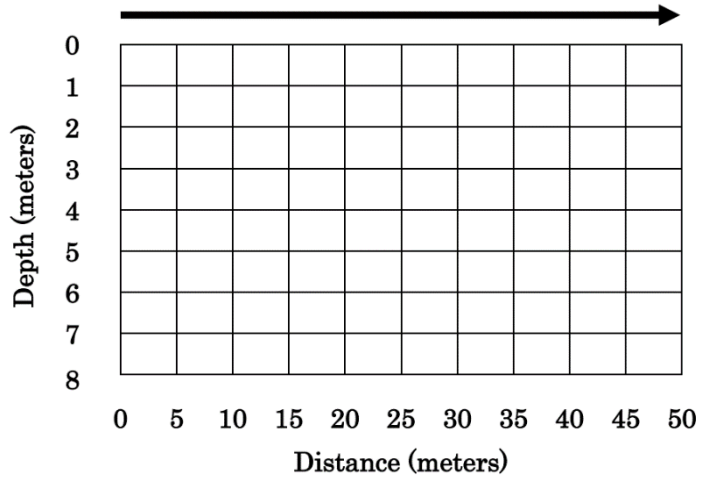
Surface A A'



Surface B B'

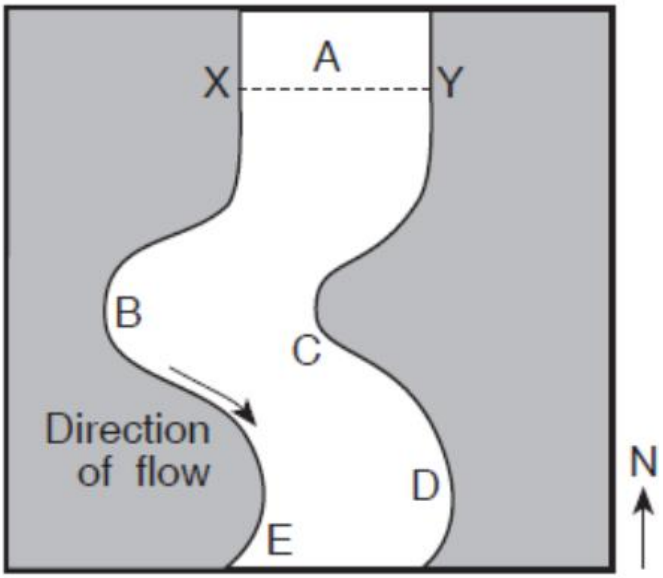


Surface C C'



34. If you were buying a house, what house would **not** be a good house to buy? Why?

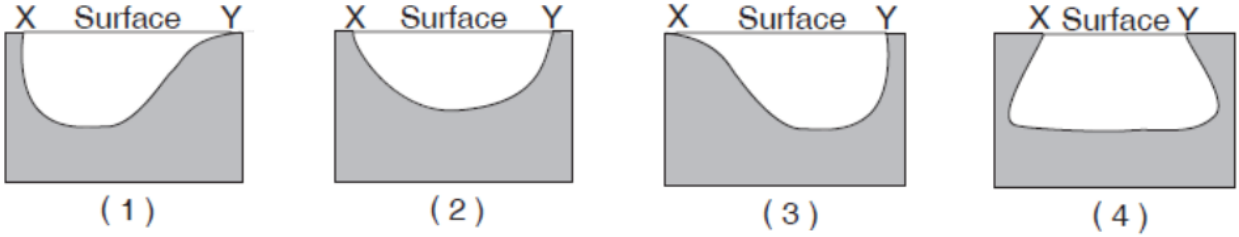
Base your answers to questions 35 through 37 on the map to the right, which shows a portion of a stream in New York State that flows southward. Letters A through E represent locations in the stream. Line XY is the location of a cross section.



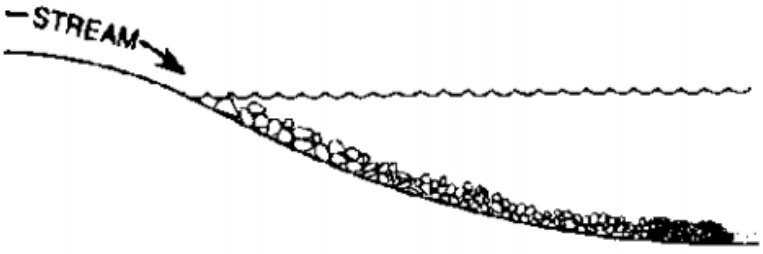
35. At which two locations in this stream is deposition normally dominant over erosion?
    a. A and D c. C and E
    b. B and E d. D and C

36. Where this stream's velocity decreases from 300 to 200 centimeters per second, which size sediment will be deposited?
    a. cobbles c. sand
    b. silt d. clay

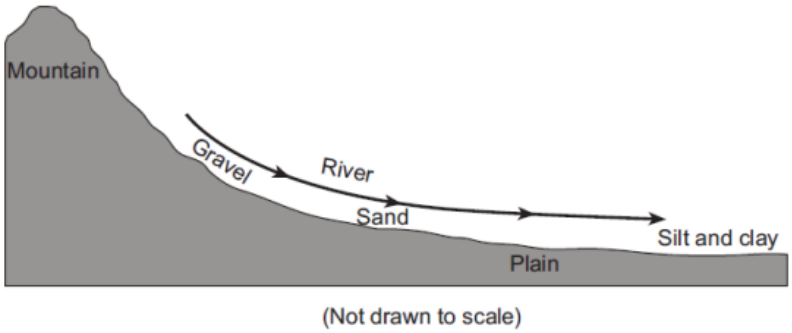
37. Which cross section along line XY best represents the shape of the stream bottom?



Horizontal sorting: Occurs when a stream enters a large body of water. The velocity of a stream slows down and the larger particles settle out first.



