

1 Earth has undergone several ice ages in its history. During an ice age, much of Earth's surface is covered by glaciers. Which types of organisms would natural selection favor **most** if Earth had another ice age?

- A. organisms that make food by photosynthesis
- B. organisms that hunt other organisms for food
- C. organisms that are able to swim in deep water
- D. organisms that have thick fur and layers of fat

Hint Think about what conditions would be like during an ice age.

2 Scientific ideas about the structure of our solar system have changed over time. Two such ideas are the geocentric model and the heliocentric model. Which of the following statements **best** compares the geocentric model and the heliocentric model?

- F. The heliocentric model placed Earth at the center of the solar system, while the geocentric model placed the sun at the center.
- G. The geocentric model placed Earth at the center of the solar system, while the heliocentric model placed the sun at the center.
- H. Both the geocentric model and the heliocentric model placed Earth at the center of the solar system.
- I. Both the geocentric model and the heliocentric model placed the sun at the center of the solar system.

Hint The heliocentric model is the currently accepted model of our solar system.

- 3 The building blocks of both living and nonliving matter are called elements. Which of the following groups of substances contains only elements?

A. N, Ni, I
B. C, NaCl, H
C. Li, NaOH, Cl
D. H₂, NaCl, CO

Hint An element is a pure substance made up of only one kind of atom.

- 4 Destiny conducted an experiment to test which of four types of batteries lasts longest in a flashlight. She used four identical flashlights and placed a different type of new battery in each flashlight. She turned the flashlights on at the same time, and she recorded the time when each flashlight stopped giving off light. Destiny's data are shown below.

BATTERY LIFE EXPERIMENT

Battery Type	Starting Time	Ending Time	Total Time
A	1:00 p.m.	3:02 a.m.	15 h 2 min
B	1:00 p.m.	10:27 p.m.	9 h 27 min
C	1:00 p.m.	10:35 a.m.	21 h 35 min
D	1:00 p.m.	12:40 p.m.	23 h 40 min

What is the independent variable in this experiment?

- F. the type of battery used
G. the type of flashlight used
H. the total amount of time each battery lasts
I. the starting time when each flashlight is turned on

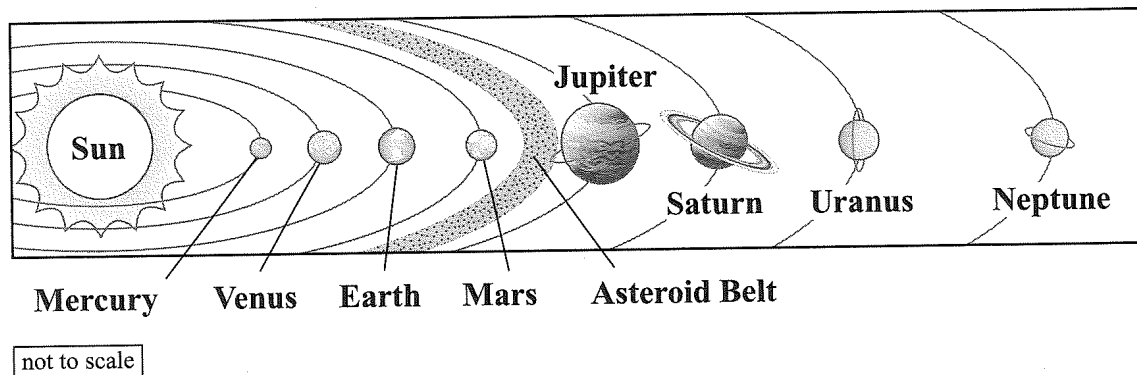
Hint The independent variable is the factor the experimenter changes to test its effect.

- 5 José plans to use a microscope to observe a cell from a maple leaf and a cell from a snake's skin. Which of the following will José **most likely** see present in both cells?

A. cell wall
B. chloroplasts
C. nucleus
D. tissue

Hint Chloroplasts carry out photosynthesis.

- 6 The diagram below shows the positions of the planets in the solar system.

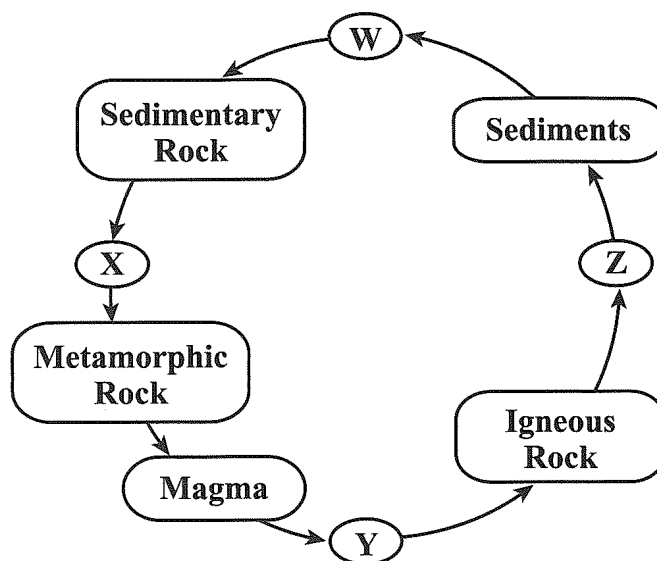


Which of the following planets **most likely** has higher surface temperatures than Earth?

