EARTH SCIENCE

QUESTION CATALOGUE

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EARTH SCIENCE

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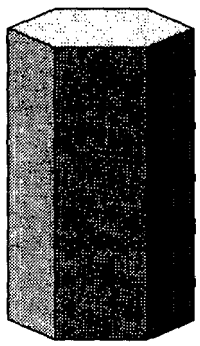
5019 A student determines the density of a mineral to be 1.5 grams per cubic centimeter. If the accepted value is 2.0 grams per cubic centimeter,what is the student's percent deviation (percent error)?
(1) 25.0% (3) 40.0%
(2) 33.3% (4) 50.0%

4938 A student incorrectly measured the volume of a mineral sample as 83 cubic centimeters when the actual volume was 89 cubic centimeters. What was the student's approximate percent deviation (percentage of error)?
(1) 6.7% (3) 9.3%
(2) 7.2% (4) 14.8%

4734 A student incorrectly measured the volume of a mineral sample as 63 cubic centimeters. The actual volume was 72 cubic centimeters. What was the student's approximate percent deviation (percentage of error)?
(1) 9.0% (3) 14.2%
(2) 12.5% (4) 15.3%

4027 A student measured the mass and volume of the mineral crystal below and recorded the data shown below. The student used these data to calculate the density of the crystal.



Data
Mass = 80 g
Volume = 32 cm^3
Density = ?

What will be the student's percent error using the recorded data if the actual density of the crystal is 2.7 grams per cubic centimeter?
(1) 0.4% **(3) 7.4%**
(2) 5.0% (4) 8.0%

3620 A person incorrectly measures the mass of a rock as 346 grams. The actual mass is 326 grams. What is the person's approximate percent deviation (percentage of error)?
(1) 5.8% (3) 8.2%
(2) 6.1% (4) 16.3%

3330 A student determined the porosity of a sample of soil to be 37.6%. The actual porosity is 42.3%. The student's percent deviation from the accepted value (percentage of error) is approximately
(1) 4.7% (3) 12.5%
(2) 11.1% (4) 79.9%

3323 A student measures the volume of water as 72 milliliters when the true volume is 75 milliliters. Which equation should be used to determine the student's percent deviation?

(1) $\%\ \text{deviation} = \frac{72}{75} \times 100$

(2) $\%\ \text{deviation} = \frac{72 + 75}{75} \times 100$

(3) $\%\ \text{deviation} = \frac{75 - 72}{75} \times 100$

(4) $\%\ \text{deviation} = \frac{75 - 72}{72} \times 100$

3091 A student incorrectly converted 20º C to 64º F instead of 68º F. What is the student's approximate percent error?
(1) 44% (3) 6.3%
(2) 5.9% (4) 4%

2913 A student measures the velocity of the water in a stream as 2.5 meters per second. The actual velocity of the water is 3.0 meters per second. What is the approximate percent deviation of the student's measurement?
(1) 0.50% (3) 20.%
(2) 17% (4) 50. %

2843 A student calculates the period of Saturn's revolution to be 31.33 years. What is the student's approximate deviation from the accepted value?
(1) 1.9% **(3) 6.3%**
(2) 5.9% (4) 19%

2532 A student finds the mass of an igneous rock sample to be 48.0 grams. Its actual mass is 52.0 grams. What is the student's approximate percent deviation (percent of error)?
(1) 9.2% **(3) 7.7%**
(2) 8.3% (4) 4.0%

2527 The accepted value for the density of the mineral corundum is 4.0 grams per cubic centimeter. A student calculates the density as 4.1 grams per cubic centimeter. What is the percent deviation from the accepted value?
(1) 1.0% (3) 5.5%
(2) 2.5% (4) 4.0%

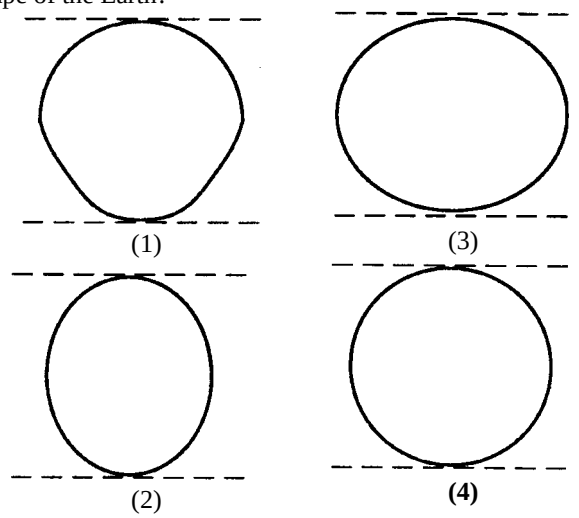
2323 An observer incorrectly measured the mass of a rock as 428.7 grams. The actual mass was 450.0 grams. What was the observer's approximate percentage of error?
(1) 5.0% (3) 4.3%
(2) 2.1% **(4) 4.7%**

2259 A person incorrectly measured the length of a room as 13.0 meters when the actual length was 12.0 meters. What is the person's approximate percent deviation (percentage of error)?
(1) 1.0% (3) 7.7%
(2) 5.9% **(4) 8.3%**

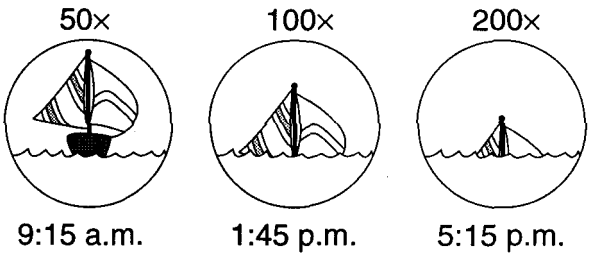
4136 The Earth is slightly flattened from a perfect spherical shape because of

(1) its rotation
(2) the pull of the sun and moon
(3) storms on the sun's surface
(4) its molten core

3334 Which diagram most accurately shows the cross-sectional shape of the Earth?



3098 The diagrams below represent photographs of a large sailboat taken through a telescope over time as the boat sailed away from shore out to sea. Each diagram shows the magnification of the lenses and the time of day.



Which statement best explains the apparent sinking of this sailboat?

(1) The sailboat is moving around the curved surface of Earth.
(2) The sailboat appears smaller as it moves farther away.
(3) The change in density of the atmosphere is causing refraction of light rays.
(4) The tide is causing an increase in the depth of the ocean.

3016 The Earth's actual shape is most correctly described as

(1) a circle
(2) a perfect sphere
(3) an oblate sphere
(4) an eccentric ellipse

2036 Measurements taken from space show the Earth to be

(1) greatest in diameter at the Equator
(2) greatest in diameter at the poles
(3) a perfect sphere
(4) pear shaped

1001 The polar circumference of the Earth is 40,008 kilometers. What is the equatorial circumference?

(1) 12,740 km
(2) 25,000 km
(3) 40,008 km
(4) 40,076 km

2844 Which object best represents a true scale model of the shape of the Earth?

(1) a Ping-Pong ball
(2) a football
(3) an egg
(4) a pear

2637 Compared to the weight of a person at the North Pole, the weight of the same person at the Equator would be

(1) slightly less, because the person is farther from the center of Earth
(2) slightly less, because the person is closer to the center of Earth
(3) slightly more, because the person is farther from the center of Earth
(4) slightly more, because the person is closer to the center of Earth

2578 Precise measurements of the Earth indicate that its polar diameter is

(1) shorter than its equatorial diameter
(2) longer than its equatorial diameter
(3) the same length as its equatorial diameter

1458 A gravity meter is used to measure the amount of gravitational pull at the Earth's North Pole and at the Earth's Equator. How would these readings of gravitational pull compare? [Assume both readings are taken at sea level.]

(1) The reading would be lower at the North Pole than at the Equator.
(2) The reading would be higher at the North Pole than at the Equator.
(3) The readings would be the same at the North Pole and at the Equator.

1286 The best evidence that the Earth has a spherical shape is provided by

(1) photographs of the Earth taken from space satellites
(2) the amount of daylight received at the North Pole on June 21
(3) the changing orbital speed of the Earth in its orbit around the Sun
(4) the cyclic change of seasons

1057 The table below shows the distance that an observer must travel on a north-south line along the surface of the Earth in order to change the observed altitude of *Polaris* by 5º.

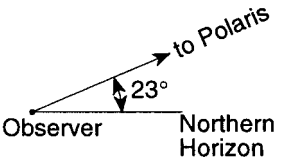
LATITUDE	DISTANCE TRAVELED TO CHANGE THE OBSERVED ALTITUDE OF POLARIS BY 5°
Between 0° and 5° N	552.75 kilometers
Between 45° N and 50° N	555.78 kilometers
Between 85° N and 90° N	558.36 kilometers

The best inference about the Earth's shape that can be made from these observations is that the Earth

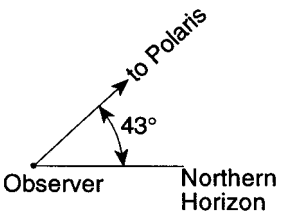
(1) is a perfect sphere
(2) is flattened at the Equator
(3) has a curved surface
(4) has a very smooth surface

3433 Which diagram best shows the altitude of *Polaris* observed near Buffalo, New York?

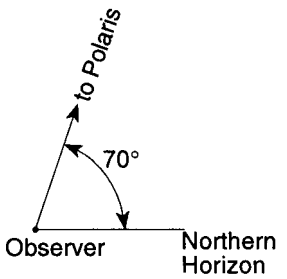
(1)



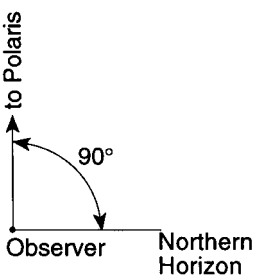
(2)



(3)



(4)



3225 Which reference line passes through both the geographic North Pole and the geographic South Pole?

(1) 0° latitude
(2) 0° longitude
(3) Tropic of Cancer
(4) Tropic of Capricorn

2202 The angle of the star *Polaris* above the northern horizon can be used to determine an observer's

(1) latitude
(2) longitude
(3) solar time
(4) local time

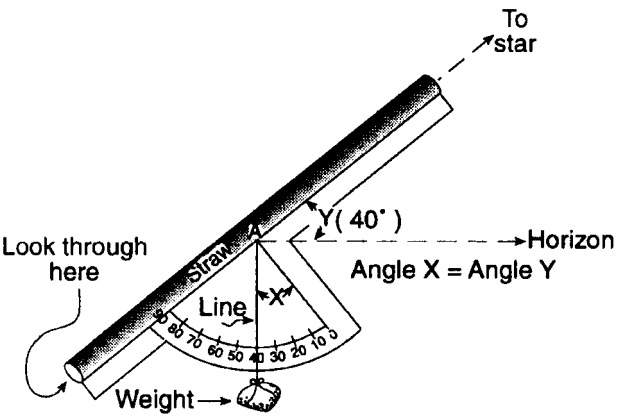
1937 As a person travels due west across New York State, the altitude of *Polaris* will