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

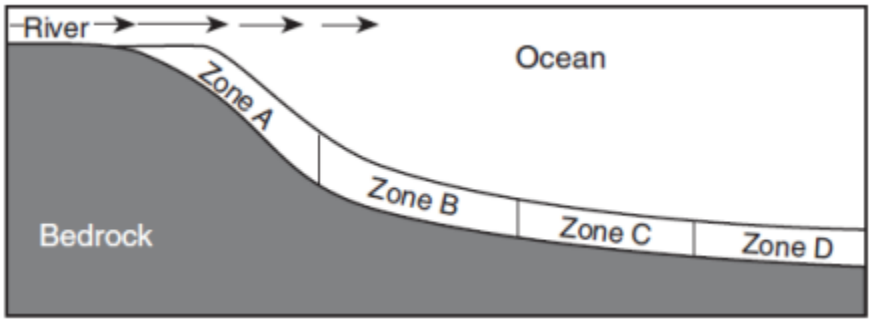


(Not drawn to scale)

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. mineral composition of the sediment
d. temperature of the water

Base your answers to questions 39 and 40 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

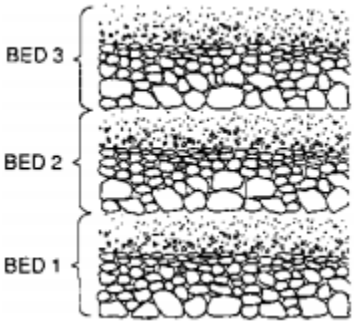
39. How is this pattern of horizontal sorting produced?
    a. High-density materials generally settle more slowly.
    b. Rounded sediments generally settle more slowly.
    c. Dissolved minerals are generally deposited first.
    d. Bigger particles are generally deposited first.

40. The sedimentary rock, siltstone, will most likely form from sediments deposited in zone.
    a. A b. B c. C d. D

Vertical sorting (graded bedding): The sorting of sediments from bottom to top. The largest, roundest, most dense particles settle out first and are on the bottom. Vertical sorting occurs after a major event such as volcanic eruptions, earthquakes and hurricanes.

Graded Bedding is a series of depositional events that occurred at different times. You can count how many events have occurred by counting the beds.

How many events are represented in the diagram to the right?



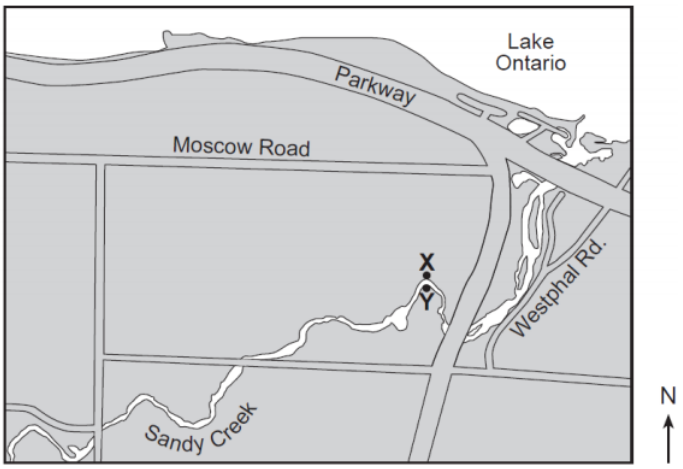
Regents Questions:

1. The large waterfall at Niagara Falls, New York, was originally located at the Niagara Escarpment. Which term best describes an escarpment?
    a. U-shaped valley b. V-shaped valley c. cliff d. drumlin

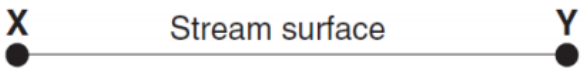
2. Trees growing on the edge of a river's meander are most likely to fall into the river due to
    a. deposition on the inside of the meander
    b. deposition on the outside of the meander
    c. erosion on the inside of the meander
    d. erosion on the outside of the meander

3. What is the approximate minimum stream velocity needed to keep a particle with a diameter of 25.6 centimeters moving?
    a. 100 cm/sec b. 200 cm/sec c. 300 cm/sec d. 400 cm/sec

Base your answers to questions 4 through 7 on the map below and on your knowledge of Earth science. The map shows the location of Sandy Creek, west of Rochester, New York. X and Y represent points on the banks of the stream.

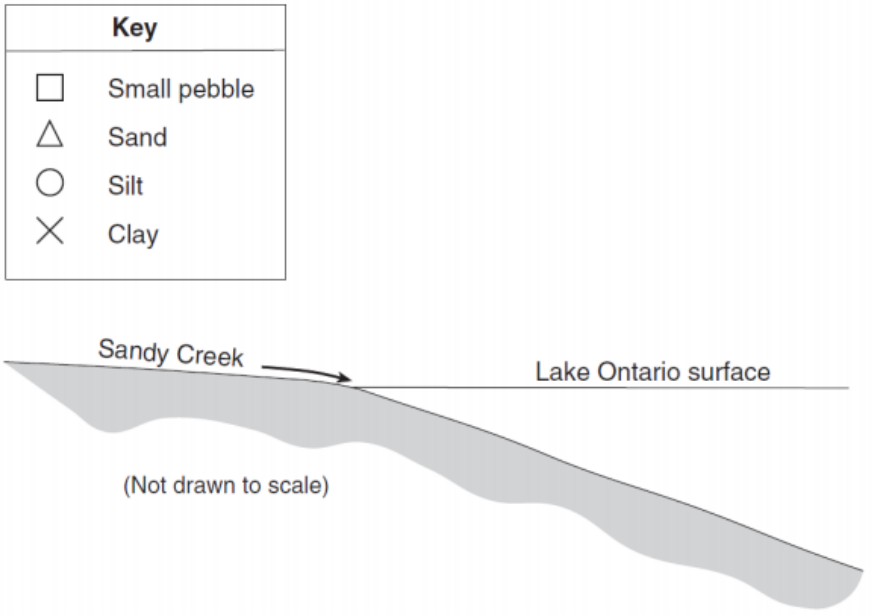


4. On the diagram below, draw a line to represent the shape of the stream bottom from point X to point Y.



5. Explain why sediments are deposited when Sandy Creek enters Lake Ontario.

6. The symbols representing four sediment particles are shown in the key below. These particles are being transported by Sandy Creek into Lake Ontario. On the cross section, draw the symbols on the bottom of Lake Ontario to show the relative position where each sediment particle is most likely deposited.