F. Mars
G. Neptune
H. Uranus
I. Venus

Hint Think about how Earth's surface receives heat.

- 7 Wind picks up and carries away pieces of weathered rock. When the wind slows down, it deposits the rock pieces in a new location. The diagram below shows part of the rock cycle.



At which point in the cycle shown above would the process of transporting and depositing weathered rocks occur?

- A. W
- B. X
- C. Y
- D. Z

Hint Pieces of weathered rock that are deposited are called sediments.

- 8 A scientist conducted an investigation to determine the relationship between algae growth and available light at increasing ocean depths. The scientist lowered a light meter into the ocean and recorded the amount of light at different depths. The scientist also collected a water sample at each depth to count the number of algae present. The table below shows the results.

**EFFECT OF DEPTH AND LIGHT LEVEL ON ALGAE
POPULATION DENSITY**

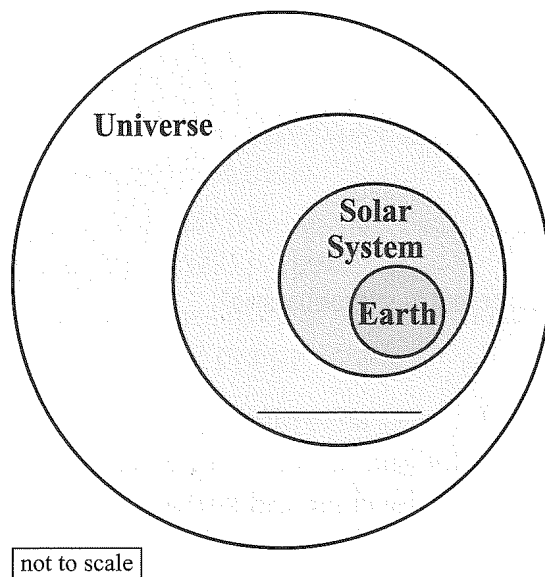
Depth (meters)	Light Level (% of surface level)	Number of Algae (cells per microliter)
0	100	602
5	95	800
15	66	506
25	60	489
35	35	100
45	18	49
55	8	16

Based on the information in the table, which of the following statements **best** describes the relationship between light and the density of the algae population?

- F. As the light level decreases, the density of the algae population decreases.
- G. As the light level decreases, the density of the algae population increases.
- H. As the density of the algae population increases, it reduces the light level.
- I. Light level has no effect on the density of the algae population.

Hint As you read each answer choice, look to see if it is supported by the data in the table.

- 9 Jasmine constructed the diagram below to represent how Earth fits into other structures that make up our universe.



Which of the following should Jasmine write on the line to **best** complete her diagram?

- A. asteroid belt
- B. Mars
- C. Milky Way
- D. Proxima Centauri

Hint Think about which answer option represents a structure that is smaller than the universe but larger than our solar system.

- 10 Organ systems in the human body work together to keep a human alive and well. Which of the following statements describes how the circulatory and excretory systems work together to maintain the human body?

- F. They bring oxygen into the body and deliver it to cells.
- G. They break down food and deliver nutrients to cells.
- H. They transmit electrical signals and move the body.
- I. They remove wastes produced by cells.

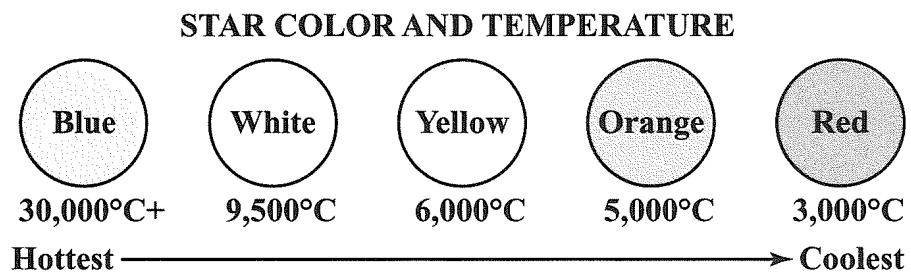
Hint The veins are part of the circulatory system, and the kidneys are part of the excretory system.

- 11 Cows would not be able to digest the grasses they eat without the help of certain bacteria. These bacteria live in the cows' digestive systems and help break down plant material to release nutrients. Which of the following **best** describes this relationship?

