VIRGINIA STANDARDS OF LEARNING

TEST ITEM SET

EARTH SCIENCE

2010 Science Standards of Learning

Released Spring 2015

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SAMPLE A

Which of these can be used to measure atmospheric pressure?

- **A** An anemometer
- **B** A barometer
- **C** A thermometer
- **D** A seismometer

Directions: Click and drag a term into each box. Each term may be used more than once.

SAMPLE B

A student conducted an investigation to determine the effect of water temperature on the amount of sugar that dissolves in a beaker of water. Identify components for trial 1 of this investigation.

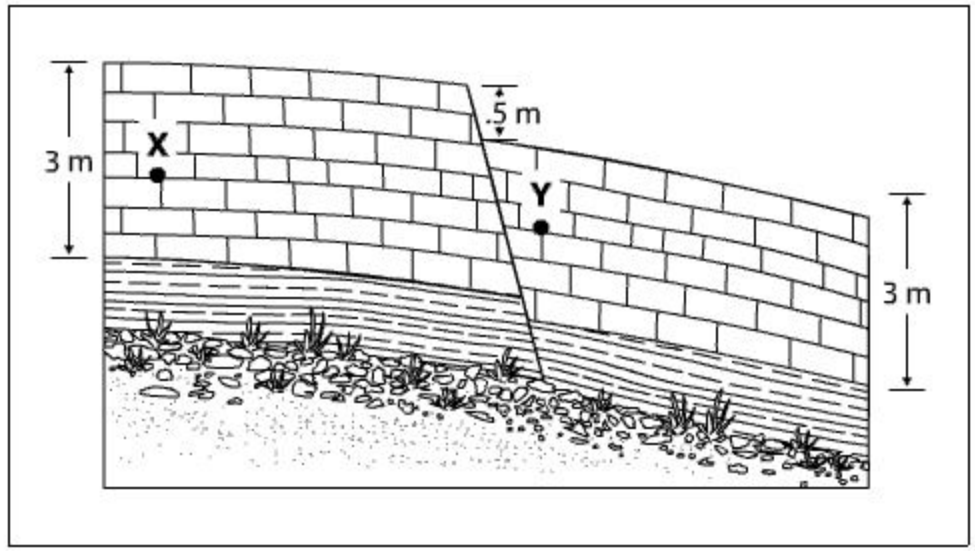
Trial 1

Beaker Number	Amount of Water (mL)	Temperature of Sugar (°C)	Temperature of Water (°C)	Amount of Sugar Dissolved (g)
1	100	20	5	185
2	100	20	10	189
3	100	20	15	194
4	100	20	20	204

Terms

- **Variable**
- **Constant**

Rock Profile



The fossil at point X has been dated to be 65 million years old. What can relative dating indicate about the fossil at point Y ?

- **A** The age of the organism when it died
- **B** The type of environment the organism lived in
- **C** The distortion of the organism by the fault
- **D** The similar time period in which the organism lived

The highest and lowest tides are known as the spring tides. When do these tides occur?

- **A** During the new moon and full moon phases
- **B** Between the half moon and full moon phases
- **C** During the new moon and crescent moon phases
- **D** Between the full moon and crescent moon phases

Aerial Photograph

© Kris Hanke/iStockphoto #3779067

Which best describes the area shown in this aerial photograph?

- **A** Forest and farmland
- **B** Deeply eroded bedrock
- **C** Extensive urban development
- **D** Folded mountainside and rivers

The moon has a stronger influence on Earth's tides than the sun because the moon —

- **A** is denser than the sun
- **B** has more mass than the sun
- **C** is much closer to Earth
- **D** moves much faster relative to Earth

Remains of ancient life are most often preserved through which process?

- **A** Freezing
- **B** Burial in sediment
- **C** Entrapment in tar
- **D** Drying out