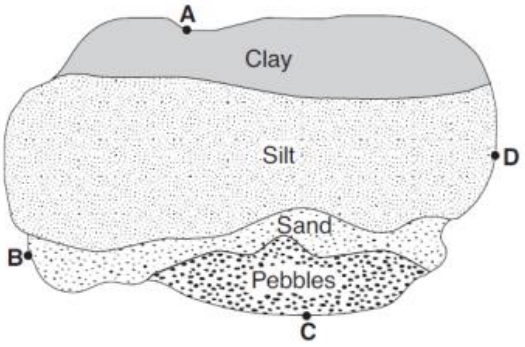


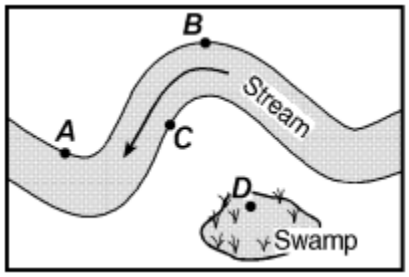
7. Record the minimum velocity this stream needs to transport a 2.0-cm-diameter particle.

8. Sediment is deposited in a river delta because the
   a. velocity of the river decreases
   b. volume of the river increases
   c. force of gravity decreases
   d. gradient of the river increases

9. What is the largest rock particle that can be transported by a stream with a velocity of 250 centimeters per second?
   a. silt b. pebbles c. sand d. cobbles

10. The map to the right shows an overhead view of sediments that have accumulated at the bottom of a lake. Points A through D represent locations on the shoreline of the lake. A river most likely flows into the lake nearest to location
    a. A b. B c. C d. D





11. The map to the left shows the area surrounding a meandering stream.

    At which point is erosion greatest?
    a. A b. B c. C d. D

12. What is the maximum size particle that can be carried by a stream having a velocity of 300 centimeters per second?
    a. 0.002 cm b. 0.02 cm c. 0.2 cm d. 20 cm

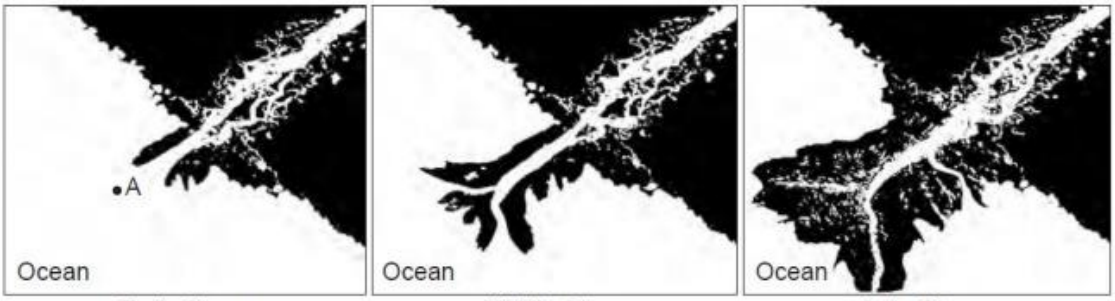
ASSESS YOURSELF ON THIS LESSON: _____/12
If you missed more than 3, do the Additional Practice. If not, go on to the next hw video!!!

1. Which is the largest sediment that could be carried by a stream flowing at a velocity of 75 centimeters per second?
   a. Silt b. pebbles c. sand d. cobbles

2. The velocity of a stream is 100 centimeters per second. What is the largest diameter particle that can be transported?
   a. 0.001 cm b. 0.01 cm c. 0.1 cm d. 1.0 cm

Base your answers to questions 3 through 6 on the three diagrams below and on your knowledge of Earth science. The diagrams represent stages in the formation of a large depositional feature formed as a river deposited sediment over time in the ocean. Letter A represents a location in the ocean.

Formation of a River Depositional Feature



Early Stage Middle Stage Late Stage

3. State the name of this large depositional feature forming in the ocean.

4. Describe the arrangement of the sediments deposited where the river enters the ocean.

5. Identify the largest particle diameter of sediment that can be carried by the water current at location A, if the water has a velocity of 0.05 cm/s.

6. Large amounts of dissolved calcite were carried by the river into the ocean and precipitated onto the ocean floor. Identify the sedimentary rock composed only of calcite that most likely formed.

ASSESS YOURSELF ON THIS ADDITIONAL PRACTICE: _____/6
If you missed more than 2 see me for extra help and/or re-watch the lesson video assignment.

Lesson 2 – Erosion by Glaciers

Objective:
- I can define what a glacier is & describe how they move
- I can describe different glacial features that form

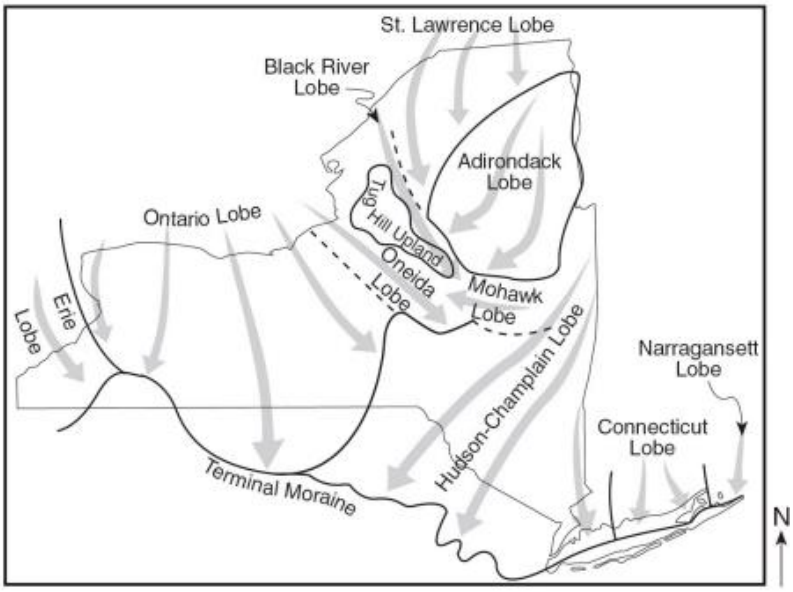
What is a glacier?
Snow falls and accumulates on the ground everywhere in New York State. In the highest parts of the Adirondack Mountains, winter snow often lasts into early summer before it is completely melted. If the mountains were 1000 or 2000 meters higher, the reduced warmth of summer would not be able to melt winter snow. Each year more snow would accumulate and exert pressure on the underlying snow. This pressure would change the snow to ice and gravity would make the ice begin to flow downhill. This is how glaciers form. The reason that no glaciers exist today in New York State is that there are no places where the snow does not completely melt before the following winter.