A. commensalism
B. mutualism
C. parasitism
D. predation

Hint Do one or both of the organisms benefit in this relationship?

- 12 Stars vary in terms of their color and surface temperature. The diagram below shows the relationship between the color and surface temperature of stars.



What color would a star with a surface temperature of 32,000°C **most likely** be?

F. blue
G. white
H. yellow
I. red

Hint On the diagram, look for the temperature closest to 32,000°C.

13 A beagle puppy has long ears, like its parents. Which of the following **best** describes how traits such as long ears are passed from one generation of dogs to the next?

- A. The puppy inherits genes from its parents and possesses all of the traits of both parents.
- B. The puppy inherits one gene from each parent, and each gene contains information for half of the puppy's traits.
- C. The puppy inherits pairs of genes from its parents, and these gene pairs determine the traits the puppy will possess.
- D. The puppy inherits pairs of genes from each parent, and these genes contain chromosomes that determine the puppy's traits.

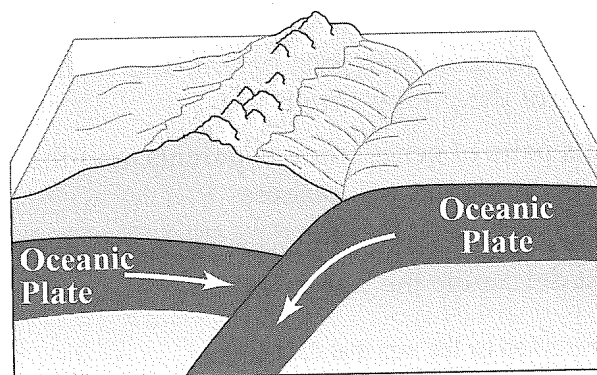
Hint An organism's traits are determined by the way that the genes inherited from each parent combine.

14 Christian conducts an experiment to test the hypothesis that adding sugar to water increases its boiling point. Christian conducts several trials of the experiment. What does conducting the trials allow Christian to do?

- F. choose different variables to test
- G. make sure the results are reliable
- H. change the hypothesis based on the results
- I. change the results at the end of the experiment

Hint A trial is a repetition of an experiment done under the same conditions as the initial experiment.

- 15 The interaction of Earth's plates at plate boundaries causes changes to Earth's surface. The diagram below shows a plate boundary and features of Earth's surface.

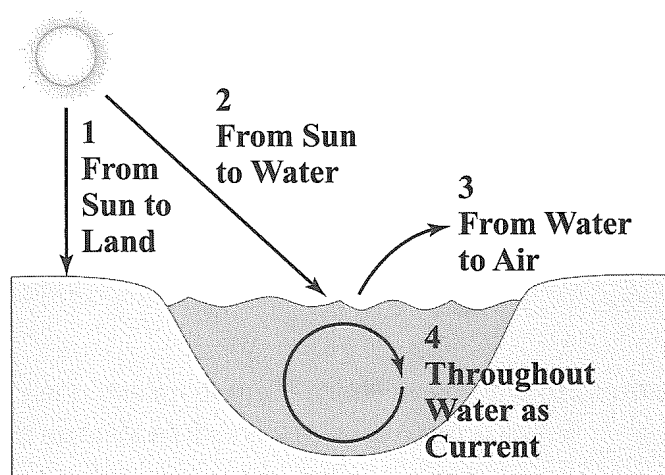


Which of the following features formed as a result of the plate interactions shown in the diagram?

- A. folded mountains
- B. mid-ocean ridge
- C. rift valley
- D. volcanic islands

Hint When one plate slides under another, it may melt to form magma.

- 16 The arrows in the picture below show several ways heat is transferred through Earth's system.



Which arrow represents conduction?

- F. 1
- G. 2
- H. 3
- I. 4

Hint Conduction is the transfer of heat between substances that touch each other.

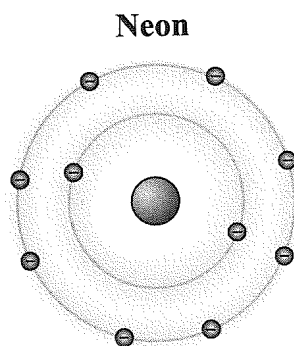
- 17 Potato plants can reproduce asexually. Which of the following is part of asexual reproduction in potato plants?

- A. bud
- B. egg
- C. pollen
- D. seed

Hint In sexual reproduction, sperm cells fertilize egg cells.

For questions 18, 19, 20, and 21, refer to the following passage and illustration.

Neon (Ne) is an element, one of many different kinds of matter that occur on Earth. The diagram below shows a model of one atom of the element neon.