(1) decrease
(2) increase
(3) remain the same

595 Cities located on the same meridian (longitude) must have the same

(1) altitude
(2) latitude
(3) length of daylight
(4) solar time

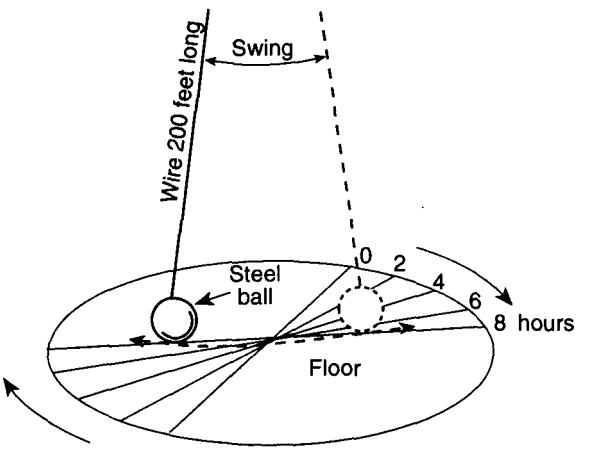
3335 The diagram below shows an instrument made from a drinking straw, protractor, string, and rock.



This instrument was most likely used to measure the

(1) distance to a star
(2) altitude of a star
(3) mass of the Earth
(4) mass of the suspended weight

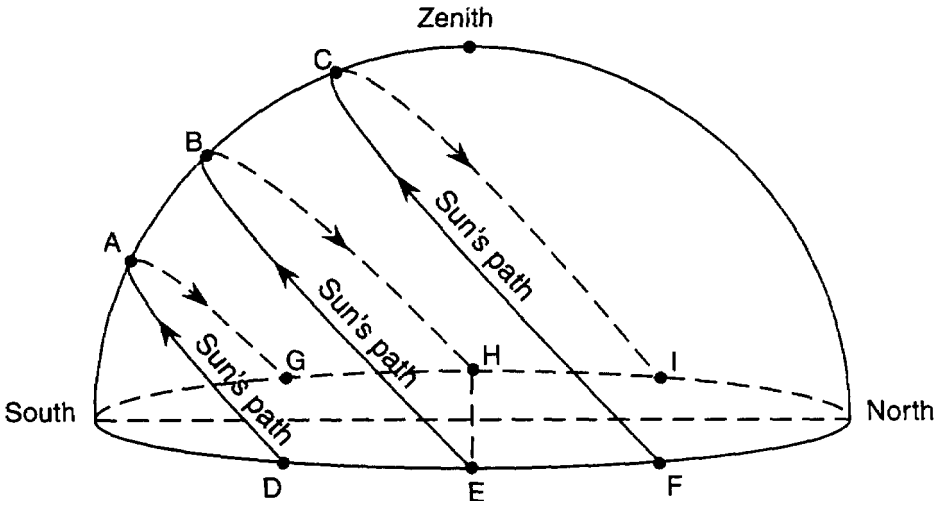
3233 The diagram below represents a Foucault pendulum swinging freely for 8 hours.



The pendulum appears to change its direction of swing because of Earth's

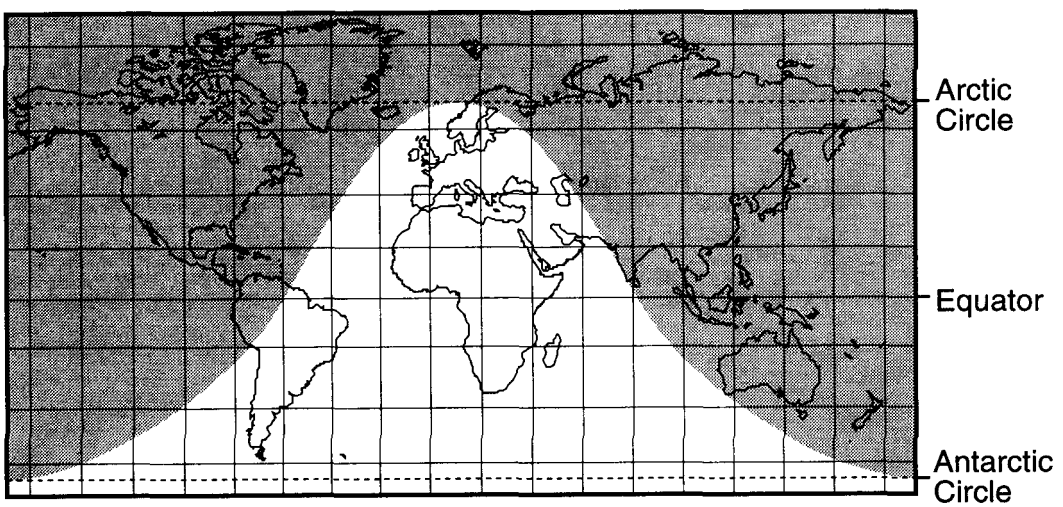
(1) tectonic plate movement
(2) force of gravity
(3) rotation
(4) revolution

3939 The diagram below represents a plastic hemisphere upon which lines have been drawn to show the apparent paths of the Sun at a location in New York State on the first day of each season. Letters *A* through *I* represent points on the paths.



Which point represents the sunrise location on the first day of winter?
(1) *G* (2) *F* (3) *E* **(4) *D***

3459 The shaded portion of the map below indicates areas of night and the unshaded portion indicates areas of daylight.

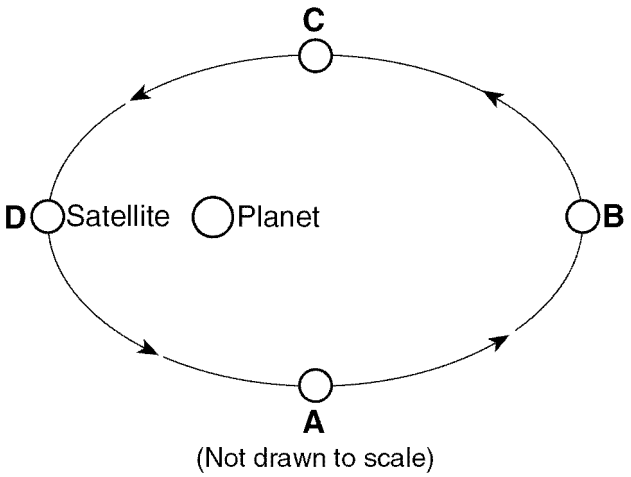


What day of the year is best represented by the map?
(1) March 21 (2) June 21 (3) September 21 **(4) December 21**

4493 The apparent daily path of the Sun changes with the seasons because
(1) Earth's axis is tilted
(2) Earth's distance from the Sun changes
(3) the Sun revolves
(4) the Sun rotates

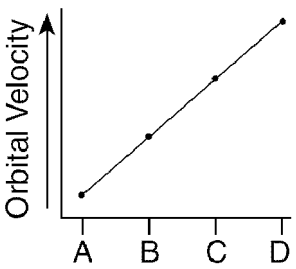
3099 Which observation is a direct result of the 23½° tilt of Earth's axis as Earth orbits the Sun?
(1) Locations on Earth's Equator receive 12 hours of daylight every day.
(2) The apparent diameter of the Sun shows predictable changes in size.
(3) A Foucault pendulum shows predictable shifts in its direction of swing.
(4) Winter occurs in the Southern Hemisphere at the same time that summer occurs in the Northern Hemisphere.

5469 The diagram below shows a satellite in four different positions as it revolves around a planet.

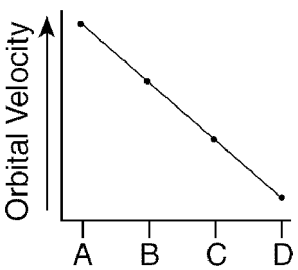


(Not drawn to scale)

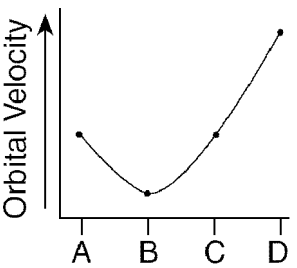
Which graph best represents the changes in this satellite's orbital velocity as it revolves around the planet?



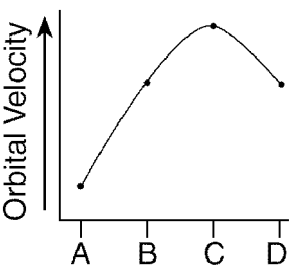
(1)



(2)

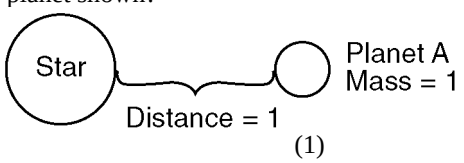


(3)

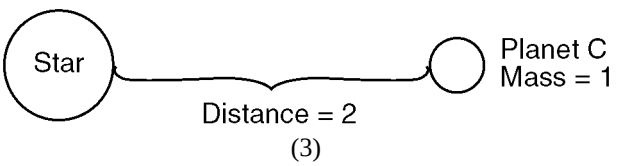


(4)

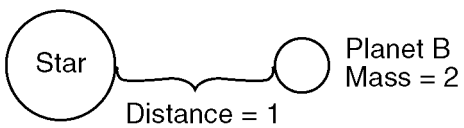
5077 In each diagram below, the mass of the star is the same. In which diagram is the force of gravity greatest between the star and the planet shown?



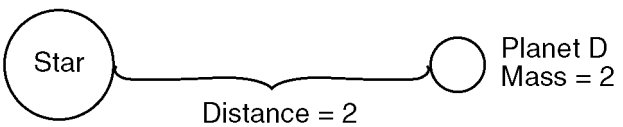
(1)



(3)



(2)



(4)

5961 One factor responsible for the strength of gravitational attraction between a planet and the Sun is the

(1) degree of tilt of the planet's axis
(2) distance between the planet and the Sun
(3) planet's period of rotation
(4) amount of insolation given off by the Sun

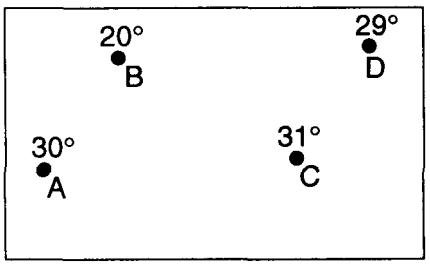
2204 The speed of a planet in its orbit around the Sun depends primarily on the planet's

(1) direction of revolution (3) polar circumference
(2) distance from the Sun (4) axial tilt

5717 What is the main reason that the gravitational attraction between Earth and the Moon changes each day?

(1) Earth's axis is tilted at 23.5°.
(2) Earth's rotational speed varies with the seasons.
(3) The Moon has an elliptical orbit.
(4) The Moon has a spherical shape.