1. Briefly describe how glaciers form.

2. Why are there currently no glaciers in New York State?

3. What causes ice, a solid material, to be able to flow downhill like a liquid?

The diagram on the left shows the extent to which the last continental ice sheet extended during the last ice age, approximately 20,000 years ago.



4. What general direction did the ice sheet move? Why do you think this is?

5. What do you think the "terminal Moraine" is and what does it tell us about the glacier that once covered New York State?

How do Glaciers Cause Erosion?

When a glacier advances down a valley or over a continent, the ice pushes, carries, and drags great quantities of soil and sediment. These loose materials have little chance of remaining in place when a mass of ice hundreds or even thousands of meters thick moves over them. Although ice is much softer than most bedrock, the rocks and sediment dragged along the bottom of a glacier scrape and scour the bedrock over which the glacier passes.

6. How can glacial striations (scratches) tell you the direction the glacier moved?

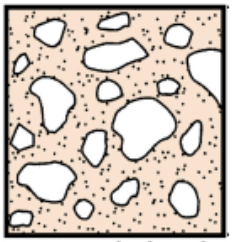
Valleys

In mountainous or hilly terrain, advancing glaciers seek the lowest passages and move through valleys first. Stream valleys often have a V-shape in profile, especially in mountain areas. Streams and the sediment they carry occupy only the bottom of the valley and do not erode the sides of the valley. The sides of a stream valley in mountainous terrain collapse under the influence of weathering and gravity, which often give them a steep but uniform slope of the V-profile. When a glacier moves down a mountain valley filling it with ice, the erosive action of the glacier and its load of sediment pluck, scrape, and scour the sides of the valley changing its profile to a broader U-shape. U-shaped valleys are strong evidence of glacial erosion.

7. Why do rivers create V-shaped valleys while glaciers create U-shaped valleys?

How Can we Recognize Deposition Caused by Glaciers?

Sediment transported by glaciers must also be deposited. There are several differences between sediments deposited by ice and sediments deposited by water or wind. Water and wind sort sediments. Moving ice transports and deposits sediment without regard to particle sizes. Therefore, sediments deposited directly by glaciers are unsorted and do not show layering. This unsorted glacial debris is sometimes called till. Stream sediments are deposited where streams flow, usually in the bottom of a valley. But a


Unsorted Glacial Sediment

glacier can move its debris anywhere that the ice covers, even to the highest parts of New York State. Glacial sediments often cover the whole land surface with an uneven blanket of till composed of mixed particle sizes. Water and wind usually deposit the larger particles of their load relatively close to its source. On the other hand, glaciers carried their load of sediments, including boulders of granite and gneiss from Canada, hundreds of kilometers southward into New York State. In western New York State where the local bedrock is sedimentary, most often shale, siltstone, and limestone, these foreign rock types are especially noticeable. New York soils have a greater variety of minerals and they are more fertile than they would have been if they contained only local rocks. Large rocks that were transported from one area to another by glaciers are known as erratics.

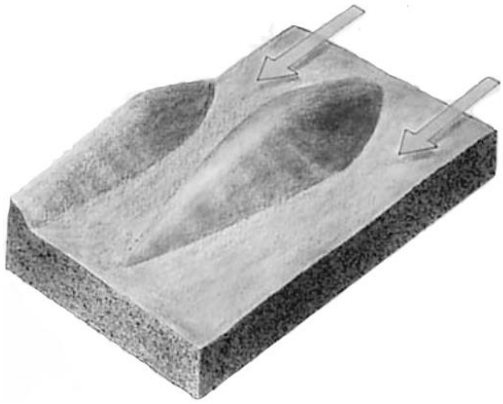
8. What is the main difference between sediment deposited by water and sediments deposited by glaciers?

9. What is glacial sediment called?

10. What is a large rock transported by a glacier called? _____

Drumlins

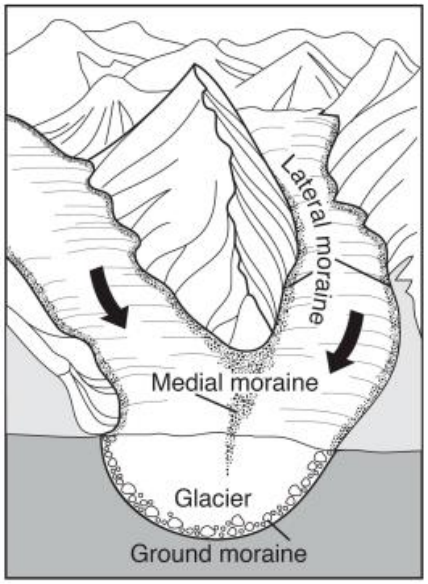
Drumlins are streamlined hills as much as 100 m high and 1 km long. Most of them are aligned north to south. They have steep sides, a blunt north slope, and a gentler slope to the south. How drumlins form is debated among scientists. One idea is that a glacier forms the hills by riding up and over sediment it is pushing forward. Thus drumlins show the direction in which the ice was moving. Within drumlins as in moraines, the unsorted and unlayered nature of till supports the idea that they are deposited by ice.