18 Which of the following statements **best** describes the atom shown in the diagram?

- F. It is identical with atoms of some other elements.
- G. It can be broken down into smaller parts by chemical means.
- H. It is the smallest unit of neon that has all the properties of neon.
- I. It is the largest unit of neon that can combine with other elements.

Hint Each element is different from every other element.

19 The atom of neon shown is made up of subatomic particles. Which of the following are shown in the diagram?

- A. electrons
- B. ions
- C. neutrons
- D. protons

Hint Protons and neutrons are located in the nucleus of an atom.

20 The diagram on page 48 is one kind of scientific model. Which of the following is the **main** advantage of this model?

- F. It is the same size as the object it represents.
- G. It accurately shows all the parts of the object it represents.
- H. It represents a three-dimensional object on a flat piece of paper.
- I. It represents an object too small to be seen even with most microscopes.

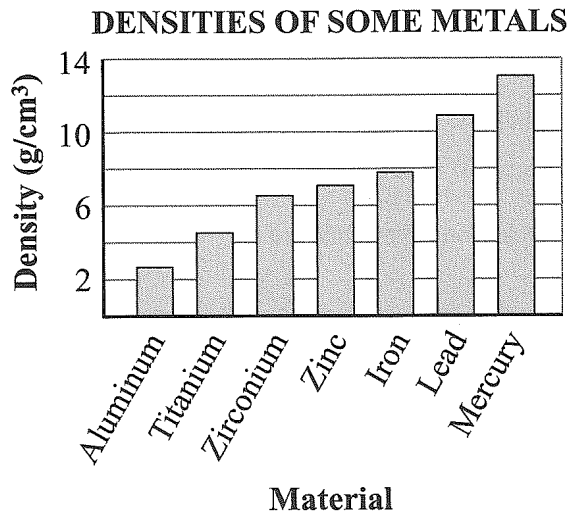
Hint Many models help scientists understand things that are not easily visible.

21 In its natural state, neon has no definite shape or volume. Its atoms move fast and are far apart. Which term describes neon in its natural state?

- A. gas
- B. liquid
- C. solid
- D. solution

Hint Molecules of water vapor move fast and are far apart.

- 22 The graph below compares the densities of seven different metals.



Based on information from the graph, which statement **best** compares the densities of two metals?

- F. Ten kilograms of aluminum is denser than one kilogram of titanium.
- G. Any sample of zirconium is denser than any sample of titanium.
- H. Five kilograms of iron is denser than one kilogram of lead.
- I. Any sample of zinc is denser than any sample of iron.

Hint Some properties of substances depend on sample size, and some do not.

- 23 Weathering is the breaking down of rock at or near Earth's surface. Which of the following is an example of chemical weathering?

- A. Water gets into cracks in rock, and substances in the water cause the rock to dissolve.
- B. Water freezes and expands in cracks in rock, pushing the rock apart.
- C. Pieces of rock carried by river water grind the rocks in the riverbed.
- D. A glacier scrapes the rocks it flows over on Earth's surface.

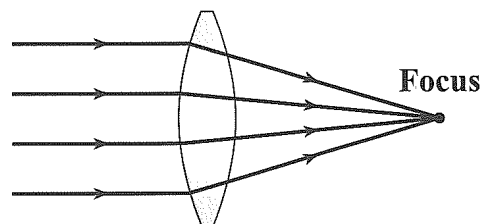
Hint Chemical weathering breaks down rock through chemical changes.

- 24 Hannah conducted an experiment to determine the temperature at which an unknown substance freezes. She conducted multiple trials of her experiment. Then Angel followed Hannah's procedure to verify her results. Which of the following statements **best** compares what Hannah and Angel did?

F. Hannah repeated her experiment, and Angel replicated it.
G. Hannah replicated her experiment, and Angel repeated it.
H. Hannah and Angel both replicated the experiment.
I. Hannah and Angel both repeated the experiment.

Hint Each repetition of an experiment is called a trial.

- 25 Farsighted people wear eyeglasses that contain convex lenses. The diagram below shows light passing through a convex lens.

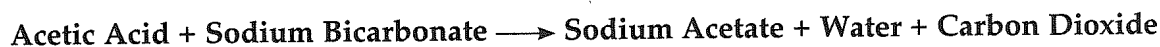


Which of these processes is represented in the diagram?

A. absorption
B. reflection
C. refraction
D. transformation

Hint When light is absorbed, it changes to heat.

- 26 The equation below shows the reaction that occurs when acetic acid and sodium bicarbonate are combined.



Which of the following **best** compares the masses of the substances involved in this reaction?

- F. The mass of acetic acid equals the combined masses of sodium acetate, water, and carbon dioxide.
- G. The mass of sodium bicarbonate equals the combined masses of sodium acetate, water, and carbon dioxide.
- H. The combined masses of acetic acid and sodium bicarbonate equal the combined masses of sodium acetate and water.
- I. The combined masses of sodium bicarbonate and acetic acid equal the combined masses of sodium acetate, water, and carbon dioxide.