3531 The map below shows four locations in a temperature field. The temperature of each location is given in degrees Celsius.



Heat energy will normally flow from
(1) *A* to *B*
(2) *A* to *C*
(3) *B* to *D*
(4) *D* to *C*

2091 The data table below shows the temperatures of two similar objects for 10 minutes after the objects were placed near each other.

Time (minutes)	Temperature (°C)	
	Object A	Object B
0	32	18
2	29	19
4	26	20
6	25	20
8	24	21
10	23	21

Which statement is best supported by the data?
(1) Some of the heat energy lost by object *B* was gained by object *A*.
(2) Most of the heat energy lost by object *A* was gained by the environment.
(3) Both objects lost heat energy.
(4) Both objects gained heat energy.

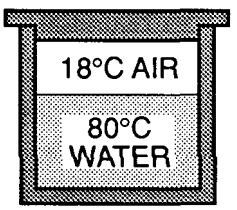
1970 An insulated cup contains 200 milliliters of water at 20ºC. When 100 grams of ice is added to the water, heat energy will most likely flow from the
(1) water to the ice, and the temperature of the mixture will drop below 20ºC
(2) water to the ice, and the temperature of the mixture will rise above 20ºC
(3) ice to the water, and the temperature of the mixture will drop below 20ºC
(4) ice to the water, and the temperature of the mixture will rise above 20ºC

1851 Which statement best describes the pattern of energy flow in a closed system?
(1) Energy flows out of the system.
(2) Energy flow is cyclical, so that equilibrium is never reached.
(3) Energy flows from energy sinks to energy sources.
(4) Energy flows from energy sources to energy sinks.

1605 Which statement best describes the major heat flow associated with an iceberg as it drifts south from the Arctic Ocean into warmer water?
(1) Heat flows from the water into the ice.
(2) Heat flows from the ice into the water.
(3) A state of equilibrium exists, with neither ice nor water gaining or losing energy.
(4) Heat flows equally from the ice and the water into the surrounding air.

1507 Heat energy transfer will normally occur between two objects that are close to each other if the objects have different
(1) specific heats
(2) temperatures
(3) masses
(4) densities

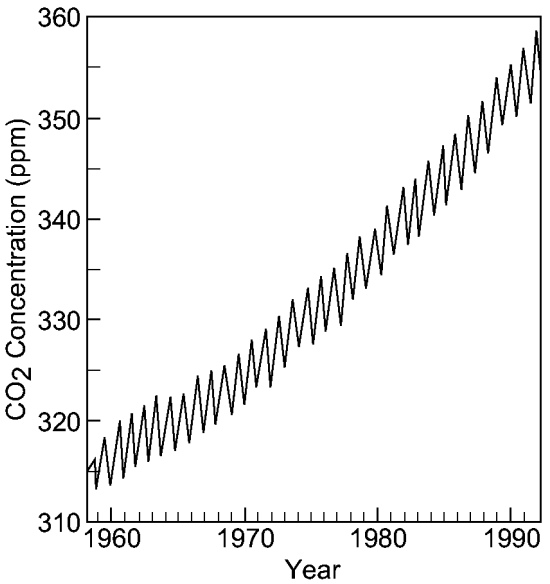
1501 The diagram below shows a sealed container holding 250 milliliters of water at 80ºC. The air above the water had an original temperature of 18ºC.



Assuming that the container does not transfer heat, which statement most accurately describes the energy exchanges inside the container?
(1) The air gains more heat energy than the water loses.
(2) The air gains less heat energy than the water loses.
(3) The air gains the same amount of heat energy that the water loses.
(4) No energy is exchanged between the water and the air.

1411 As a lake's water temperature decreases on a cloudy night, what occurs at the interface between the lake's surface and the air above the lake?
(1) Energy given up by the lake is lost directly to outer space.
(2) More energy is gained by the lake than is gained by the air.
(3) The temperature of the air remains constant.
(4) Energy is gained by the air from the lake.

4559 The graph below shows the change in carbon dioxide concentration in parts per million (ppm) in Earth's atmosphere from 1960 to 1990.



The most likely cause of the overall change in the level of carbon dioxide from 1960 to 1990 is an increase in the

(1) number of violent storms
(2) number of volcanic eruptions
(3) use of nuclear power
(4) use of fossil fuels

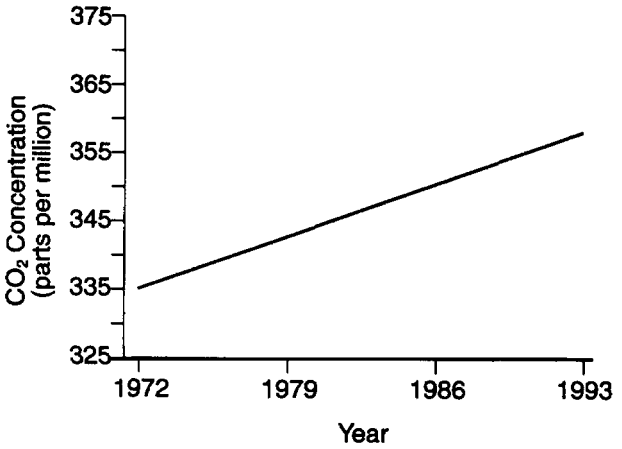
4304 Earth's atmosphere is warmed when

(1) ultraviolet radiation emitted by Earth is absorbed by nitrogen and carbon dioxide in the atmosphere
(2) x-ray radiation emitted by Earth is absorbed by nitrogen and carbon dioxide in the atmosphere
(3) infrared radiation emitted by Earth is absorbed by carbon dioxide and water vapor in the atmosphere
(4) gamma radiation emitted by Earth is absorbed by carbon dioxide and water vapor in the atmosphere

3232 Why are carbon dioxide and water vapor called the greenhouse gases?

(1) They are found in varying amounts in Earth's atmosphere.
(2) They are found in fixed amounts in Earth's bedrock.
(3) They are good reflectors of infrared radiation.
(4) They are good absorbers of infrared radiation.

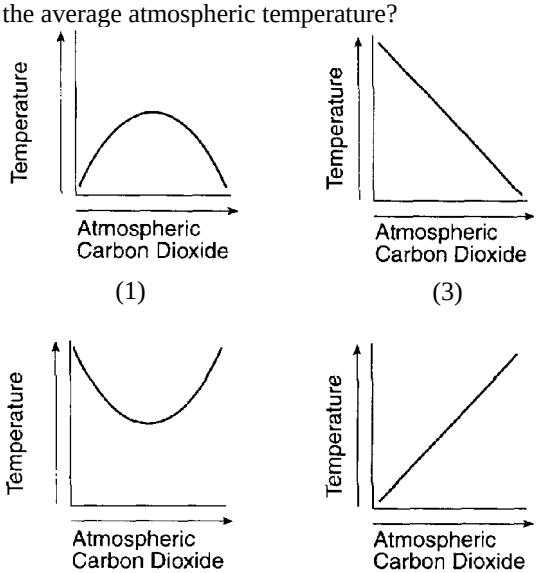
3869 The graph below represents the average yearly concentration of carbon dioxide (CO_2) in Earth's atmosphere from 1972 to 1993.



This change in CO_2 concentration most likely caused

(1) a decrease in the average wavelength of solar radiation
(2) a decrease in the thickness of Earth's atmosphere
(3) an increase in the absorption of long-wave heat radiation by Earth's atmosphere
(4) an increase in the thickness of Earth's glaciers

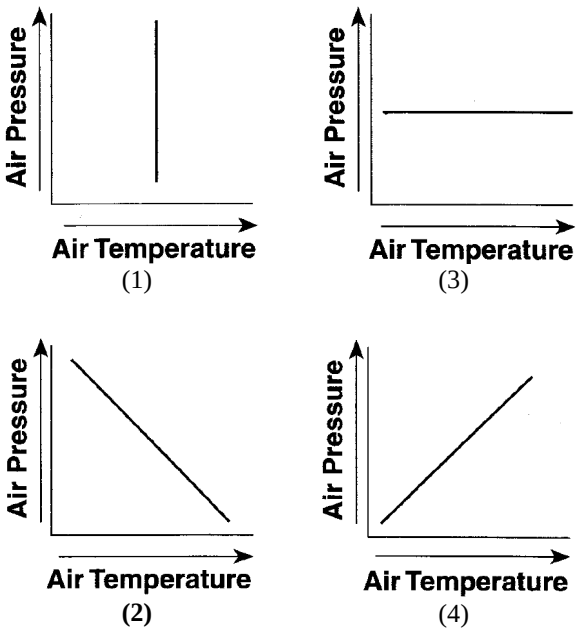
3678 Which graph best shows the relationship between the amount of carbon dioxide contained in Earth's atmosphere and the average atmospheric temperature?



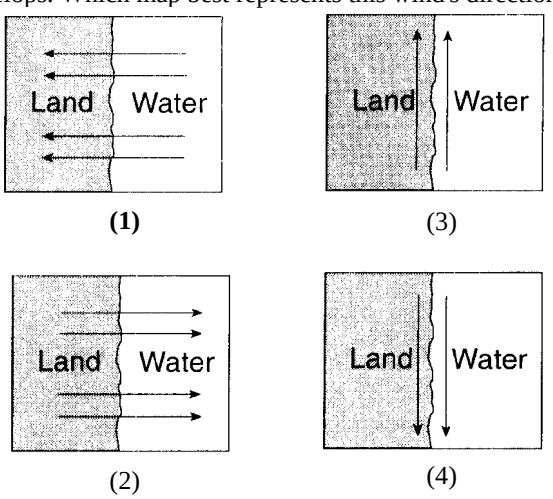
6665 Air pressure is usually highest when the air is
(1) cool and humid
(2) **cool and dry**
(3) warm and humid
(4) warm and dry

6570 Which weather variable would most likely *decrease* ahead of an approaching storm system?
(1) wind speed
(2) **air pressure**
(3) cloud cover
(4) relative humidity

6567 Which graph best represents the change in air pressure as air temperature increases at Earth's surface?

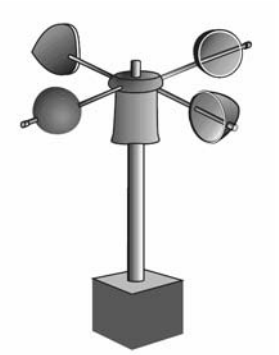


6333 Adjacent water and landmasses are heated by the morning Sun on a clear, calm day. After a few hours, a surface wind develops. Which map best represents this wind's direction?