11. What important information can be gained by studying drumlins?

Moraines and Kettles

A moraine is a mass of till deposited by a glacier. Sometimes moraines form hills, often irregular in shape, where a glacier stopped advancing. This kind of deposit is known as a terminal moraine. Even though the front of the glacier was nearly stationary, ice continued to transport sediment to the front of the glacier where it was released. The barriers of sediment that close of the Finger Lakes are moraines. Smaller moraines can be found throughout the state. Most of these are places where the ice front stalled and dumped its sediment load over a period of time. Among the irregular hills in a moraine are depressions called kettles. A kettle is a small closed basin with no low level outlet. Some kettles form when a block of ice within the till melts, leaving a closed depression. Some kettles fill with water to become kettle lakes.

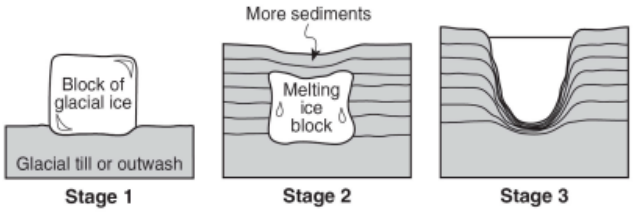


12. Describe what a moraine is in your own words.

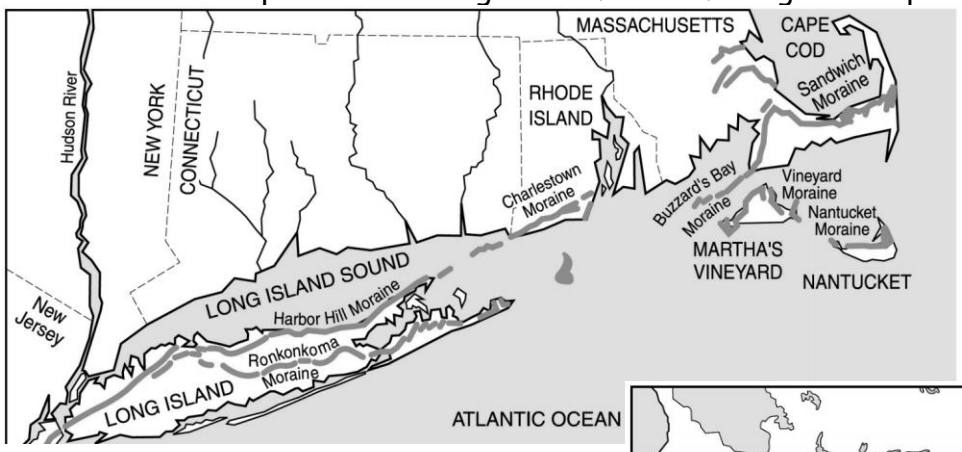
13. What does the location of a terminal moraine tell you about the glacier?

14. Describe the sediment that will be found within a moraine?

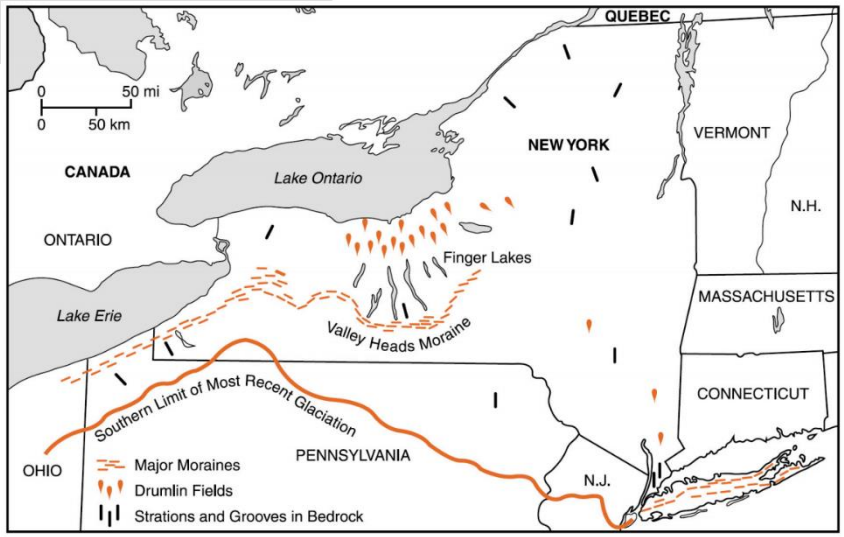
15. Describe the formation of a kettle lake.



16. What evidence proves that Long Island formed from glacial deposition?



17. According to this map of New York, what features found in New York state reveal that it was once covered by an ice sheet?



Regents Questions:

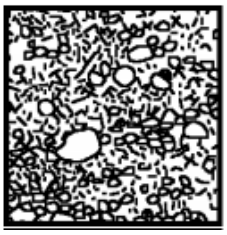
1. The occurrence of parallel scratches on bedrock in a U-shaped valley indicates that the area has most likely been eroded by
   a. a stream b. waves c. a glacier d. wind

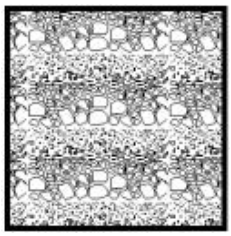
2. The moraines are recognized as glacial deposits because they are composed of rock materials that are
   a. uniform in size and layered
   b. many different sizes and layered
   c. uniform in size and not layered
   d. many different sizes and not layered

3. How were the striations made?
    a. Frost action cracked the bedrock during the ice age.
    b. Rocks at the bottom of the glaciers were dragged over the bedrock.
    c. Particles carried by winds scratched the bedrock during the ice age.
    d. Particles carried by glacial melt water eroded the bedrock.

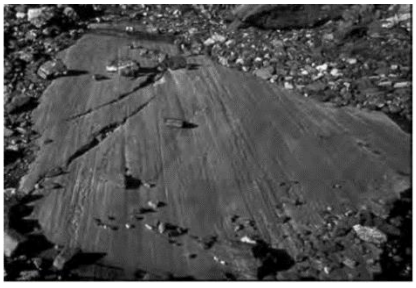
4. Which statement provides the best evidence that New York State's Finger Lakes formed as a result of continental glaciation?
    a. The lake surfaces are above sea level.
    b. The lakes fill long, narrow U-shaped valleys.
    c. The lakes are partially filled with sorted beds of sediment.
    d. The lakes are surrounded by sharp, jagged peaks and ridges.

