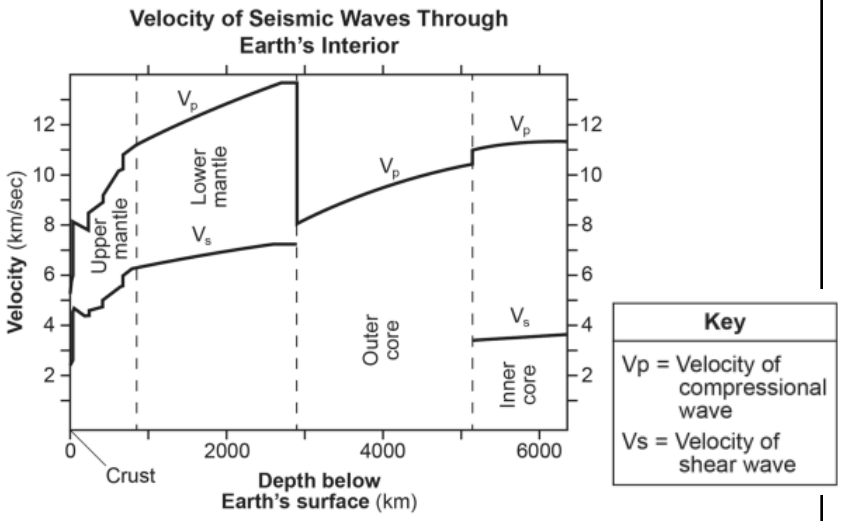
WARM-UP

Modeling Earth's Interior

While other planets experience tectonic deformation in the form of volcanic activity, Earth is the only planet currently known to exhibit active plate tectonics involving multiple plates. To gain a better understanding of Earth's interior, scientists have developed models using seismic waves, rock samples, and laboratory experiments. These models assist scientists in the visualization of Earth's complex interior and crustal dynamics.

Conditions within Earth's interior cause different substances to be found at different depths. The table below shows regions within Earth's interior where some substances are found.

The graph below shows some information about the velocity of seismic waves as the waves travel through Earth's interior.



Substances Found in Earth's Interior

Region (depths)	Substances
inner core (6371-5150 km)	solid, stable iron
outer core (5150-2891 km)	liquid iron
lower mantle (2891-670 km)	magnesium and iron-bearing silicates
transition zone (670-410 km)	structures with both SiO_4 and SiO_6 groups (e.g., majorite garnet)
upper mantle (410-40 km)	olivine, pyroxene, garnet, spinel
crust (average depth 40 km)	feldspar, quartz

1.) Which row in the table below correctly describes the substance(s) found in Earth's interior and the characteristic of that interior layer of Earth?

Row	Substance(s) in Earth's Interior	Characteristics of Earth's Interior
A	liquid iron	found in a layer where compressional velocity is greatest in Earth's interior
B	solid, stable iron	found in a layer where compressional wave velocity is approximately 11.2 km/sec
C	pyroxene and quartz	found only at a depth of 500 kilometers
D	magnesium silicates	found in a layer where shear wave velocity is greater than compressional wave velocity

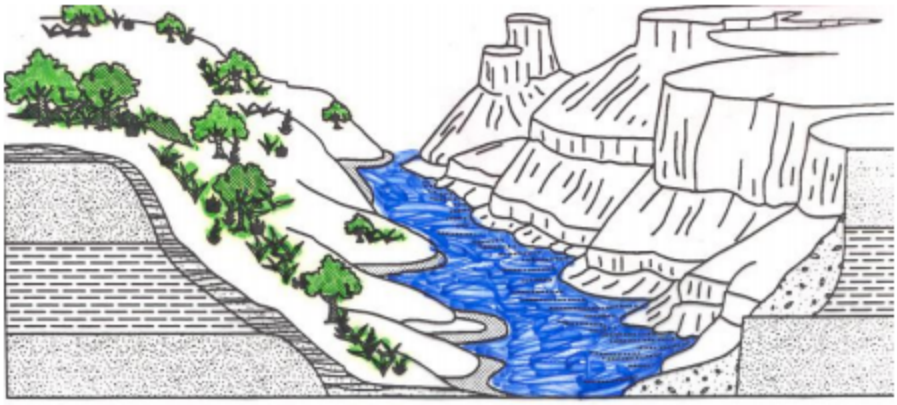
OBJECTIVE

SWBAT identify landscape features based on images and describe the landscapes in which they form.