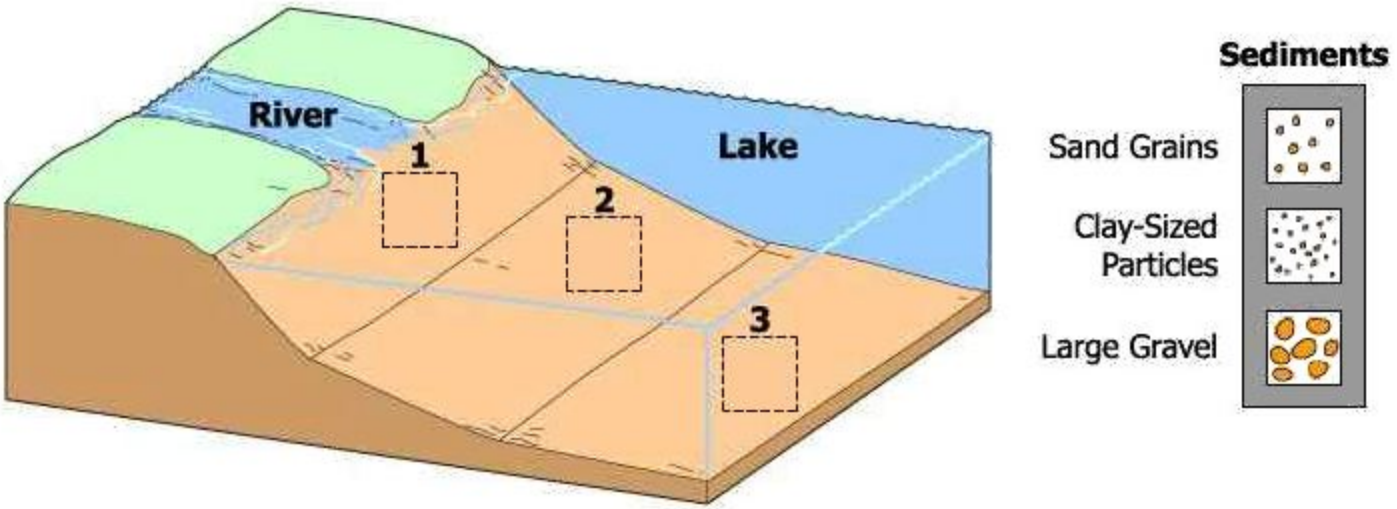
Environmental effects of the impact of a meteorite 66.4 million years ago may have led to the extinction of many species on Earth. Which evidence best supports this theory?

- **A** The Cenozoic Era began 66.4 million years ago when the Mesozoic Era ended.
- **B** Iridium found in meteorites is also present in rock layers that are 66.4 million years old.
- **C** Many other meteorite impact sites have been identified on Earth.
- **D** Many asteroids are found between Mars and Jupiter.

Directions: Click and drag the answers to the correct boxes.

When a river flows into a lake, the velocity of the water decreases. Which sediments will most likely be in the numbered locations?

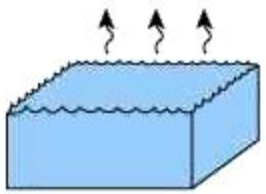
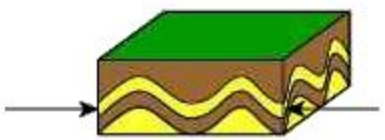
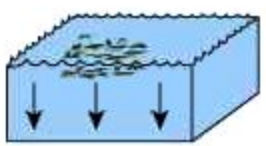
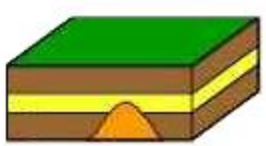
River and Lake Diagram



Directions: Click and drag the answers to the correct boxes.

Which type of rock is formed by each process?

Processes

	Type of Rock Formed
 Evaporation of Ocean	
 Compression of Crust	
 Sinking of Plankton	
 Formation of Granite Underground	