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






6. Which agent of erosion most likely carried sediment that scratched and polished this bedrock surface?
    a. a moving glacier
    b. wave action
    c. running water
    d. wind



7. Photographs *A* and *B* below show two different valleys.

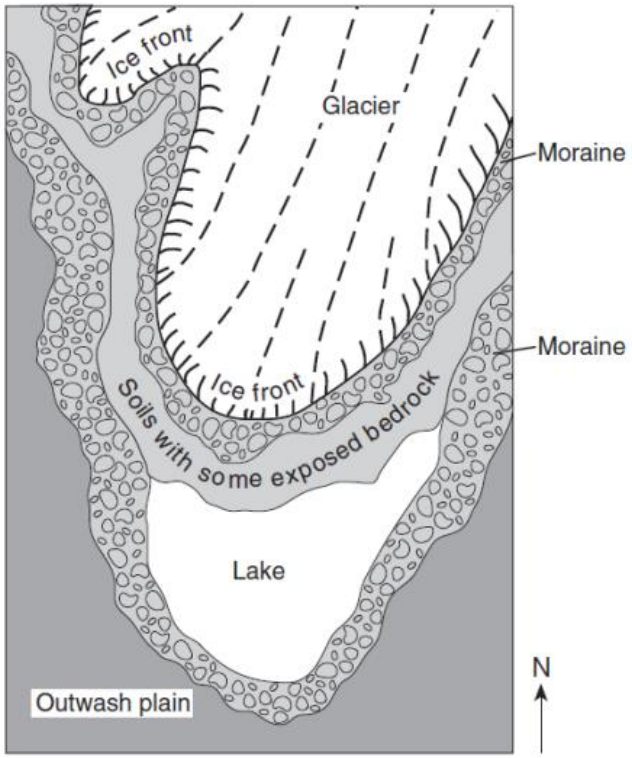
Photograph A

Photograph B

Which list best identifies the agent of erosion that primarily determined the shape of each valley?

a. photograph *A*—glacier; photograph *B*—river
b. photograph *A*—river; photograph *B*—glacier
c. both photographs—river
d. both photographs—glacier

Base your answers to questions 8 through 10 on the map below and on your knowledge of Earth science. The map shows a retreating valley glacier and the features that have formed because of the advance and retreat of the glacier.



8. Describe *one* piece of evidence likely to be found on the exposed bedrock surfaces that could indicate the direction this glacier moved.

9. Describe *one* difference between the arrangement of sediment in the moraines and the arrangement of sediment in the outwash plain.

10. Describe the most likely shape of the valley being formed due to erosion by this glacier.

ASSESS YOURSELF ON THIS LESSON: _____/10
If you missed more than 3, do the Additional Practice. If not, go on to the next hw video!!!

Base your answers to questions 36 through 38 on the passage below and on your knowledge of Earth science.

Ice Ages

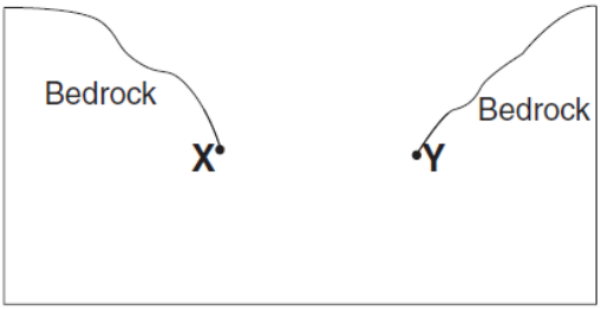
Earth has undergone many ice ages, each lasting millions of years. Some scientists infer that most ice ages were caused by landmasses blocking the ocean currents between equatorial regions and the poles. Ice ages usually ended when the positions of continents allowed ocean currents to resume transporting equatorial heat to the poles. During each ice age there were advances and retreats of glaciers. These cool glacial and warm interglacial climate intervals were caused mostly by changes in Earth's orbit and tilt. Earth is presently in a warm interglacial interval.

1. Earth's warm interglacial intervals are due primarily to
   a. changes in Earth's period of rotation
   b. changes in Earth's orbit and tilt
   c. increases in elevation of North America
   d. divergence at the Mid-Atlantic Ridge

2. Approximately 359 million years ago, the average intensity of insolation received in a year by the land area that is now eastern North America was likely (**Use ESRT pg 9**)
   a. greater, because eastern North America was at a lower latitude
   b. greater, because eastern North America was at a higher latitude
   c. less, because eastern North America was at a lower latitude
   d. less, because eastern North America was at a higher latitude

3. Evidence that glaciers covered large areas of New York State is best provided by
   a. long-term temperature measurements
   b. folded layers of bedrock
   c. kettle lakes and drumlins
   d. the presence of streams and rivers

4. The diagram *below* shows a partial cross section of a valley. On this diagram, draw a line beginning at *X* and ending at *Y* to show the shape of this valley after it was eroded by glacial ice that flowed down the valley.



5. Which erosional agent typically deposits hills of unsorted sediments?
   a. Glaciers b. winds c. streams d. ocean waves

ASSESS YOURSELF ON THIS ADDITIONAL PRACTICE: _____/5
If you missed more than 2 you should see me for extra help and/or re-watch the lesson video assignment.