Criteria For Success (CFS)

Students will receive a minimum score of an 80% on the exit ticket.

The Influence of Climate on Landscape:

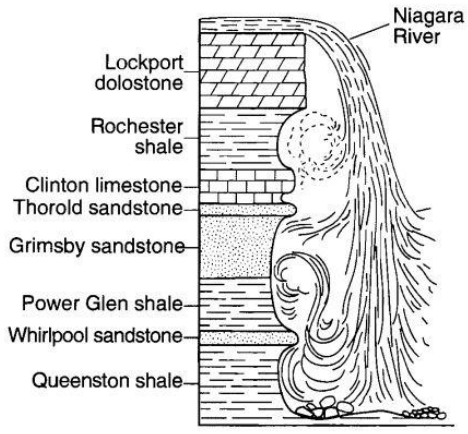


Climate	Humid (moist)	Arid (dry)
Slope		
Soil		
Type of Weathering		

The Influence of Bedrock on Landscape:

Notice how the rock types weather differently. Differences in rock resistance create varied & interesting landscapes.

Which rock is least resistant? _____

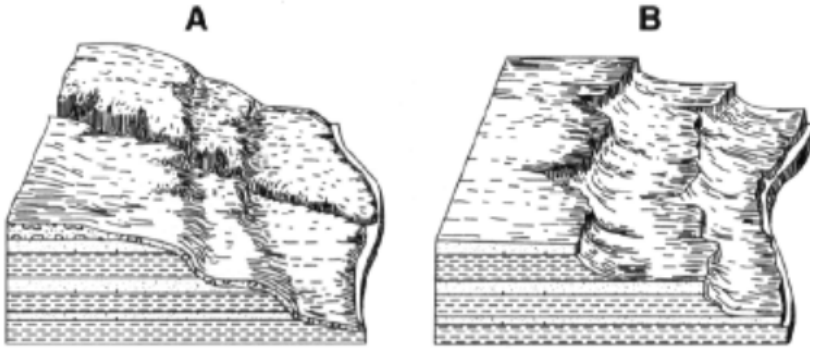


Video: **Name three landforms:**

_____, _____, _____

Practice 1:

1.) The block diagrams below show two landscape regions labeled A and B.

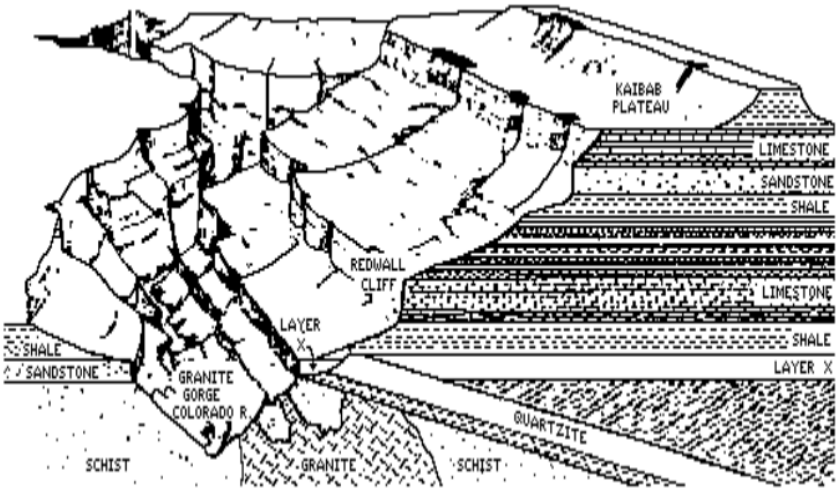


What is the most probable cause of the difference in surface features between A and B?

a.) A is the result of a humid climate, while B is the result of a dry climate.
b.) A is at high elevation, while B is located at sea level.
c.) A is a plateau region, while B is a mountainous region.
d.) A is composed of igneous bedrock, while B is composed of sedimentary bedrock.