Type of Rock

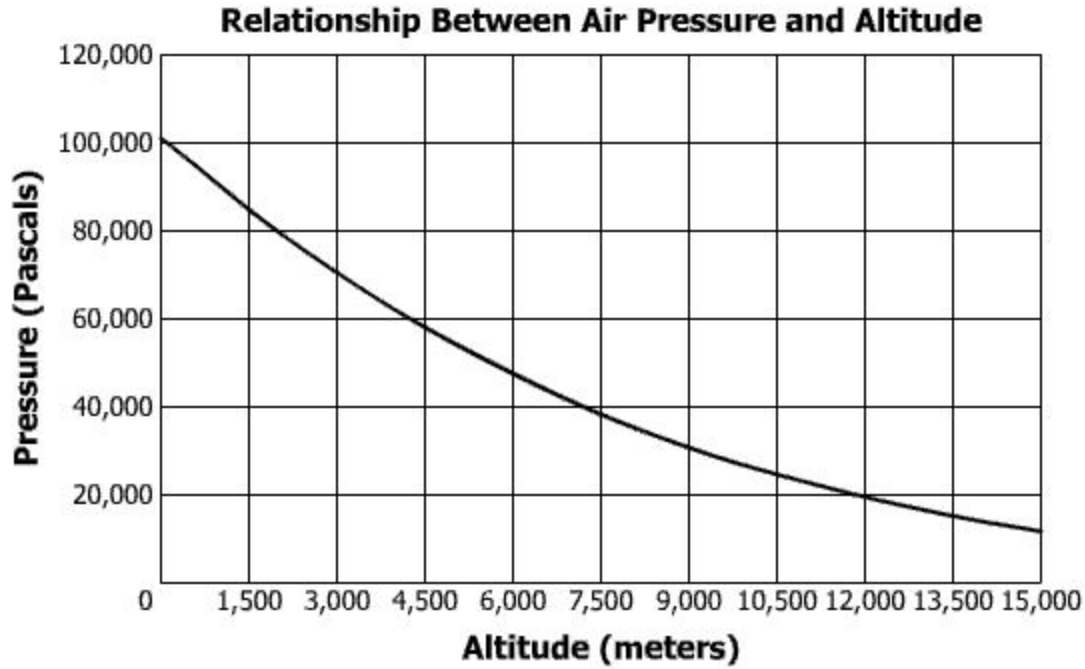
- Intrusive Igneous
- Extrusive Igneous
- Chemical Sedimentary
- Organic Sedimentary
- Metamorphic

A student hypothesizes that water from infrequently used school faucets contains more chemical impurities than the water from frequently used faucets. At the same time of day, the student uses a water test kit to measure the water impurities from the different faucets. Which is the manipulated variable in this investigation?

- **A** The chemicals used to test the water
- **B** The amount of water per sample
- **C** The time of day when water is collected
- **D** The locations of water collection

Which coordinates identify a location north of a city that has a latitude of 38.0°N and a longitude of 25.0°W?

- **A** 0.0° and 0.0°
- **B** 25.0°N and 38.0°W
- **C** 38.0°N and 47.0°W
- **D** 47.0°N and 25.0°W

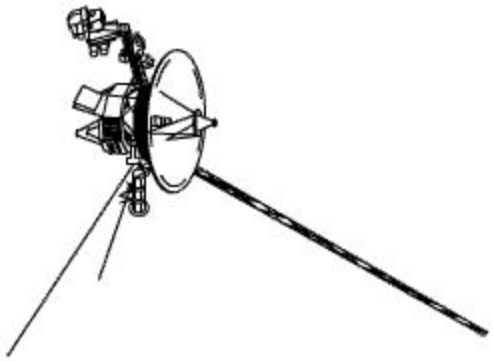


At which range of altitude is air pressure closest to 40 kPa based on these data?

- **A** Between 4.5 km and 6.0 km
- **B** Between 6.0 km and 7.5 km
- **C** Between 7.5 km and 9.0 km
- **D** Between 9.0 km and 10.5 km

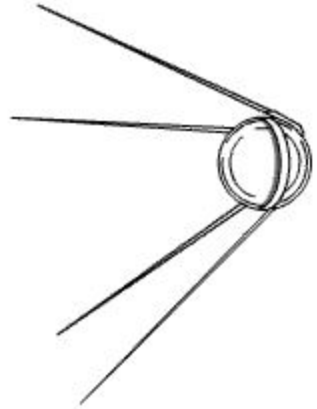
Which was the first object made by humans to orbit Earth?