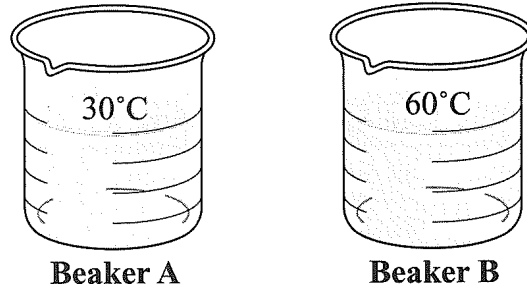
Hint Mass is not gained or lost when substances undergo a chemical change.

- 27 In an ecosystem, energy is transferred from one organism to another. Which of the following **best** shows the transfer of energy among organisms in an ecosystem's food web?

- A. omnivore \longrightarrow carnivore \longrightarrow herbivore \longrightarrow producer
- B. producer \longrightarrow herbivore \longrightarrow carnivore \longrightarrow decomposer
- C. producer \longrightarrow decomposer \longrightarrow herbivore \longrightarrow omnivore
- D. carnivore \longrightarrow herbivore \longrightarrow decomposer \longrightarrow omnivore

Hint An herbivore is an animal that eats mainly producers or their products.

- 28 Mr. James poured the same amount of water, but at different temperatures, into the two beakers shown below. He placed the two beakers in a room with an air temperature of 20°C .



He left the beakers in the room for two hours. Which of the following describes a direct flow of heat that took place during those two hours?

- F. from Beaker A to the air
- G. from the air to Beaker A
- H. from the air to Beaker B
- I. from Beaker B to Beaker A

Hint Heat always flows from an object or substance at a higher temperature to an object or substance at a lower temperature.

- 29 Earth is made up of layers with different characteristics and compositions. Which layer is made up of very dense, liquid metal?

- A. crust
- B. inner core
- C. mantle
- D. outer core

Hint Earth's innermost layer is called the core.

- 30 Mr. Benjamin asked his class to form four groups. He provided the groups with identical balances, rulers, and metal blocks. He asked each group to use the tools to determine the mass, volume, and density of its block. The table below shows each group's data.

MASS, VOLUME, AND DENSITY OF METAL BLOCKS

Group	Mass (g)	Volume (cm ³)	Density (g/cm ³)
1	83.5	26	3.21
2	82.0	24	3.42
3	83.5	26	3.20
4	83.5	26	3.21

Mr. Benjamin informed the class that the actual density of each metal block was 3.21 g/cm³. Which of the following is **most likely** responsible for differences in the data?

- F. Group 2 calculated incorrectly.
- G. Group 2 measured incorrectly.
- H. Group 3 measured incorrectly.
- I. Group 3 recorded data incorrectly.

Hint Look carefully at the table to see how the data recorded by the groups compare. Think about how the data in each column were obtained.

- 31 Earth rotates on an axis that is tilted at an angle of 23.5°. Which of the following would NOT occur if Earth's axis were not tilted?

- A. day and night
- B. moon phases
- C. seasons
- D. tides

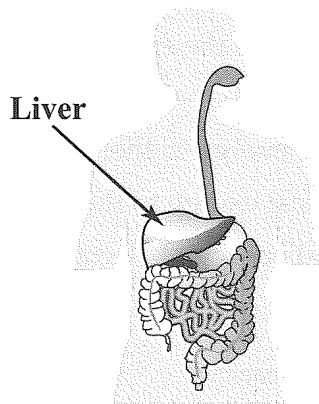
Hint Earth's tilt affects how much sunlight different areas of Earth receive during the year.

- 32 Limiting factors vary from one ecosystem to another. Which of the following pairs are limiting factors in a deep ocean ecosystem?

F. bacteria and erosion
G. temperature and light
H. rainfall and temperature
I. light and soil composition

Hint Limiting factors are conditions that limit how many organisms can live in an ecosystem.

- 33 The liver is one of several organs that work together to break down food in the human body. The diagram below shows these organs.

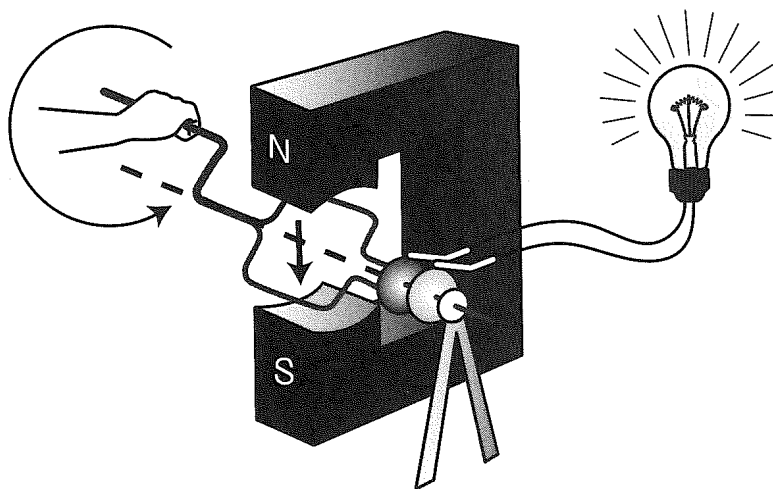


Which of the following do these organs make up?