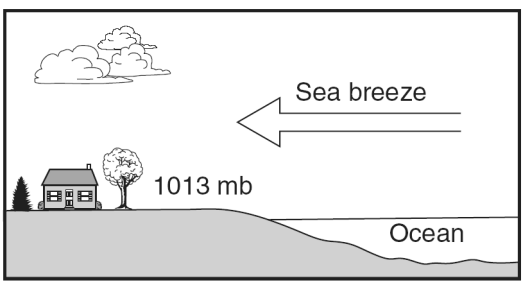
6224 A barometric pressure of 1021.0 millibars is equal to how many inches of mercury?
(1) 29.88
(2) **30.15**
(3) 30.25
(4) 30.50

6229 An instrument used to measure a weather variable is shown below.



Which weather variable is measured by this instrument?
(1) wind direction
(2) air pressure
(3) **wind speed**
(4) amount of rainfall

6228 The cross section below shows a sea breeze blowing from the ocean toward the land. The air pressure at the land surface is 1013 millibars.



(Not drawn to scale)

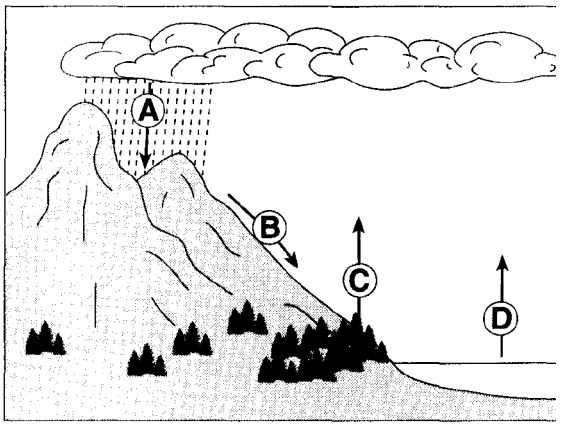
The air pressure at the ocean surface a few miles from the shore is most likely
(1) 994 mb
(2) 1005 mb
(3) 1013 mb
(4) **1017 mb**

5892 Earth's surface winds generally blow from regions of higher
(1) air temperature toward regions of lower air temperature
(2) **air pressure toward regions of lower air pressure**
(3) latitudes toward regions of lower latitudes
(4) elevations toward regions of lower elevations

5889 In the United States, most tornadoes are classified as intense
(1) low-pressure funnel clouds that spin clockwise
(2) **low-pressure funnel clouds that spin counterclockwise**
(3) high-pressure funnel clouds that spin clockwise
(4) high-pressure funnel clouds that spin counterclockwise

5806 Which weather condition most directly determines wind speeds at Earth's surface?
(1) visibility changes
(2) amount of cloud cover
(3) **air-pressure gradient**
(4) dewpoint differences

6303 The arrows in the diagram below represent the movement of water in the water cycle.



Which arrow represents the process of transpiration?
(1) *A* **(3) *C***
(2) *B* (4) *D*

5803 Under which atmospheric conditions will water most likely evaporate at the fastest rate?
(1) hot, humid, and calm (3) cold, humid, and windy
(2) hot, dry, and windy (4) cold, dry, and calm

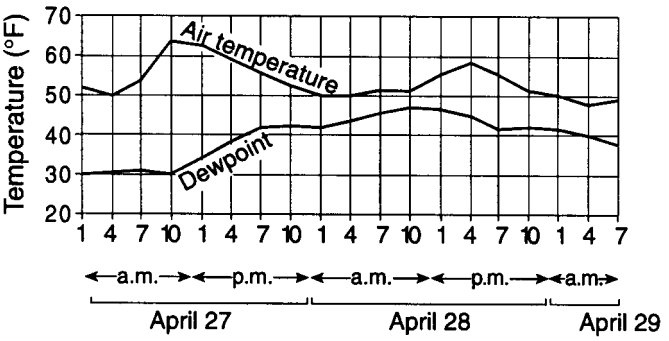
4921 Most water vapor enters Earth's atmosphere by the processes of
(1) condensation and precipitation
(2) radiation and cementation
(3) conduction and convection
(4) evaporation and transpiration

4768 A student uses a sling psychrometer outdoors on a clear day. The dry-bulb (air) temperature is 10°C. The water on the wet bulb will most likely
(1) condense, causing the wet-bulb temperature to be higher than the air temperature
(2) condense, causing the wet-bulb temperature to be equal to the air temperature
(3) evaporate, causing the wet-bulb temperature to be lower than the air temperature
(4) evaporate, causing the wet-bulb temperature to be equal to the air temperature

3943 A container of water is placed in an open outdoor area so that the evaporation rate can be observed. The water will most likely evaporate fastest when the weather is
(1) cool, humid, and windy (3) warm, humid, and calm
(2) cool, dry, and calm **(4) warm, dry, and windy**

3543 Which process occurs when water vapor moves out of the leaves of a tree into the atmosphere?
(1) condensation (3) runoff
(2) infiltration **(4) transpiration**

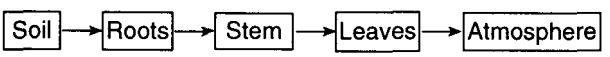
4040 The graph below is a computer-generated forecast of air temperature and dewpoint for a city during a period of $2\frac{1}{4}$ days.



At which time during this period is the rate of evaporation expected to be highest?
(1) April 27 at 10 a.m. (3) April 28 at 4 p.m.
(2) April 28 at 10 a.m. (4) April 29 at 4 a.m.

3494 When would the water in a Georgia pond evaporate fastest?
(1) in January, when the pond is frozen
(2) in March, when the pond ice is melting
(3) in May on a calm, sunny day
(4) in July on a hot, windy day

3241 The flowchart below shows one process by which moisture enters the atmosphere.



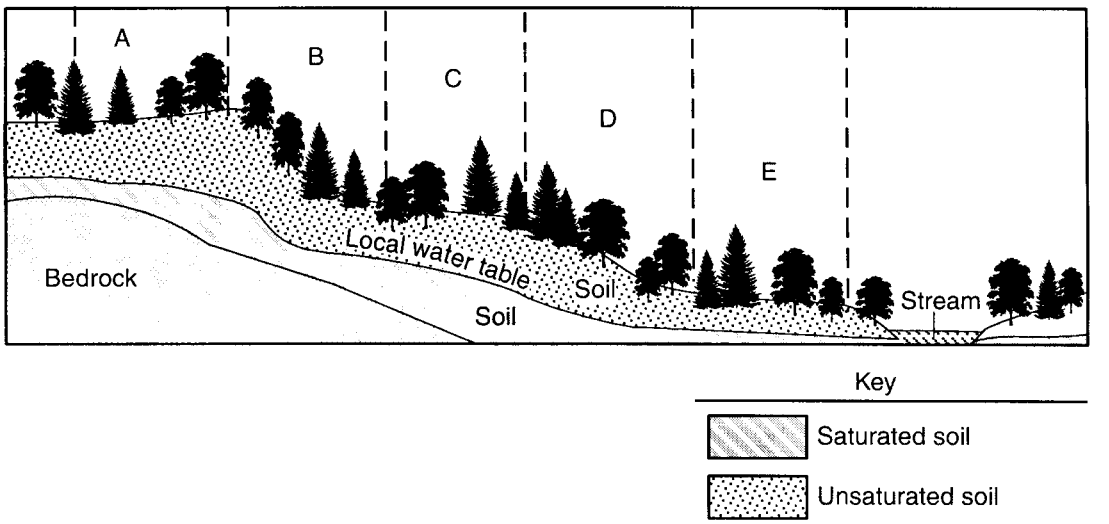
The last step of this process is known as
(1) condensation (3) radiation
(2) convection **(4) transpiration**

3112 Under which set of atmospheric conditions does water usually evaporate at the fastest rate?
(1) warm temperatures, calm winds, and high humidity
(2) warm temperatures, high winds, and low humidity
(3) cold temperatures, calm winds, and low humidity
(4) cold temperatures, high winds, and high humidity

2931 What is the most effective method for increasing the rate of evaporation of a given amount of water?
(1) decreasing the water's temperature
(2) decreasing the air movement over the water's surface
(3) increasing the water's surface area
(4) increasing the air pressure over the water's surface

2046 When a person leaves the ocean after swimming on a windy day, the person usually feels cold because
(1) water evaporates from the skin
(2) water condenses on the skin
(3) salt is absorbed through the skin
(4) radiation is absorbed through the skin

4310 The cross section below represents a forested area in Vermont.



During heavy rainfall, the greatest amount of runoff should occur in which two sections of the forest?
(1) *A* and *B* **(2) *B* and *D*** (3) *C* and *E* (4) *D* and *E*

6391 During a heavy rainstorm, runoff is most likely to occur if the surface soil is
(1) firmly packed clay-sized particles
(2) loosely packed sand-sized particles
(3) covered by trees, shrubs, and grasses
(4) unsaturated and has a gentle slope

6222 Which soil conditions normally result in the greatest amount of runoff?
(1) low permeability and gentle slope
(2) low permeability and steep slope
(3) high permeability and gentle slope
(4) high permeability and steep slope

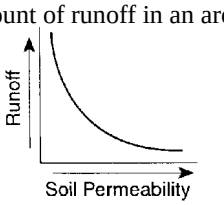
5000 When rainfall occurs, the rainwater will most likely become surface runoff if the land surface is
(1) sandy (3) covered with grass
(2) impermeable (4) nearly flat

4851 Which set of conditions would produce the most runoff of precipitation?
(1) gentle slope and permeable surface
(2) gentle slope and impermeable surface
(3) steep slope and permeable surface
(4) steep slope and impermeable surface

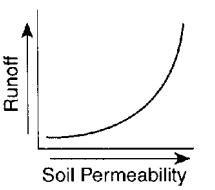
4708 During a rainfall, surface runoff will probably be greatest in an area that has a
(1) steep slope and a clay-covered surface
(2) steep slope and a gravel-covered surface
(3) gentle slope and a grass-covered surface
(4) gentle slope and a tree-covered surface

4621 Which condition would cause surface runoff to increase in a particular location?
(1) covering a dirt road with pavement
(2) reducing the gradient of a steep hill
(3) planting grasses and shrubs on a hillside
(4) having a decrease in the annual rainfall

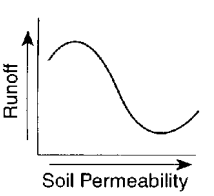
4423 Which graph shows the effect of soil permeability on the amount of runoff in an area?