A



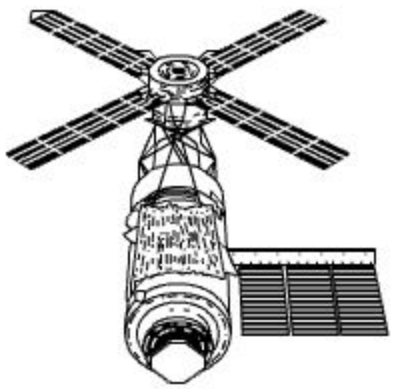
Voyager

C



Sputnik

B



Skylab

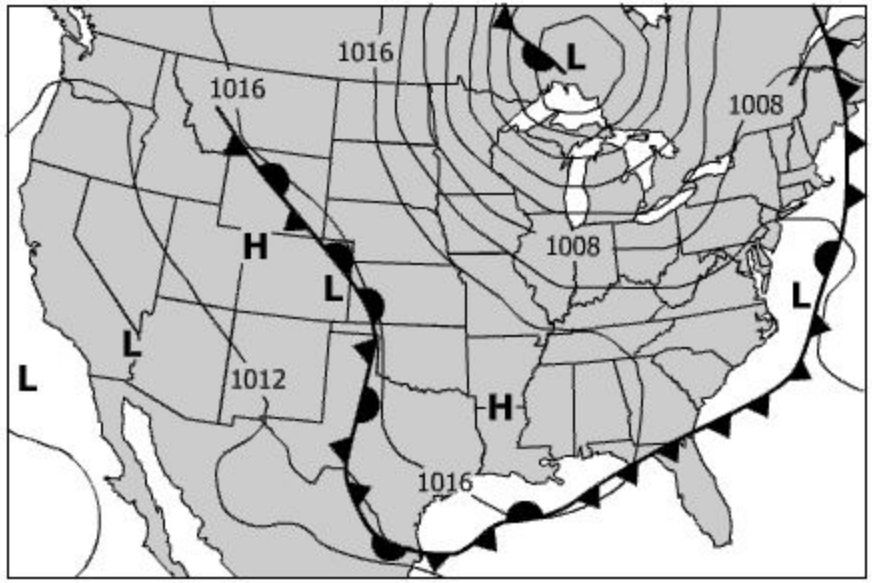
D

Mercury

Under which condition would a lowering of the water table most likely occur?

- **A** Extended drought over the recharge zone
- **B** Decreased runoff due to the planting of grass
- **C** Icecaps expand and cause lower sea levels
- **D** Slow evaporation of heavy rainfall

Weather Map



This weather map helps to predict the location where a storm will occur by giving which type of information?

- **A** Air pressure
- **B** Humidity
- **C** Wind speed
- **D** Temperature

Spacecraft traveling to Jupiter from Earth would most likely have to navigate through or around which natural obstacle?

- **A** Uranus
- **B** Neptune
- **C** Asteroid belt
- **D** Comet's tail

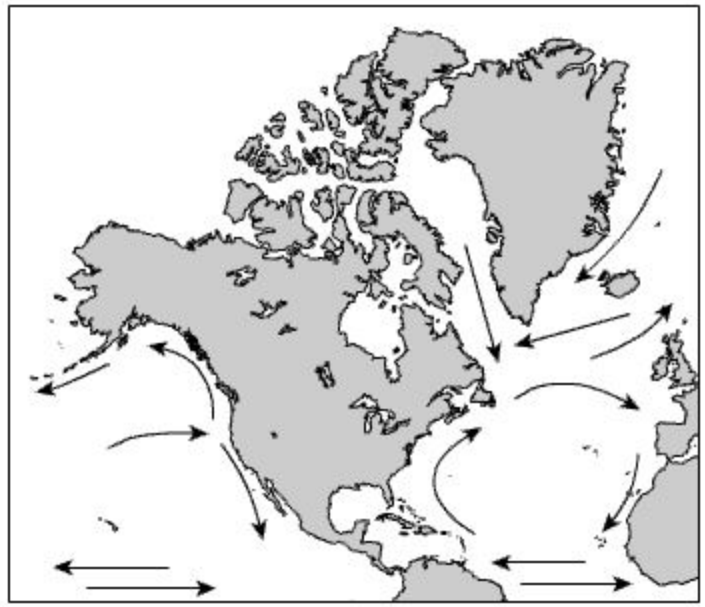
A geologist studying volcanic activity is collecting rocks that formed from hot, molten magma. What type of rock is the geologist collecting?

- **A** Clastic sedimentary
- **B** Metamorphic
- **C** Chemical sedimentary
- **D** Igneous

Which substance is a mixture of organic matter and weathered rock?

- **A** Limestone
- **B** Schist
- **C** Soil
- **D** Granite

Ocean Currents



Which natural process is the main cause of the ocean currents shown?

- **A** Convection
- **B** Orbit of Earth
- **C** Evaporation
- **D** Drift of continents

Determining how the sea floor changes over time has given scientists information about the —

- **A** circulation of solar energy
- **B** patterns of carbon movement
- **C** formation rate of the ocean crust
- **D** impact of the atmosphere on ocean depth

Why do regions of the world near the equator (0° latitude) have a more consistent climate than regions at middle latitudes?

- **A** They have strong, moist westerly prevailing winds.
- **B** They have high averages of yearly rainfall.
- **C** They get about the same amount of radiant energy year-round.
- **D** They are close to large areas of very warm ocean water.