2.) The Grand Canyon is primarily the result of erosion due to

a.) glaciers
b.) wind
c.) running water
d.) volcanic activity



3.) The most probable explanation for the development of the steep Redwall cliffs is that this limestone layer

a.) was uplifted by the granite intrusion
b.) was deposited in a marine environment
c.) is more resistant to erosion than the rock layers above and below the cliffs
d.) is younger than the rock layers above the cliffs

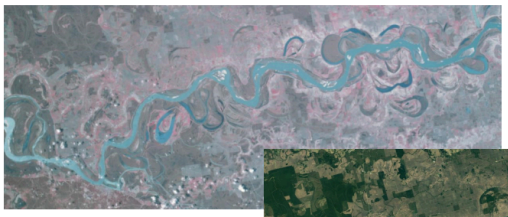
4.) This landscape area developed in an arid climate. If the climate of this region were to become humid, the hills would eventually

a.) become more rounded in shape
b.) become more angular in shape
c.) continue to erode in the same way
d.) erode at a slower rate

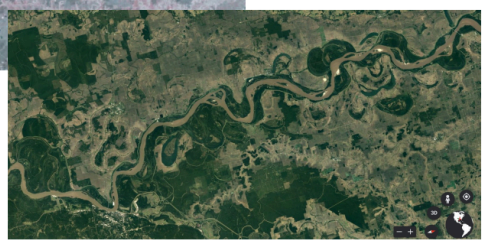
Altered Landscapes Practice:

Compare and contrast the images on the screen. Label examples of deposition (**D**) and erosion (**E**). Note: The image colors are not always accurate and any color differences should be ignored. The images may also not be perfectly aligned.

Image 1: Mississippi River



March 9, 1969: Color infrared photograph of the Mississippi River between Vicksburg and Greenville as photographed from the Apollo 9. Image courtesy of NASA.



August 18, 2020: Color photograph of the same location from the Copernicus satellite. Image courtesy of Google Earth.

Image 2: Colorado River

View of the mouth of the Colorado River and the Gulf of California in northwestern Mexico. The left photo is from April 4, 1968 as photographed from the unmanned Apollo 6 courtesy of NASA. The right photo is from August 18, 2020 from Copernicus courtesy of Google Earth.

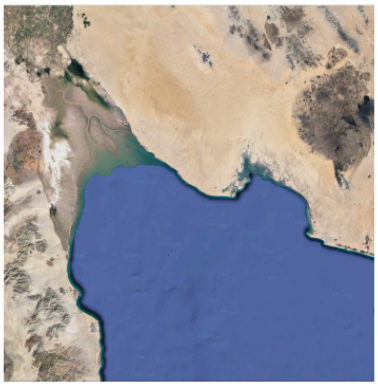
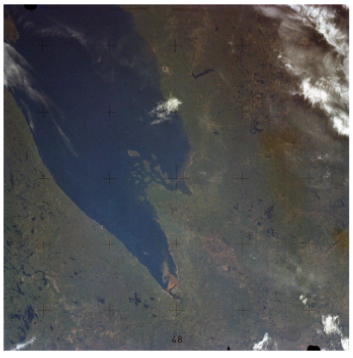


Image 3: Lake Superior



This view shows the west end of Lake Superior and Duluth, MN. The image on the left is from June 22,1973 taken by Nasa. The image on the right is from August 18,2020 from ESRI courtesy of USGS.