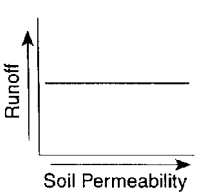
(1)



(3)



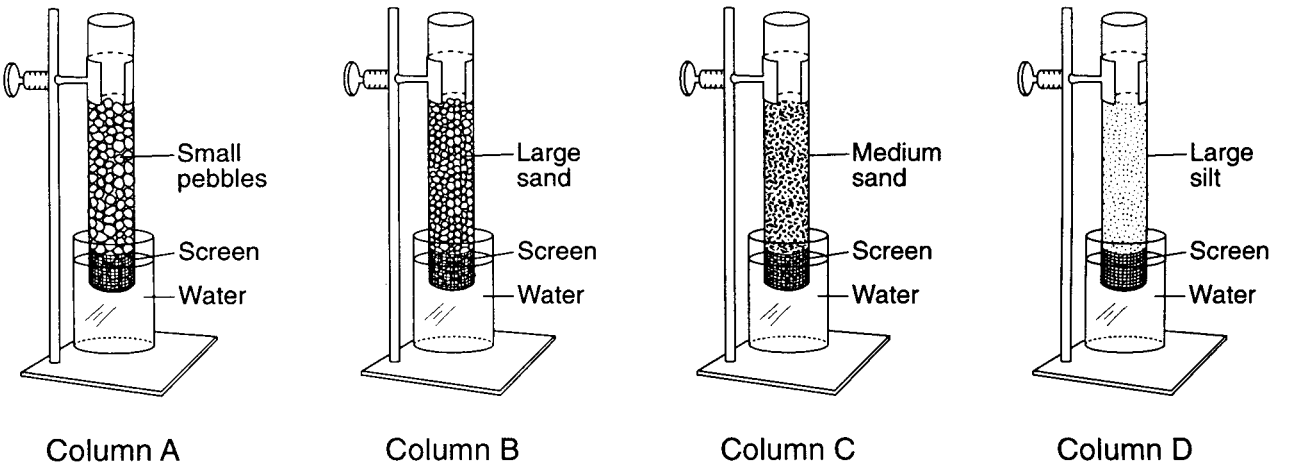
(2)



(4)

3955 Which condition makes surface runoff of rainfall most likely?
(1) The gradient of the surface is low.
(2) Permeability rate exceeds the rate of rainfall.
(3) Surface soil pore spaces are filled.
(4) The porosity of the surface soil is high.

Base your answers to questions **4481** through **4483** on the diagram below. 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.

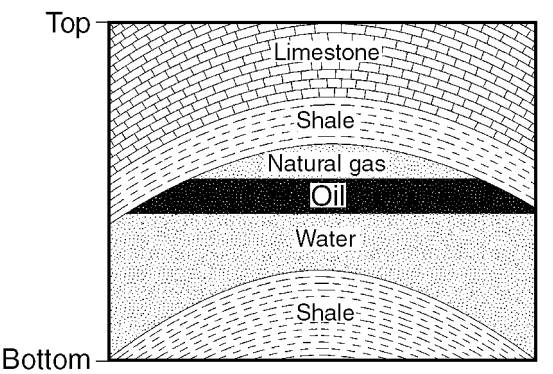


4481 Which column contains sediment with an average diameter closest to 0.1 centimeter?
(1) *A* **(2) *B*** (3) *C* (4) *D*

4482 In which sediment will capillary action cause the water from the beaker to rise fastest in the column?
(1) small pebbles (2) large sand (3) medium sand **(4) large silt**

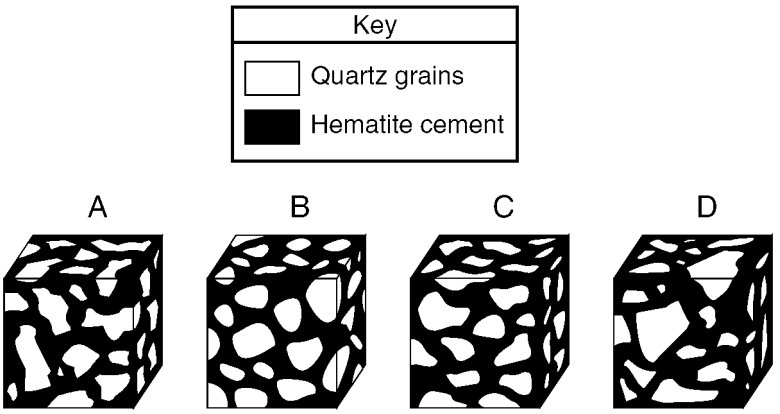
4483 In an experiment, the beakers of water were removed and replaced with empty beakers. The sediments were allowed to dry. Then water was poured into each column to compare the permeability of the sediments. The permeability rate of the medium sand sample was shown to be
(1) less than the silt and pebble samples
(3) greater than the silt sample but less than the pebble sample
(2) less than the silt sample but more than the pebble sample
(4) greater than the silt and pebble samples

5262 Base your answer to the following question on the bedrock cross section below, which represents part of Earth's crust where natural gas, oil, and water have moved upward through a layer of folded sandstone and filled the pore spaces at the top of the sandstone layer.



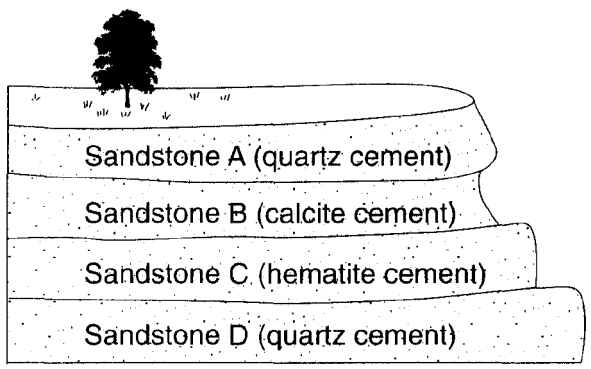
The natural gas, oil, and water are trapped within the top of the sandstone and do not move upward through the shale because, compared to the sandstone, the shale has
(1) lower permeability (2) less foliation (3) larger pore spaces (4) larger particles

5249 The diagram below shows four magnified block-shaped sandstone samples labeled *A*, *B*, *C*, and *D*. Each sandstone sample contains quartz grains of different shapes and sizes. The quartz grains are held together by hematite cement.



In which sample did the quartz grains undergo the most abrasion during erosional transport?
(1) *A* **(2) *B*** (3) *C* (4) *D*

6315 The diagram below shows an outcrop of different layers of sandstone in a region receiving heavy rainfall.

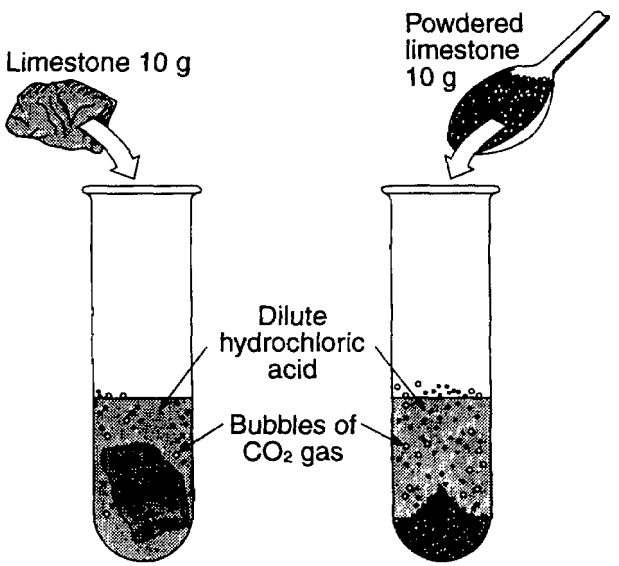


Which sandstone layer appears to be the *least* resistant to weathering?
(1) *A* (3) *C*
(2) *B* (4) *D*

3841 Adding automobile exhaust gases to the atmosphere has had the greatest impact on landscape development by
(1) changing the position of crustal plates
(2) changing Earth's prevailing wind patterns
(3) increasing the rate of chemical weathering
(4) increasing the amount of ozone in ground water

3653 Which long-term atmospheric changes would increase the rate of chemical weathering of surface bedrock?
(1) decreasing temperature and decreasing precipitation
(2) decreasing temperature and increasing precipitation
(3) increasing temperature and decreasing precipitation
(4) increasing temperature and increasing precipitation

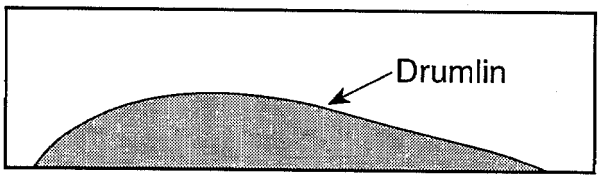
3851 The demonstration shown in the diagram below indicates that powdered limestone reacts faster than a single large piece of limestone of equal mass when both are placed in acid.



The most likely reason powdered limestone reacts faster is that it has
(1) less total volume **(3) more total surface area**
(2) more chemical bonds (4) lower density

2939 In hot, wet climates, bedrock rapidly weathers into soil because water
(1) dissolves many minerals
(2) expands when it freezes
(3) is part of most chemical compounds
(4) cools the surroundings when it evaporates

2221 The diagram below represents a side view of a hill (drumlin) that was deposited by a glacier on the Atlantic coast.



This hill is most likely composed of

(1) cemented sediments
(2) unsorted sediments
(3) vertically layered sediments
(4) horizontally layered sediments

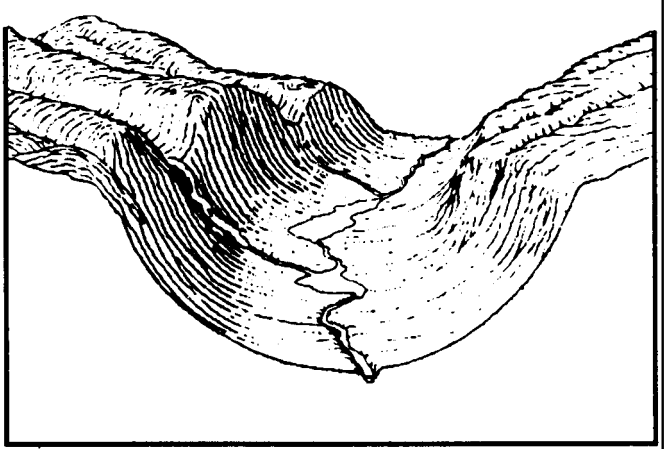
2116 Which erosional agent typically deposits hills of unsorted sediments?