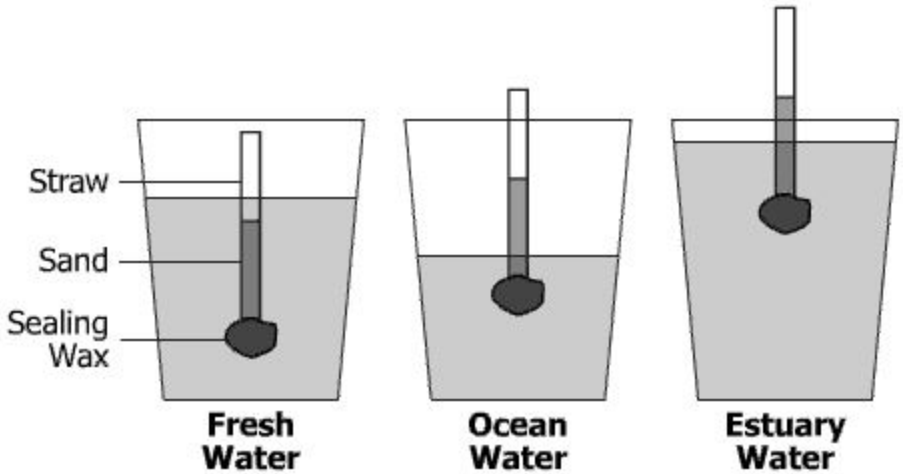
In order to protect aquifers near landfills, material is placed under the soil to prevent pollution. Which property must the protective material possess?

- **A** High porosity
- **B** Low permeability
- **C** High reflectivity
- **D** Low conductivity

Which is a characteristic of all nonfoliated metamorphic rocks?

- **A** Presence of fossils
- **B** Cleavage planes
- **C** Lack of banding
- **D** Metallic luster

Hydrometer Investigation



Students made a hydrometer by sealing the end of a straw with wax and adding some sand until the hydrometer barely floated in fresh water. The diagram shows what the students observed when they used the hydrometer to test water from three different sites. Each water sample had the same temperature. Which of these explanations best fits these observations?

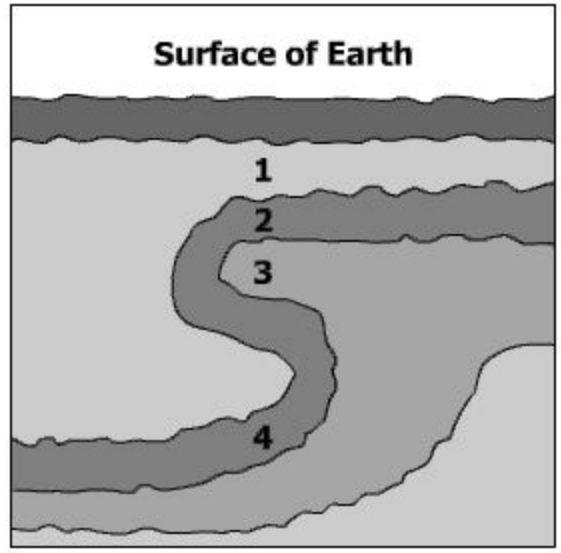
- **A** Estuaries are less salty than fresh water.
- **B** Oceans support more microbes than fresh water.
- **C** Salt water is denser than fresh water.
- **D** Ocean water can freeze at lower temperatures than fresh water.

The cleavage properties of mica result from the —

- **A** alternating layers of silica and aluminum
- **B** weak bonds between flat layers
- **C** strong covalent bonds within dense carbon clusters
- **D** metallic bonds between all elements present

A star begins its formation as gravitational forces cause instability within a —

- **A** black hole
- **B** red giant
- **C** supernova
- **D** nebula



The diagram represents areas below the surface of Earth in which fossils have been found. The fossil located in which labeled area is most likely the oldest?