A. a cell
B. a tissue
C. an organ system
D. an organism

Hint In the human body, the digestive system breaks down food.

- 34 The diagram below shows a simple generator connected to a lightbulb. Turning the wire coil between the poles of the magnet causes a current to flow to the bulb.



Which of the following **best** describes the energy transformations that take place in the system shown?

- F. chemical energy to magnetic energy to thermal energy
- G. electrical energy to mechanical energy to thermal energy
- H. magnetic energy to electrical energy to electromagnetic energy
- I. mechanical energy to electrical energy to electromagnetic energy

Hint Visible light is one form of electromagnetic energy.

35 The cell theory developed from the work of many different scientists. Which of the following statements is NOT part of the cell theory?

- A. All cells come from other living cells.
- B. The cell is the basic unit of all living things.
- C. All cells of living things have the same organelles.
- D. All living things are made up of one or more cells.

Hint Animal cells do not contain chloroplasts.

36 Interactions between the geosphere and atmosphere can have an impact on Earth's weather. Which of the following is an example of an interaction between the geosphere and atmosphere?

- F. eruption of lava, gases, and ash from a volcano
- G. melting of ice from a glacier in a valley
- H. evaporation of water from a large lake
- I. falling of snow onto trees in a forest

Hint The geosphere is the solid Earth, or land.

- 37 Emma is conducting an investigation to compare several physical properties of samples of two different kinds of rocks. When she measured and compared the masses of the two rocks, she found that rock 1 had a greater mass than rock 2. Which of the following is the **best** prediction of how another property of the rocks will compare?

- A. The density of rock 1 will be the same as the density of rock 2.
- B. The weight of rock 1 will be greater than the weight of rock 2.
- C. The volume of rock 1 will be less than the volume of rock 2.
- D. The state of rock 1 will be different from the state of rock 2.

Hint Which of the properties in the answer options is directly proportional to mass?

- 38 The Punnett square below shows a cross between two pea plants. The gene for green pods (G) is dominant over the gene for yellow pods (g).

	G	g
G	GG	Gg
g	Gg	gg

What percentage of plants produced by the cross shown are expected to have yellow pods?

- F. 100%
- G. 75%
- H. 50%
- I. 25%

Hint Dominant genes are always expressed when they are present.

- 39 A scientist finds a fossil of a fern in a hot, dry desert. The fern is the ancestor of a modern fern that lives in warm, moist climates. Which of the following is the **best** conclusion for the scientist to draw?

A. The desert was under water in the distant past.
 B. Ancient ferns were able to live in very dry climates.
 C. The climate of the desert has stayed the same over time.
 D. The desert had a warm, moist climate in the distant past.

Hint Fossils provide clues about how Earth and its environments have evolved over time.

- 40 The following statements were taken from the procedures of four different investigations.

INVESTIGATION PROCEDURES

Investigation	Statement
1	Dissolve 8 grams of table salt in 100 milliliters of water.
2	Heat an ice cube in a beaker on a hot plate until the ice cube melts.
3	Stir the antacid tablet in the water until bubbles stop appearing.
4	Cut the newspaper into four pieces of about the same size.

The statement from which investigation is an example of how to cause a chemical change?

F. 1
 G. 2
 H. 3
 I. 4

Hint Which statement describes a new substance forming?

For questions 41, 42, and 43, refer to the following passage and table.

A scientist is investigating two unknown organisms. She plans to use the characteristics of the organisms to classify them. She has observed each organism and samples of its cells and has recorded her observations. The table below lists some of her observations.

OBSERVATIONS OF TWO UNKNOWN ORGANISMS

Organism	Observations of Cells	Other Observations
1	Many-celled; cells have cell walls and nuclei but do not contain chloroplasts	Lives in damp, shady places; breaks down dead organisms for food
2	Many-celled; cells have cell walls, nuclei, and chloroplasts	Lives in damp, shady places; makes its own food

41 As a first step, the scientist classifies both organisms as belonging to the domain Eukarya. Which of the following observations **best** supports this classification?

- A. Both organisms have cell walls.
- B. Both organisms are made up of many cells.
- C. Both organisms live in damp, shady places.
- D. One organism has chloroplasts, and one does not.