(1) glaciers (3) winds
(2) streams (4) ocean waves

2070 Which landscape feature was most likely formed by glacial activity?

(1) an eroded plateau **(3) a U-shaped valley**
(2) a flat floodplain (4) a V-shaped valley

2008 The diagram below represents the surface topography of a mountain valley.



Which agent of erosion most likely created the shape of the valley shown in the diagram?

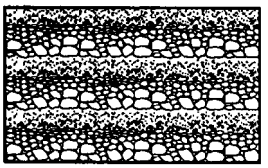
(1) wind (3) ocean waves
(2) glaciers (4) running water

743 Many elongated hills, each having a long axis with a mostly north-south direction, are found scattered across New York State. These hills contain unsorted soils, pebbles, and boulders. Which process most likely formed these hills?

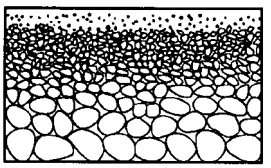
(1) stream deposition (3) wave deposition
(2) wind deposition **(4) glacial deposition**

1874 Which diagram best illustrates a cross section of sediments that were transported and deposited by a glacier?

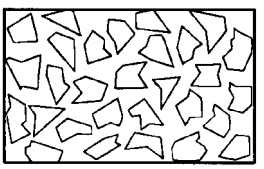
(1)



(2)

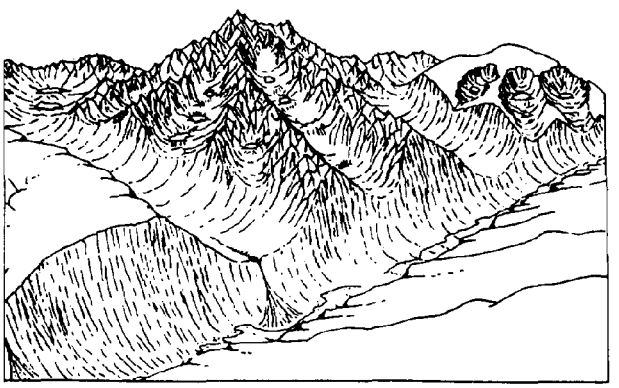


(3)



(4)

1332 The diagram below represents a landscape area.



Which process is primarily responsible for the shape of the surface shown in the diagram?

(1) crustal subsidence **(3) glacial action**
(2) wave action (4) stream erosion

149 Which is the best evidence that more than one glacial advance occurred in a region?

(1) ancient forests covered by glacial deposits
(2) river valleys buried deeply in glacial deposits
(3) scratches in bedrock that is buried by glacial deposits
(4) glacial deposits that overlay soils formed from glacial deposits

3957 Diagram I below shows a laboratory setup for observing the settling pattern in water of sediments composed of the same mineral. When the sediments in the container were poured into the tube of water, they settled to the bottom in the pattern shown in diagram II below. [Diagram II is enlarged to show the sedimentary particles.]

Diagram I

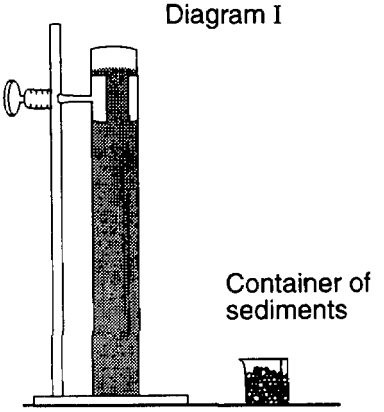
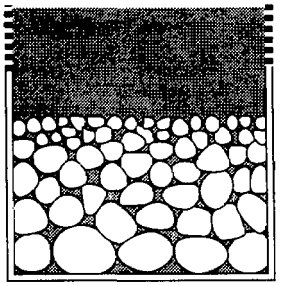


Diagram II



Which characteristic of the sedimentary particles most likely caused the pattern of deposition shown in diagram II?
(1) particle shape **(2) particle size** (3) particle composition (4) particle density

5811 Which property would best distinguish sediment deposited by a river from sediment deposited by a glacier?
(1) mineral composition of the sediment
(2) amount of sediment sorting
(3) thickness of sediment layers
(4) age of fossils found in the sediment

5065 Which statement best describes sediments deposited by glaciers and rivers?
(1) Glacial deposits and river deposits are both sorted.
(2) Glacial deposits are sorted, and river deposits are unsorted.
(3) Glacial deposits are unsorted, and river deposits are sorted.
(4) Glacial deposits and river deposits are both unsorted.

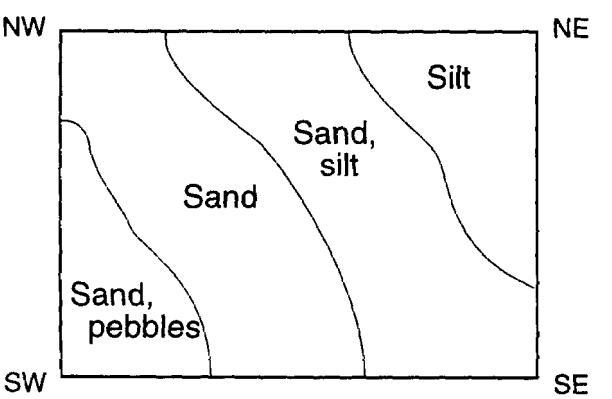
4488 The four particles shown in the table below are of equal volume and are dropped into a column filled with water.

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***

3359 The velocity of a stream is decreasing. As the velocity approaches zero, which size particle will most likely remain in suspension?
(1) clay (3) sand
(2) pebble (4) boulder

4025 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) (3) southeast (SE)
(2) northwest (NW) **(4) southwest (SW)**

2452 When particles of uniform shape and density are dropped into a calm lake, silt will settle faster than
(1) sand (3) cobbles
(2) clay (4) pebbles

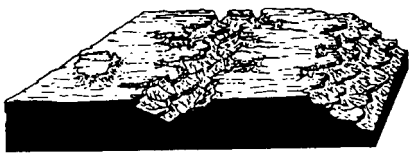
1995 How are dissolved materials carried in a river?
(1) in solution (3) by precipitation
(2) in suspension (4) by bouncing and rolling

723 Which rock particles will remain suspended in water for the longest time?
(1) pebbles (3) silt
(2) sand **(4) clay**

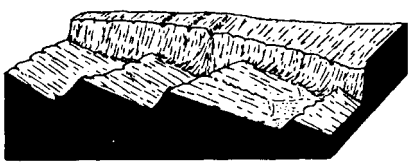
4336 Which landscape region probably resulted from the erosion of faulted rock layers?

(1)

(2)



(3)



(4)

3975 Which characteristics best distinguish one landscape region from another?

(1) human population density and types of environmental pollutants
(2) composition of bedrock and variety of fossils
(3) bedrock structure and elevation of land surfaces
(4) stream gradients and soil types

3276 The boundaries of landscape regions are generally well defined by changes in

(1) vegetation and soil type
(2) stream size and drainage pattern
(3) latitude and longitude
(4) elevation and bedrock structure

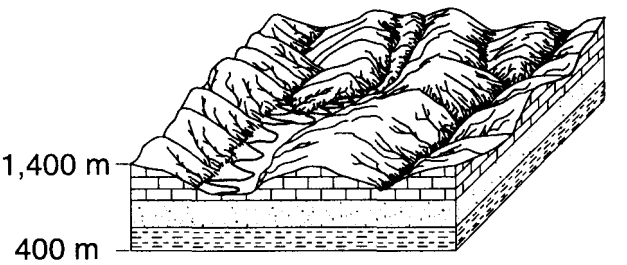
3272 Which evidence best indicates that a landscape has been eroded primarily by streams?

(1) parallel sets of U-shaped valleys
(2) sand dunes
(3) thick residual soil
(4) sorted layers of cobbles and sand

2962 Which characteristics of Earth's surface can be determined by using a topographic map?

(1) hillslope and stream gradients
(2) bedrock erosion and stream velocity
(3) hilltop elevations and bedrock age
(4) soil thickness and benchmark movement

3274 The diagram below shows a cross section of a portion of Earth's crust. Altitude is shown in meters above sea level.



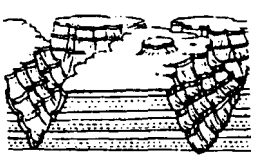
This landscape region is best classified as an eroded

(1) plain
(2) plateau
(3) domed mountain
(4) folded lowland

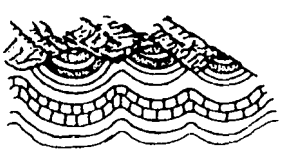
2960 Which diagram represents a plateau landscape?

(1)

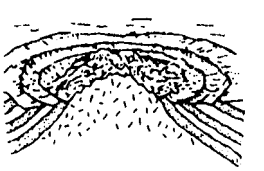
(2)



(3)



(4)



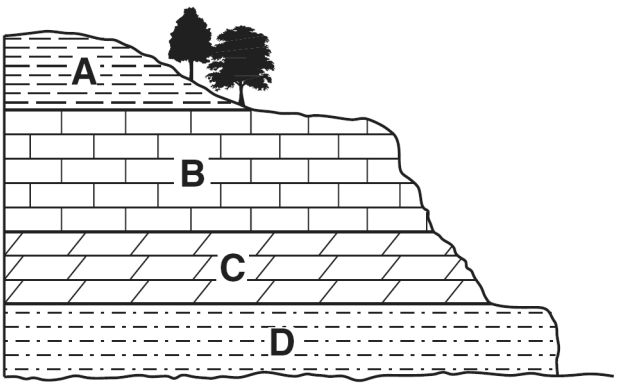
2683 Continents are divided into landscape regions on the basis of

(1) bedrock fossils and depositional patterns
(2) rainfall and temperature changes
(3) surface features and bedrock structure
(4) boundaries of the drainage basins of major rivers

2477 Landscape regions are best identified by their

(1) fossils and rock age
(2) latitude and climate
(3) elevation and bedrock structure
(4) soil composition and particle size

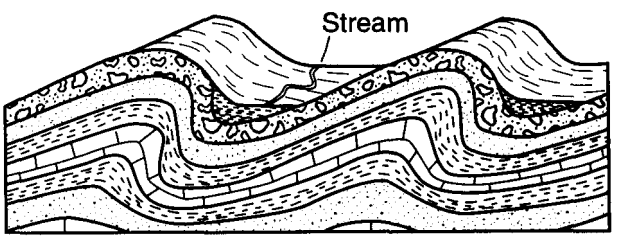
5723 The cross section below shows sedimentary bedrock layers *A*, *B*, *C*, and *D* exposed at Earth's surface.