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

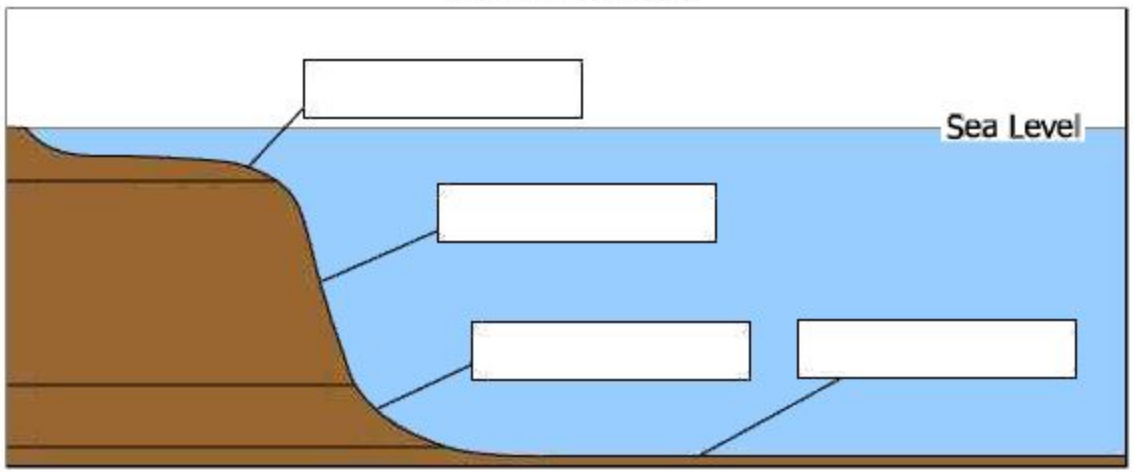
Which structure is most similar to an alluvial fan in formation and composition?

- **A** Delta
- **B** Watershed
- **C** River
- **D** Lake

Directions: Click and drag the answers to the correct boxes.

Label these ocean features.

Ocean Features

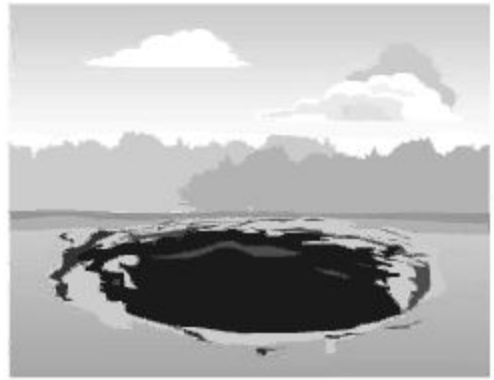


Features

- Continental Slope
- Abyssal Plain
- Continental Shelf
- Continental Rise

Scientists study small pockets of air trapped deep within frozen glaciers. What are scientists trying to understand about the climate of Earth by analyzing these ice samples?

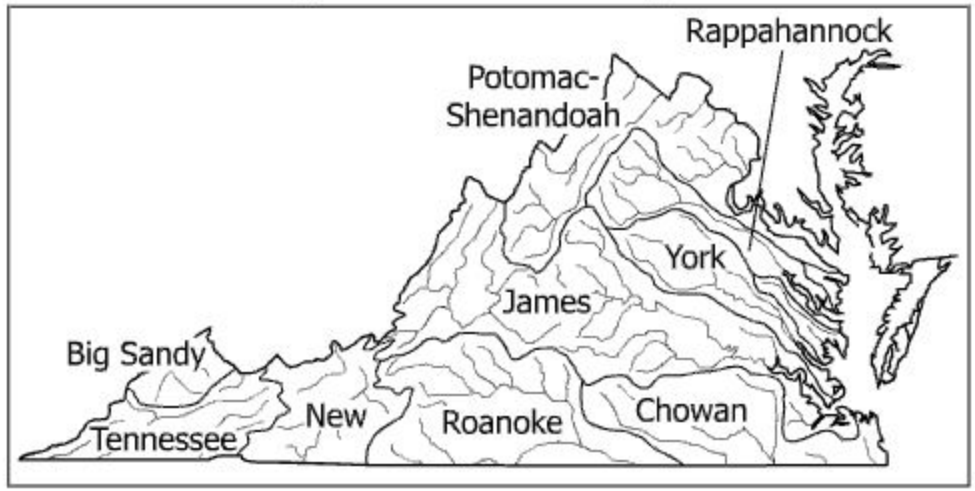
- **A** Changes in direction of the magnetic poles
- **B** Changes in atmospheric gas composition
- **C** Changes in global wind patterns
- **D** Changes in atmospheric pressure



The picture shows a sinkhole. Which of these most likely caused this sinkhole to form?

- **A** The collapse of the roof of a limestone cave
- **B** The abrupt movement of two tectonic plates
- **C** The thinning of topsoil due to forest clearing
- **D** The impact of a meteorite striking the surface of Earth

Major Watersheds of Virginia



Which Virginia watershed has the greatest impact in the state due to its size?

- **A** Tennessee River Watershed
- **B** James River Watershed
- **C** Chowan River Watershed
- **D** Rappahannock River Watershed

Which mineral is most likely an ingredient used in baby powder?