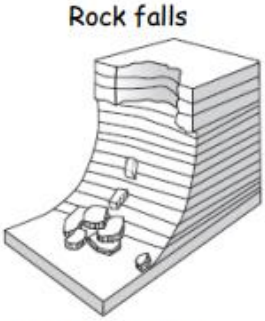
Lesson 3 - Erosion by Mass Movement, Wind, Waves & People

Objective:
- I can describe erosion by gravity & features that are created.
- I can describe erosion by wind & features that are created.
- I can describe erosion by waves & features that are created.
- I can describe general characteristics of material deposited by the main types of erosion

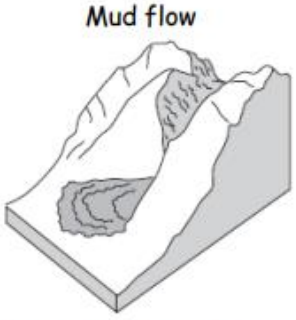
Erosion by Gravity (Mass Movement)

Landslide is a general term that includes rock falls, slides and flows. Any of these landslides can occur when the angle of the slope, type of soil or rock and amount of moisture are in the correct combination. They can happen abruptly or over a long period of time. Landslides can be brought on by excessive rain, earthquakes and even human impact. Avalanches are also caused by gravity and are considered a form of erosion as well.

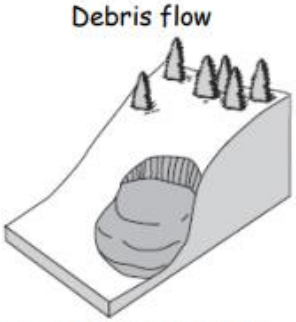
Mass wasting:
- The steeper the slope the greater the mass wasting
- Weak sediments and fractured rocks increase the chance of mass wasting
- Water loosens the rocks and sediments to allow movement to occur easily


Rock falls

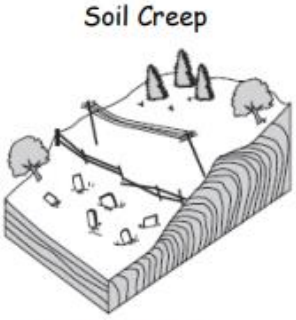
Rapid falling of pieces of rock from a cliff or steep slope


Mud flow

Downward flow of fine particles (mud) and large amounts of water


Debris flow

Rapid downslope flow of debris


Soil Creep

gradual downhill movement of soil

1. What is another name given to erosion by gravity? _____
2. What does the term landslide include? _____
3. List the three things that make mass wasting easier.
   a. _____
   b. _____
   c. _____

Wind Erosion

Wind erosion is most common in arid (dry) climates, usually in deserts. Beaches too have wind erosion. The faster the wind blows, the larger the sediment it can carry. Once the wind begins to slow down larger particles settle out first. The main type of weathering is by abrasion. Features may be pitted flat faces and straight edges on the surface of the sediments. Surface features include dunes and sand blasted bedrock.

1. What kind of climate does wind erosion take place? _____
2. Where does most wind erosion take place? _____
3. Where is another place wind erosion may take place? _____
4. Describe how the velocity of the wind affects what sediments are carries or deposited.

5. What is the main type of weathering that takes place? _____
6. Describe the features of the sediments.

7. Describe two surface features sediments.

Wave Erosion

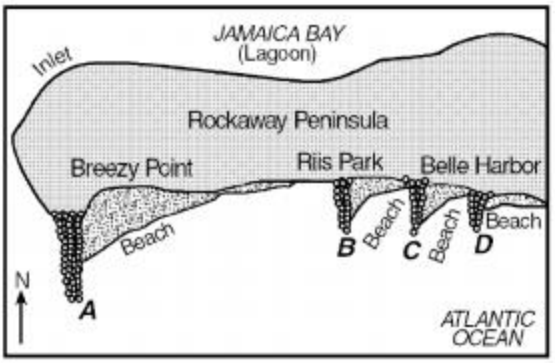
Ocean waves are the driving force that continually shape and reshape our coastlines. Continuous abrasion cause the sediment to become more round. The waves help to weather and erode continental and oceanic rocks that eventually create beaches. The shores are proteced by sand dunes and barrier islands. Barrier islands are long and narrow deposits of sediments that run parallel to the main land. They are built up by the actions of waves, currents and wind that distribute the sand which protect the coast from erosion. Ridges of sand, called sandbars, form along a shore by the action of waves and currents. They protect barrier islands from erosion. As waves aproach the coastline they move sand parallel along the shore.

1. What continually reshapes our coastline? _____
2. What is the source of sand on the coastlines? _____
3. Name two features that help protect shores. _____

4. What are barrier islands?

5. What are sandbars?

6. The map to the right 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.
   - Notice where the sand for the beaches are located
   - Draw arrows to show which way the sand had been moved by the ocean waves



Review

Match the agent of erosion that corresponds to the identifying characteristic surface features described below.

Agent of Erosion	**Surface Feature Formed**
____ Glaciers	A: Beach, sandbars, barrier islands
____ Mass Movement	B: Loss of topsoil, sand dunes
____ Running Water	C: U-shaped valley, moraines, drumlins
____ Waves	D: V-shaped valley, deltas, meanders
____ Wind	E: Landslides, slumps

Regents Questions

1. A landslide is an example of
   a. river deposition b. glacial scouring c. mass movement d. chemical weathering

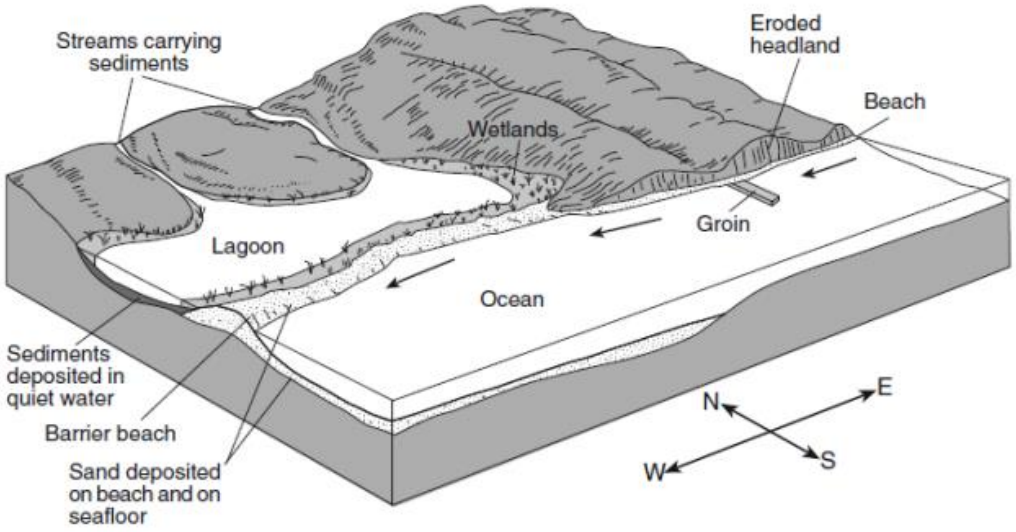
2. Which agent of erosion is most likely responsible for the deposition of sandbars along ocean shorelines?
   a. glaciers b. mass movement c. wave action d. wind action