Which layer appears to be the *least* resistant to weathering?

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

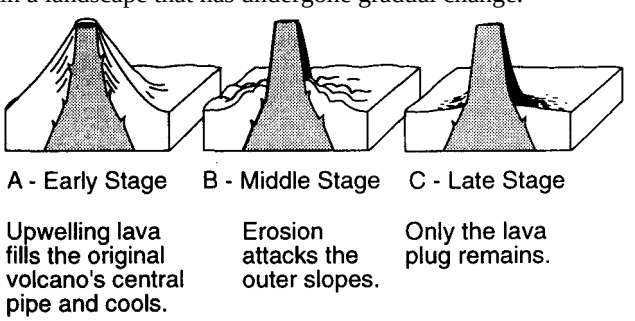
3442 The diagram below shows a cross section of a portion of Earth's crust.



The hills of this area were formed primarily by

(1) bedrock folding
(2) bedrock faulting
(3) stream erosion
(4) volcanic activity

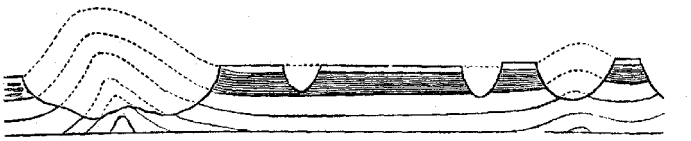
3277 The block diagrams below show cross sections of the crust in a landscape that has undergone gradual change.



The hardened lava in this volcano's central pipe formed a mountain peak in the late stage because the lava plug was composed of

(1) soft igneous rock
(2) soft metamorphic rock
(3) igneous rock that is resistant to erosion
(4) metamorphic rock that is resistant to erosion

2872 The diagram below represents a cross section of the bedrock and land surface in part of Tennessee. The dotted lines indicate missing rock layers.



Which statement is best supported by the diagram?

(1) Rocks are weathered and eroded evenly.
(2) Folded rocks are more easily weathered and eroded.
(3) Deposits of sediments provide evidence of erosion.
(4) Climate differences affect the amount of erosion.

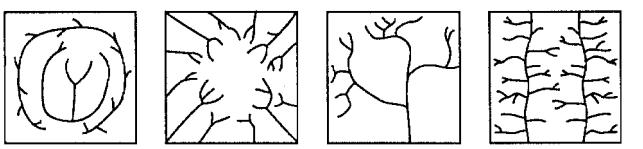
2871 Which bedrock characteristics most influence landscape development?

(1) composition and structure
(2) structure and age
(3) age and color
(4) color and composition

2577 A variety of soil types are found in Pennsylvania primarily because areas of the State differ in their

(1) amounts of insolation
(2) distances from the ocean
(3) underlying bedrock and sediments
(4) amounts of human activities

2476 The maps below represent four different stream drainage patterns.



Which factor most likely caused the differences in these patterns?

(1) time
(2) climate
(3) human activities
(4) bedrock structure

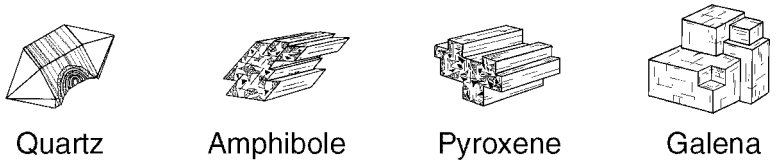
819 One characteristic used to classify landscape regions as plains, plateaus, or mountains is

(1) type of soil
(2) amount of stream discharge
(3) weathering rate
(4) underlying bedrock structure

692 The primary reason that several landscape regions have formed in New York State is that the various regions of the State have different

(1) climates
(2) latitudes
(3) soil characteristics
(4) bedrock characteristics

5583 The diagram below shows four mineral samples, each having approximately the same mass.



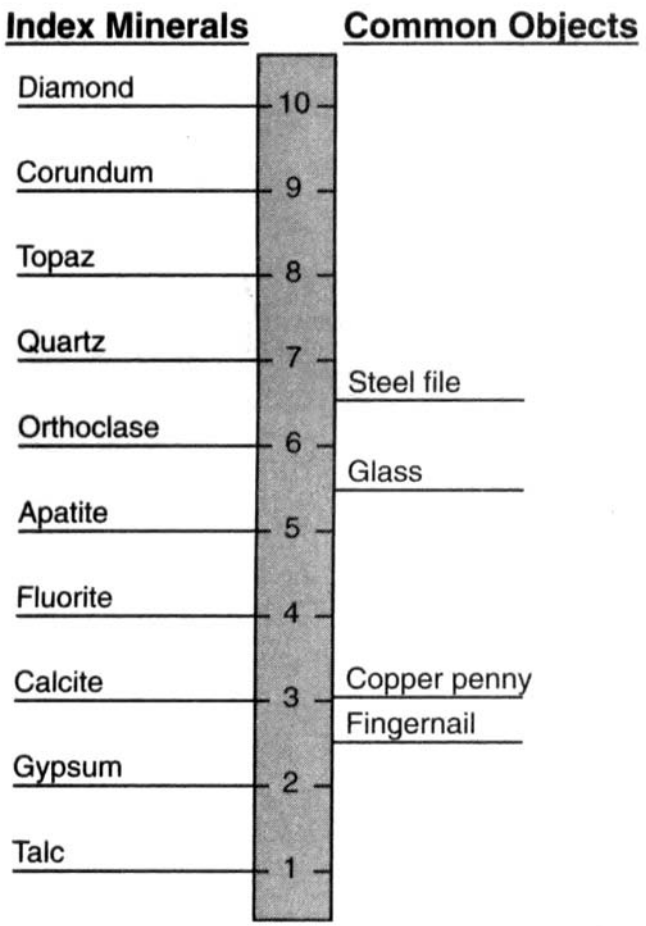
If all four samples are placed together in a closed, dry container and shaken vigorously for 10 minutes, which mineral sample would experience the most abrasion?

(1) quartz (2) amphibole (3) pyroxene **(4) galena**

6683 Which mineral is commonly used as a food additive?

(1) calcite **(3) halite**
(2) talc (4) fluorite

6159 The diagram below shows the index minerals of Mohs hardness scale compared with the hardness of some common objects.

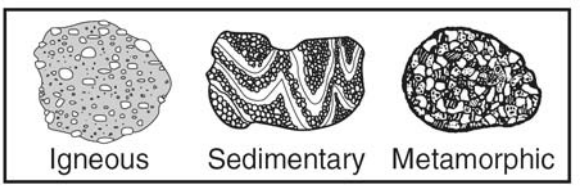


Which statement is best supported by the diagram?

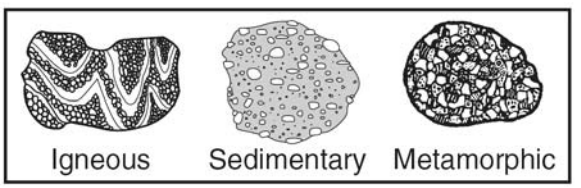
(1) A fingernail will scratch calcite but not gypsum.
(2) Calcite will be scratched by a copper penny.
(3) The mineral apatite will scratch topaz.
(4) A steel file has a hardness of about 7.5.

5982 In which set are the rock drawings labeled with their correct rock types?

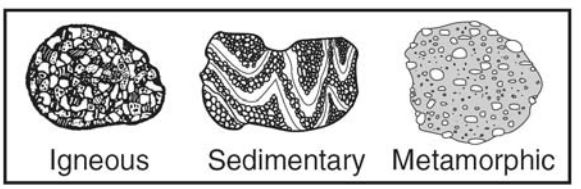
(1)



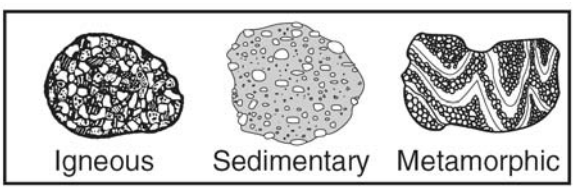
(2)



(3)



(4)



5979 Which mineral has a metallic luster, a black streak, and is an ore of iron?

(1) galena (3) pyroxene
(2) magnetite (4) graphite

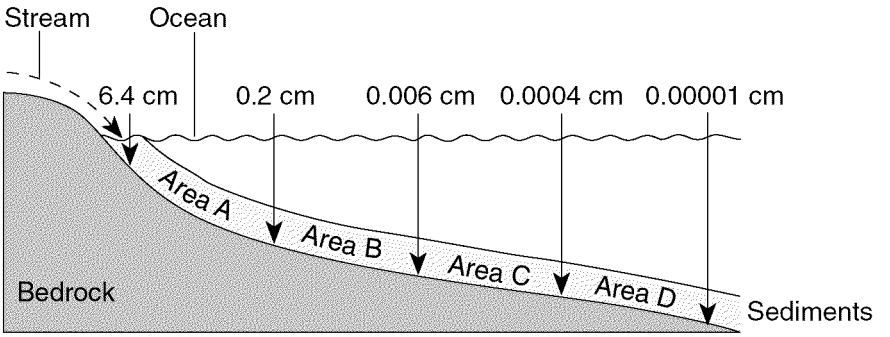
5732 The mineral graphite is often used as

(1) a lubricant (3) a source of iron
(2) an abrasive (4) a cementing material

5244 Which home-building material is made mostly from the mineral gypsum?

(1) plastic pipes **(3) drywall panels**
(2) window glass (4) iron nails

4770 The profile below shows the average diameter of sediment that was sorted and deposited in specific areas *A*, *B*, *C*, and *D* by a stream entering an ocean.