- **A** Graphite
- **B** Pyrite
- **C** Corundum
- **D** Talc

Pollution due to coal burning most frequently tends to affect lakes by —

- **A** reducing the amount of dissolved carbon dioxide
- **B** increasing acidity
- **C** reducing radioactivity
- **D** increasing the concentration of nutrients

Some ponds are designed to increase the amount of water seeping into the ground. These types of ponds will fail to work properly in —

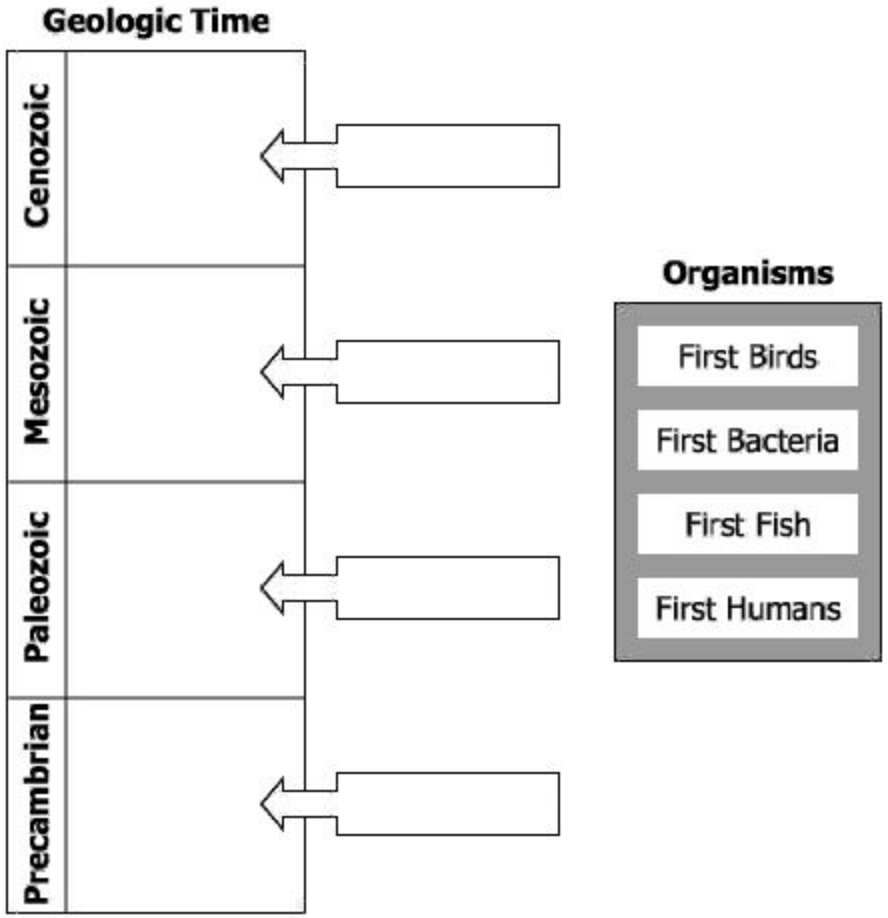
- **A** locations with shallow wells
- **B** areas with deep surface sands
- **C** soils with low permeability
- **D** rock with high porosity

Which action would most likely reduce concerns about how strip mining can harm the environment?

- **A** Restrict mining operations to rural areas
- **B** Reclaim the ecosystem after mining
- **C** Increase the usage of the products being mined
- **D** Decrease the amount of labor needed in the mines

Directions: Click and drag the answers to the correct boxes.

Identify the geologic time in which these organisms first appeared.



Crushed stone is an economic resource that is second only to coal in Virginia. How is crushed stone mainly used?

- **A** As building insulation
- **B** In steel production
- **C** For coal mine reclamation
- **D** As a construction material

A student hypothesizes that a sample of rock formed from ocean sediments. Which would best help the student support this hypothesis?