Landscape	Climate (Temp. and/or Precip.)	Weathering & Erosion Types	Landscape Features
Arid: Deserts	☐ Warm ☐ Temperate ☐ Cold ☐ Wet/Humid ☐ Dry/Arid	☐ Physical Weathering ☐ Chemical Weathering Agent(s) of Erosion: _____	
Glacial: Mountain Glaciers	☐ Warm ☐ Temperate ☐ Cold ☐ Wet/Humid ☐ Dry/Arid	☐ Physical Weathering ☐ Chemical Weathering Agent(s) of Erosion: _____	
Glacial: Continental Glaciers	☐ Warm ☐ Temperate ☐ Cold ☐ Wet/Humid ☐ Dry/Arid	☐ Physical Weathering ☐ Chemical Weathering Agent(s) of Erosion: _____	
Fluvial: Rivers and Streams	☐ Warm ☐ Temperate ☐ Cold ☐ Wet/Humid ☐ Dry/Arid	☐ Physical Weathering ☐ Chemical Weathering Agent(s) of Erosion: _____	
Coastal: Coastlines	☐ Warm ☐ Temperate ☐ Cold ☐ Wet/Humid ☐ Dry/Arid	☐ Physical Weathering ☐ Chemical Weathering Agent(s) of Erosion: _____	

Practice 2:

Get a set of "Name that Feature Cards" from your teacher. Study the cards and try to identify the features you see. You may not have all features and some features may be pictured more than once.

Feature	Card Number(s)
A. Oxbow Lake	
B. Meander	
C. Waterfall	
D. V-Shaped Valley	
E. Floodplain	
F. U-Shaped Valley	
G. Glacial Horn	
H. Glacial Arête	
I. Moraine	
J. Drumlin	
K. Mesa	
L. Butte	
M. Canyon	
N. Barrier Island	
O. Spit	

Exit Ticket Grade

_____/_____

Name: _____

Date: _____

Class: _____

OBJECTIVE

SWBAT identify landscape features based on images and describe the landscapes in which they form.

(NOVICE) 1 2 3 4 5 (MASTERY)

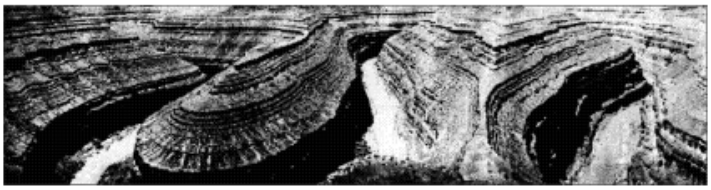
Exit Ticket

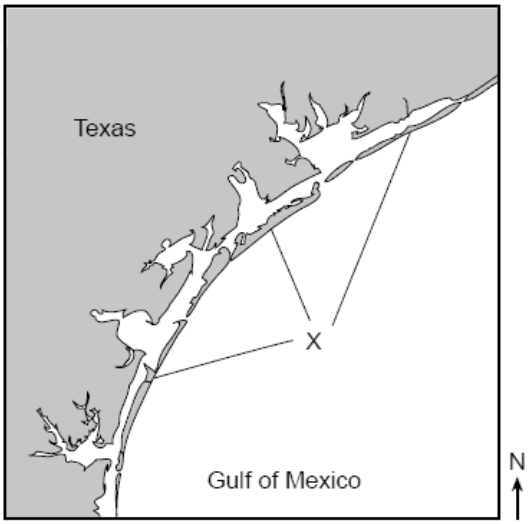
1.) Which process is primarily responsible for the shape of the surface shown in the diagram to the left?

a.) wave action
b.) stream erosion
c.) glacial action
d.) crustal subsidence

2.) The landscape to the right was developed by the process of

a.) crustal uplift and stream erosion
b.) crustal uplift and glacial erosion
c.) crustal folding and stream erosion
d.) crustal folding and glacial erosion