Hint Which observation is not true for any organisms in the domains Bacteria and Archaea?

42 Next, the scientist classifies each organism in a kingdom. Which pair of classifications is **best** supported by the information in the table?

- F. Organism 1 belongs to kingdom Plantae, and Organism 2 belongs to Fungi.
- G. Organism 1 belongs to kingdom Fungi, and Organism 2 belongs to Plantae.
- H. Organism 1 belongs to kingdom Fungi, and Organism 2 belongs to Animalia.
- I. Organism 1 belongs to kingdom Animalia, and Organism 2 belongs to Protista.

Hint Think about how organisms in each kingdom get food.

43 An experiment is only one of several different kinds of investigations that scientists conduct. Which of the following statements **best** describes why the scientist's investigation is NOT an experiment?

- A. She did not conduct a carefully controlled test.
- B. She did not take measurements and record data.
- C. She did not display her observations in a line graph.
- D. She observed the characteristics of only two organisms.

Hint In an experiment, all the conditions are managed by the investigator.

- 44 An electromagnet is a temporary magnet made by passing an electric current through coils of wire wrapped around a metal core. Current passing through the wire causes the wire to act as a magnet. The magnet is stronger if the core is made of a material that has magnetic properties. Which of the following objects would be **best** to use for the core of an electromagnet?

- F. aluminum rod
- G. copper pipe
- H. iron rod
- I. lead pipe

Hint Only three metals have strong magnetic properties.

- 45 A shopping cart in a parking lot is not moving. Then a gust of wind causes the cart to roll across the lot. Which statement **best** describes the forces acting on the shopping cart?

- A. At first the forces acting on the cart are balanced. Then the wind exerts an unbalanced force on the cart.
- B. At first the forces acting on the cart are unbalanced. Then the wind exerts a balanced force on the cart.
- C. The force exerted by the wind causes the forces of gravity and friction to decrease.
- D. The forces of gravity and friction cause the force exerted by the wind to increase.

Hint Unbalanced forces cause motion or a change in motion, and balanced forces do not.

- 46 The table below lists information about four stars.

STAR DATA

Star	Distance from Sun (light-years)	Time since Formation (Earth years)
Alpha Centauri B	4.4	5 billion
Vega	25.0	500 million
Sirius B	8.6	300 million
Procyon A	11.5	3 billion

Sophia used a telescope to observe the four stars listed in the table. Which of these stars emitted light that traveled for the **longest** time before reaching Sophia?

- F. Alpha Centauri B
- G. Vega
- H. Sirius B
- I. Procyon A

Hint A light-year is the distance light travels in one Earth year.

- 47 Increased erosion is one effect human activities have on the environment. Which of the following activities would result in an increase in erosion?

- A. clearing trees to build roads
- B. using fertilizers and pesticides
- C. disposing of chemicals improperly
- D. burning fossil fuels such as coal and oil

Hint Which activity results in a loss of plants, the roots of which help hold soil in place?

- 48 When viewed from Earth, star X appears much brighter than star Y. However, star X is a smaller and cooler star than star Y. Which of the following **best** explains the difference in apparent magnitude of these stars?

- F. Star Y rotates faster than star X.
- G. Star X rotates faster than star Y.
- H. Star Y is closer to Earth than star X.
- I. Star X is closer to Earth than star Y.

Hint Think about why our sun appears so much brighter to us than other stars do.

- 49 Different methods are used in conducting investigations in different fields of science. Which of the following is a scientist in the field of biology **most likely** to do?

- A. conduct experiments on the properties of matter
- B. observe erosion and deposition by rivers
- C. observe bird populations in a forest
- D. model how tectonic plates move

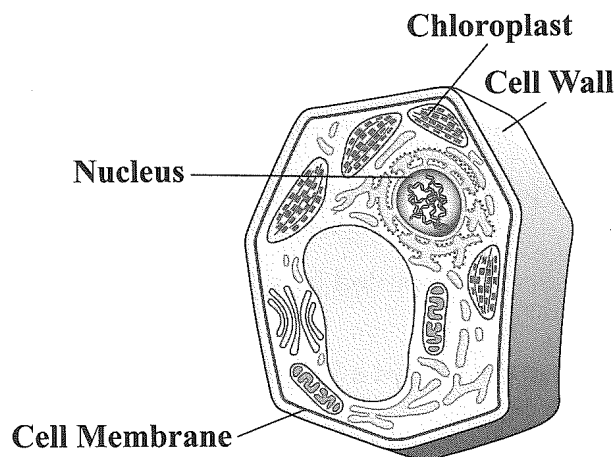
Hint Biology is the study of living things.

- 50 The atmosphere helps organisms survive in many ways. Which of the following statements describes one way in which the troposphere helps organisms survive?