As compaction and cementation of these sediments eventually occur, which area will become siltstone?
(1) *A* (2) *B* **(3) *C*** (4) *D*

6682 Soil that contains large quantities of calcium was most likely formed by the weathering of
(1) rock salt (3) coal
(2) quartzite **(4) limestone**

6398 Most sandstone bedrock is composed of sediment that was
(1) sorted by size and not layered
(2) sorted by size and layered
(3) unsorted and not layered
(4) unsorted and layered

6316 Which process led to the formation of thick salt deposits found in the bedrock at some locations in New York State?
(1) melting (3) condensation
(2) runoff **(4) evaporation**

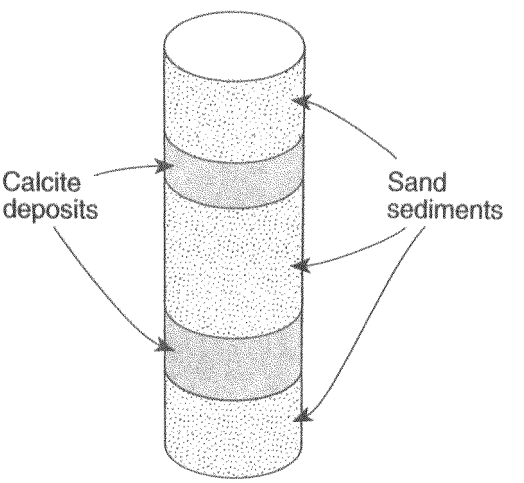
5570 A student obtains a cup of quartz sand from a beach. A saltwater solution is poured into the sand and allowed to evaporate. The mineral residue from the saltwater solution cements the sand grains together, forming a material that is most similar in origin to
(1) an extrusive igneous rock
(2) an intrusive igneous rock
(3) a clastic sedimentary rock
(4) a foliated metamorphic rock

5236 Which type of rock most likely contains fossils?
(1) scoria (3) schist
(2) gabbro **(4) shale**

4334 Which type of rock is most likely to contain fossils?
(1) granite **(3) shale**
(2) gneiss (4) metaconglomerate

4317 Particles of sediment collected from a lake bottom averaged 1.2 centimeters in diameter. If left on the lake bottom to become buried by more sediment and compressed into rock, these particles would form
(1) sandstone (3) quartzite
(2) conglomerate (4) granite

5414 The diagram below shows a drill core of sediment that was taken from the bottom of a lake.



Which types of rock would most likely form from compaction and cementation of these sediments?
(1) sandstone and limestone
(2) shale and coal
(3) breccia and rock salt
(4) conglomerate and siltstone

3664 A rock is composed of several large, rounded pebbles and sand grains cemented together. Which inference about the rock is best supported by this description?
(1) The rock is older than the pebbles.
(2) The rock is igneous.
(3) The rock is sedimentary.
(4) The rock resulted from evaporation of sea water.

3256 Which rock is made up of angular fragments of rock held together by a natural cement?
(1) breccia (3) granite
(2) scoria (4) quartzite

6576 The interior of Earth between a depth of 5200 kilometers and 6300 kilometers is inferred to be composed mostly of
(1) silicon and iron (3) iron and lead
(2) silicon and oxygen **(4) iron and nickel**

6494 Which element is most abundant in Earth's crust?
(1) nitrogen **(3) oxygen**
(2) hydrogen (4) silicon

6401 The basaltic bedrock of the oceanic crust is classified as
(1) felsic, with a density of 2.7 g/cm^3
(2) felsic, with a density of 3.0 g/cm^3
(3) mafic, with a density of 2.7 g/cm^3
(4) mafic, with a density of 3.0 g/cm^3

6241 Which group of elements is listed in increasing order based on the percent by mass in Earth's crust?
(1) aluminum, iron, calcium
(2) aluminum, silicon, magnesium
(3) magnesium, iron, aluminum
(4) magnesium, silicon, calcium

6070 Compared to the continental crust, the oceanic crust is
(1) less dense and less felsic
(2) less dense and less mafic
(3) more dense and more felsic
(4) more dense and more mafic

5245 The two most abundant elements by mass in Earth's crust are oxygen and
(1) potassium (3) nitrogen
(2) hydrogen **(4) silicon**

5005 The observed difference in density between continental crust and oceanic crust is most likely due to differences in their
(1) composition (3) porosity
(2) thickness (4) rate of cooling

4499 What are the two most abundant elements by mass found in Earth's crust?
(1) aluminum and iron (3) calcium and carbon
(2) sodium and chlorine **(4) oxygen and silicon**

3964 Compared to continental crust, oceanic crust is
(1) less dense, more mafic, and thinner
(2) less dense, more felsic, and thicker
(3) more dense, more mafic, and thinner
(4) more dense, more felsic, and thicker

3361 Which element in the Earth's crust makes up the largest volume of most minerals?
(1) oxygen (3) hydrogen
(2) nitrogen (4) iron

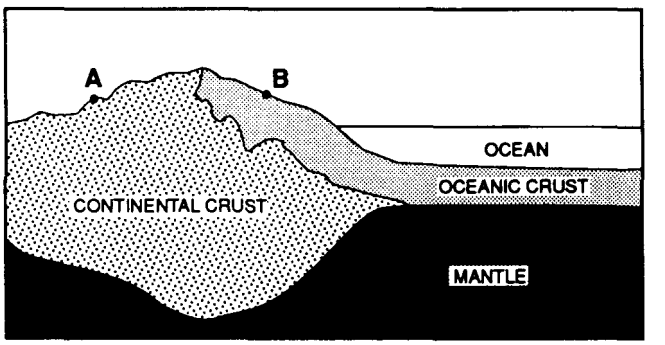
3222 What is the approximate percentage by volume of oxygen in the crust of the Earth?
(1) 20% (3) 70%
(2) 30% **(4) 90%**

3045 Which two elements make up the greatest volume of the Earth's crust?
(1) silicon and potassium (3) iron and nickel
(2) silicon and iron **(4) oxygen and potassium**

2945 Compared to the continental crust, the oceanic crust is
(1) thicker (3) more granitic
(2) more dense (4) more felsic

2767 The most abundant element in the Earth's crust is
(1) nitrogen (3) silicon
(2) oxygen (4) hydrogen

2564 In the diagram below, letters *A* and *B* represent locations near the edge of a continent.



A geologist who compares nonsedimentary rock samples from locations *A* and *B* would probably find that the samples from location *A* contain
(1) more granite
(2) more basalt
(3) more fossils
(4) the same minerals and fossils

2374 Oxygen is the most abundant element by volume in the Earth's
(1) inner core (3) hydrosphere
(2) troposphere **(4) crust**

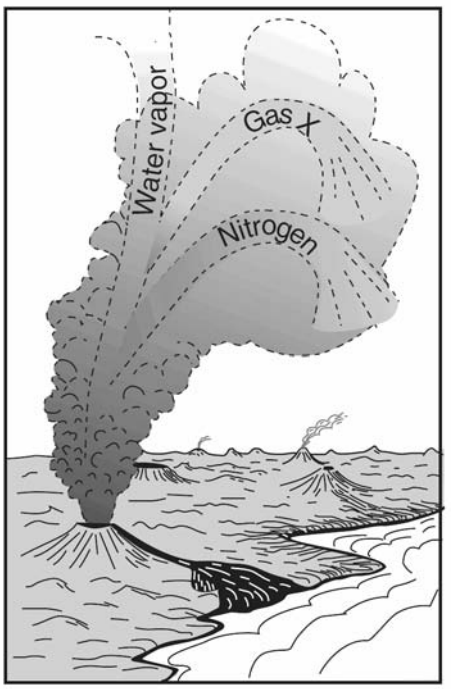
2294 Most of the oceanic crust is composed of rock material similar to
(1) basalt (3) sandstone
(2) granite (4) limestone

2231 Compared to the continental crust of central North America, the oceanic crust of the Mid-Atlantic Ridge is
(1) younger (3) less dense
(2) thicker (4) more felsic

1998 How does the oceanic crust compare to the continental crust?
(1) The oceanic crust is thinner and contains less basalt.
(2) The oceanic crust is thinner and contains more basalt.
(3) The oceanic crust is thicker and contains less basalt.
(4) The oceanic crust is thicker and contains more basalt.

1026 What are the four most abundant elements, by volume, in the Earth's crust?
(1) oxygen, potassium, sodium, and calcium
(2) hydrogen, oxygen, nitrogen, and potassium
(3) aluminum, iron, silicon, and magnesium
(4) aluminum, calcium, hydrogen, and iron

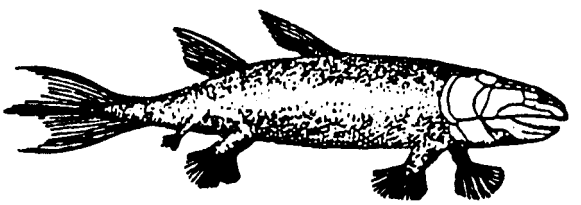
6234 The diagram below shows a process thought to have produced Earth's early atmosphere.



Which major component is shown as gas *X*?
(1) helium
(3) carbon dioxide
(2) ozone
(4) hydrogen

5170 Earth's fossil record shows evidence that
(1) very few life-forms have become extinct
(2) life-forms existed on land before life-forms existed in water
(3) more complex life-forms probably have evolved from less complex life-forms
(4) older bedrock contains a great variety of lifeforms, while younger bedrock contains less variety of life-forms

3271 The primitive lobe-finned fish shown below is thought to be an ancestor of early amphibians.



This evolutionary development from fish to amphibian is believed to have occurred during the
(1) Triassic Period
(3) Cretaceous Period
(2) Devonian Period
(4) Permian Period

2570 The changes observed in the fossil record from the Precambrian Era to the Cenozoic Era best provide evidence of
(1) sublimation
(3) evolution
(2) radioactive decay
(4) planetary motion

2233 Which life-form appeared first?
(1) trilobite
(3) coelophysis
(2) human
(4) stromatolite

2006 Theories of evolution suggest that variations between members of the same species give the species greater probability of
(1) remaining unchanged
(2) surviving environmental changes
(3) becoming fossilized
(4) becoming extinct

1377 The similarity of some fossil forms from different time periods suggests a gradual transition that may be the result of
(1) unconformities
(2) evolutionary development
(3) folding and faulting
(4) uplift and erosion

1037 Trilobite fossils from different time periods show small changes in appearance. These observations suggest that the changes may be the result of
(1) evolutionary development
(2) a variety of geologic processes
(3) periods of destruction of the geologic record
(4) the gradual disintegration of radioactive substances

950 Studies of the fossil record found in Utah indicate that
(1) variations within a species can be observed, measured, and described
(2) variations within a species have had little effect upon the survival of the species
(3) few of the species of plants and animals that existed have become extinct
(4) there is no evidence for evolutionary development among the different fossil species

679 Earth scientists studied fossils of a certain type of plant. They noted slight differences in the plant throughout geologic time. What inference is best made from this evidence?
(1) When the environment changed, this type of plant also changed, allowing it to survive.
(2) When uplifting occurred, the fossils of this type of plant were deformed.
(3) The processes which form fossils today differ from those of the past.
(4) The fossils have changed as a result of weathering and erosion.