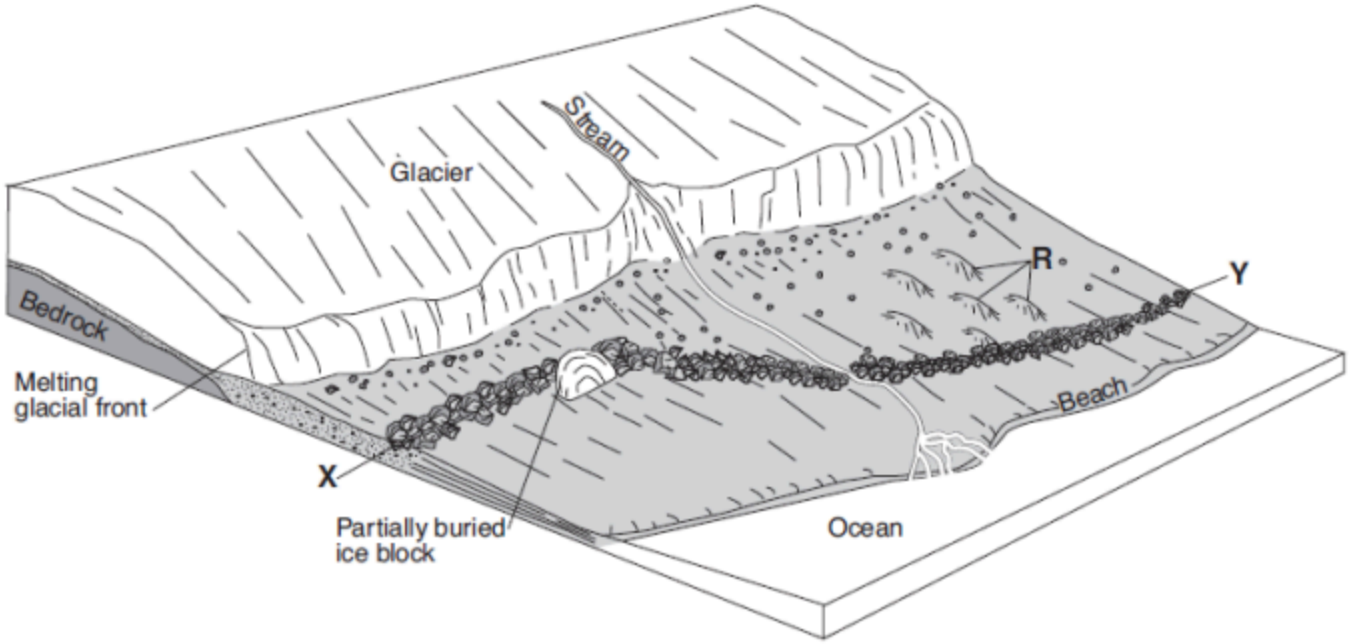


The map to the left shows a portion of the coast of Texas. Letter *X* indicates features formed by wave action.

3.) What is the name of the features indicated by the letter X?

a.) barrier islands
b.) island arc
c.) deltas
d.) moraines

Base your answer to questions 4 and 5 on the diagram below, which shows the edge of a continental glacier that is receding. *R* indicates elongated hills. The ridge of sediments from *X* to *Y* represents a landscape feature.



4.) Which process is primarily responsible for the formation of the ridge of sediments labeled X to Y?

a.) Wave action from the ocean
b.) Deposition from the glacier
c.) Erosion from the bedrock
d.) Tectonic uplift

Glaciers are made of frozen water (ice). Streams are moving bodies of water.

5.) Explain how the effects of water by the glacier on the landscape occur at different spatial *and* temporal scales compared to the effects of water by the stream on the landscape.

Glacier

spatial: _____

temporal: _____

Stream

spatial: _____

temporal: _____