3. Pieces of bedrock material that are broken from a cliff and deposited by a landslide at the base of the cliff are best described as
   a. rounded and sorted
   b. rounded and unsorted
   c. angular and sorted
   d. angular and unsorted

4. The narrow, sandy, barrier islands in the ocean along the south coast of Long Island were deposited by
   a. wind b. streams c. glacial ice d. wave action

5. 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

Base your answers to questions 6 through 9 on the diagram below. The arrows show the direction in which sediment is being transported along the shoreline. A barrier beach has formed, creating a lagoon (a shallow body of water in which sediments are being deposited). The eroded headlands are composed of diorite bedrock. A groin has recently been constructed. Groins are wall-like structures built into the water perpendicular to the shoreline to trap beach sand.



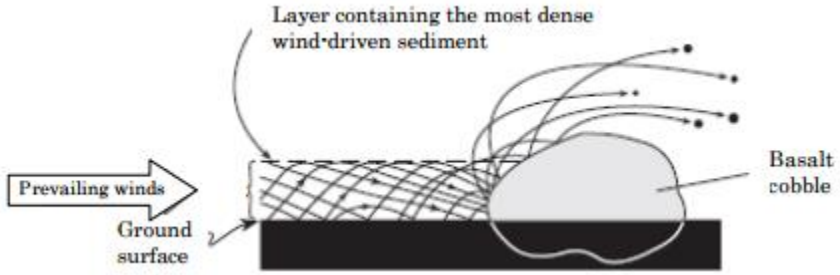
6. The groin structure will change the pattern of deposition along the shoreline, initially causing the beach to become
   a. wider on the western side of the groin
   b. wider on the eastern side of the groin
   c. narrower on both sides of the groin
   d. wider on both sides of the groin

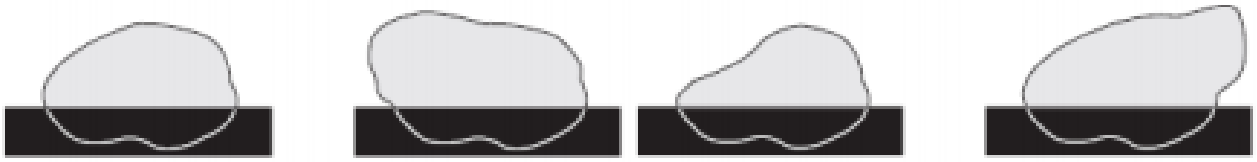
7. Which two minerals are most likely found in the beach sand that was eroded from the headlands?
   a. quartz and olivine
   b. plagioclase feldspar and amphibole
   c. potassium feldspar and biotite
   d. pyroxene and calcite

8. The sediments that have been deposited by streams flowing into the lagoon are most likely
   a. sorted and layered
   b. sorted and not layered
   c. unsorted and layered
   d. unsorted and not layered

9. Which event will most likely occur during a heavy rainfall?
   a. Less sediment will be carried by the streams.
   b. An increase in sea level will cause more sediments to be deposited along the shoreline.
   c. The shoreline will experience a greater range in tides.
   d. The discharge from the streams into the lagoon will increase

10. The cross section shows the movement of wind-driven sand particles that strike a partly exposed basalt cobble located at the surface of a windy desert. Which cross section to the right best represents the appearance of this cobble after many years of exposure to the wind-driven sand?





11. Which erosional force acts alone to produce avalanches and landslides?
    a. Winds b. running water c. sea waves d. gravity

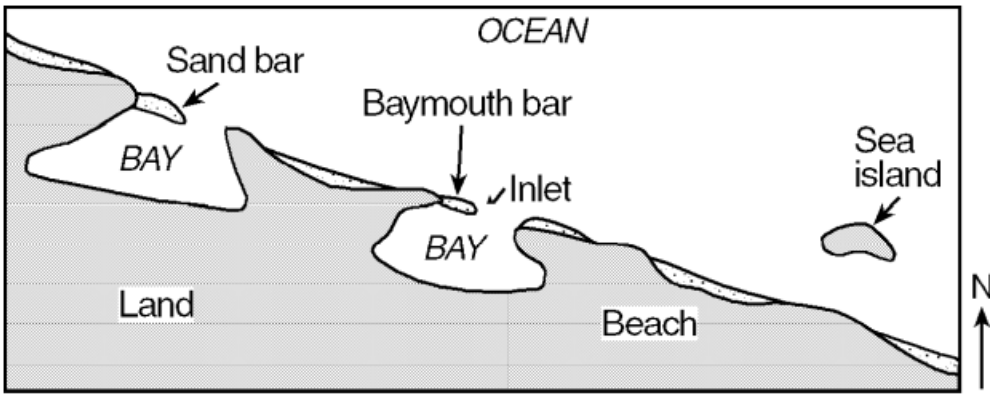
12. Which landscape features are primarily the result of wind erosion and deposition?
    a. terraces of gravel containing unsorted layers of sediment
    b. U-shaped valleys containing unsorted layers of sediment
    c. cross-bedded sand deposits containing finely sorted layers of sediment
    d. V-shaped valleys containing well-sorted layers of sediment

ASSESS YOURSELF ON THIS LESSON: _____/12
If you missed more than 3, do the Additional Practice. If not, go on to the next hw video!!!

1. The primary force responsible for the flow of water in a stream is
    a. Wind b. gravity c. solar energy d. magnetic field

2. 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

3. 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 c. southwest
b. northwest d. southeast