- **A** A textbook about rock formation methods
- **B** Rock samples from several locations on Earth
- **C** A model of the different crustal plate boundaries
- **D** Clam shells found within the rock sample

About 2.0 billion years ago, complex organisms began to inhabit Earth. These complex organisms developed primarily because of —

- **A** changes in atmospheric gases
- **B** sunlight being absorbed by land
- **C** the eruption of volcanoes
- **D** the impact of comets

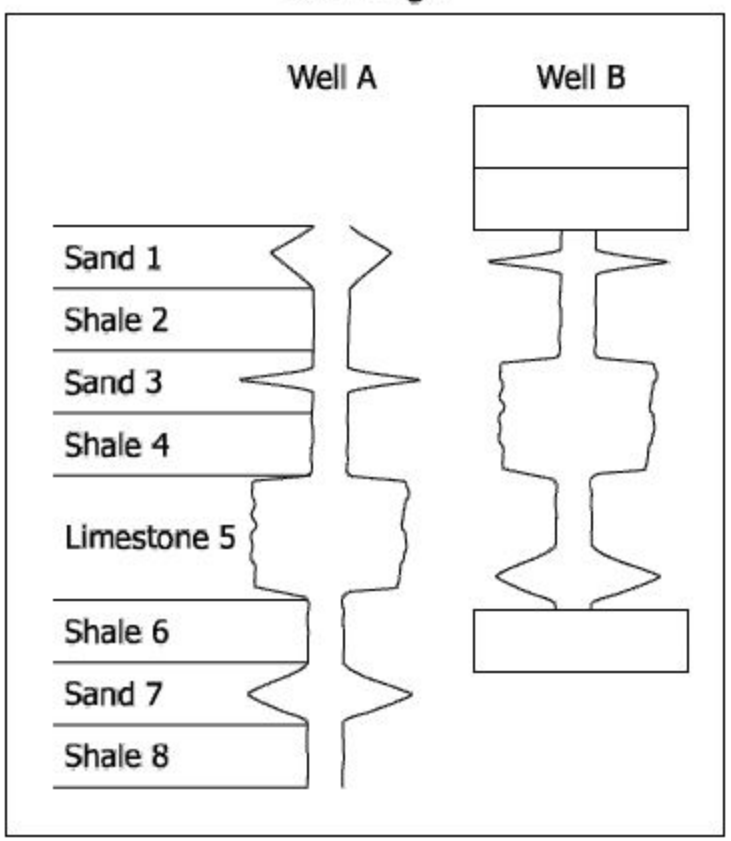
Students on a geology field trip will identify minerals by their streak. Which of these should the students bring on the field trip?

- **A** A long, pointed iron rod
- **B** A rough, white ceramic tile
- **C** A disposable sample of talc
- **D** A low-powered telescope

Directions: Click and drag the answers to the correct boxes.

Well logs are used by oil companies to correlate geologic formations. Based on the formations in Well A, which geologic formations are missing in Well B?

Well Logs



Geologic Formations

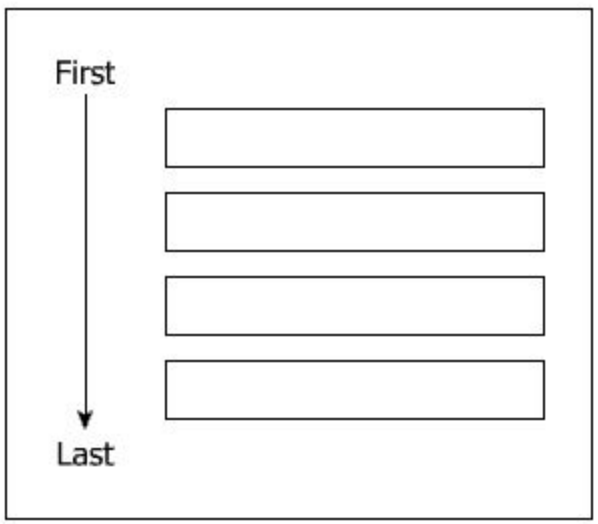
- Sand 1
- Shale 2
- Sand 3
- Shale 4
- Limestone 5
- Shale 6
- Sand 7
- Shale 8

A low pressure system has moved away from the equator and is moving directly over water. When the system reaches 60°N latitude, the system will most likely be at a point where —

- **A** its water temperature is at its highest level
- **B** its direction of rotation has changed
- **C** most of its wind speeds are greatest
- **D** most of its energy is lost

Directions: Click and drag the answers to the correct boxes.

Starting with the event that scientists theorize happened first and ending with the event that scientists theorize happened last, arrange the events in chronological order.



- Birth of the Earliest Star
- Formation of the Sun
- Origin of Life on Earth
- The Big Bang

Which characteristic do all the planets in our solar system have in common?

- **A** Angle of axial tilt
- **B** Direction of revolution
- **C** Percentages of atmospheric gases
- **D** Features of a rocky crust

A scientist is studying energy transfer that occurs in the oceans, atmosphere, and Earth's interior. Which of these is the scientist most likely studying?

- **A** Pressure
- **B** Density
- **C** Gravity
- **D** Convection