- F. It contains a layer of ozone gas that absorbs harmful ultraviolet radiation.
- G. It contains gases, such as carbon dioxide and water vapor, that trap heat.
- H. It causes meteors to burn up before they crash on Earth's surface.
- I. It provides a layer of thin air in which satellites can orbit Earth.

Hint The troposphere is the layer of the atmosphere closest to the ground.

- 51 The diagram below identifies four structures in a plant cell.



Which structure controls what enters and leaves the cell?

- A. cell membrane
- B. cell wall
- C. chloroplast
- D. nucleus

Hint Animal cells also have this structure.

- 52 There are millions of different compounds on Earth. Which of the following substances is an example of a compound?

- F. chlorine (Cl)
- G. hydrogen ion (H^+)
- H. sodium (Na)
- I. sodium hydroxide (NaOH)

Hint When two or more elements combine chemically, they form a compound.

53 Luke has an idea that insects help cause thunderstorms. He calls his idea a theory. Trinity uses the cell theory to understand where bean plant cells come from. Trinity thinks that the cell theory is a scientific theory but that Luke's idea is not. How can Trinity **best** defend her conclusion?

- A. by demonstrating that the cell theory answers a question but Luke's idea does not
- B. by verifying that the cell theory applies to insects but Luke's idea does not apply to bean plants
- C. by demonstrating that the cell theory is supported by a large amount of data but Luke's idea is not
- D. by verifying that the cell theory was developed a long time ago and Luke's idea was developed recently

Hint A hypothesis that is backed by evidence from many investigations may become a scientific theory.

54 Scientists build on the work of other scientists, but scientific knowledge can change. Which of the following would **most likely** cause scientific ideas to change?

- F. conducting an experiment that supports the law of conservation of mass
- G. using a GPS system to measure the movement of tectonic plates
- H. using biotechnology to develop a pest-resistant kind of corn
- I. finding a fossil of an unknown species of early human

Hint Eliminate the choices that would confirm or use existing knowledge.

55 Predation is one type of relationship between organisms. Which of the following describes an example of predation?

- A. a group of fish living in a pond
- B. an ant colony building its home in soil
- C. a flea living on and biting a cat to get food
- D. a sparrow hunting, killing, and eating a worm

Hint Look for an example of a relationship between a predator and its prey.

- 56 A spectroscope is a device that breaks down visible light by acting like a prism. Each element produces its own "fingerprint," or lines of color. Which of the following scientists would be **most likely** to use a spectroscope?

F. a physicist measuring the refraction of light by a material
G. a biologist examining a luminescent organism
H. a geologist identifying a mineral sample
I. an astronomer studying a distant star

Hint Which scientist cannot investigate directly?

- 57 In a complex organism, there is a pattern of organization of structures. Which of the following shows the organization of structures in a deer, from simplest to most complex?

A. cells → atoms → organs → organ systems → tissues
B. tissues → organs → atoms → cells → organ systems
C. atoms → cells → tissues → organs → organ systems
D. organ systems → tissues → cells → organs → atoms

Hint A deer is an organism made up of many organ systems.

- 58 When gasoline is used to run a motorcycle, the motorcycle's engine makes a noise, the headlights light up, and the wheels turn. Which of the following is an example of potential energy?

F. the energy given off by the headlights
G. the energy given off by the engine
H. the energy stored in the gasoline
I. the energy of the turning wheels

Hint Your body has potential energy stored in fat that changes to kinetic energy when you move.

59 Energy is needed to start global winds moving through the atmosphere. Which of the following is the source of energy that causes global winds?

- A. the sun
- B. local winds
- C. warm oceans
- D. ocean currents

Hint Think about why air near the equator absorbs more energy than air near the poles.

60 A scientific law describes something that is always true under certain conditions. A scientific theory explains a set of related observations. Both laws and theories are widely accepted ideas based on evidence. Which of the following ideas is a scientific theory?

- F. Energy can change from one form to another, but it cannot be created or destroyed.
- G. In undisturbed rock layers, older layers always lie under younger layers.
- H. Gravitational force attracts all objects in the universe toward each other.
- I. Living things developed from earlier species that changed over time.

Hint Which idea answers a question about *how* or *why*?

61 Sound waves travel at different speeds through different materials. Through which of the following materials do sound waves travel fastest?

- A. air
- B. milk
- C. water
- D. wood

Hint Sound travels more slowly through gases and liquids than through solids.

- 62 A scientist measured the weight of a steel ball on an ocean beach and again on a mountaintop and compared the measurements. The scientist found that the ball weighed slightly more on the beach than on the top of the mountain. Based on this information, which of the following is the **most** logical hypothesis for the scientist to state?

F. As elevation decreases, the force of gravity decreases.
G. As elevation increases, the force of gravity decreases.
H. Elevation does not affect the force of gravity.
I. As elevation increases, weight increases.

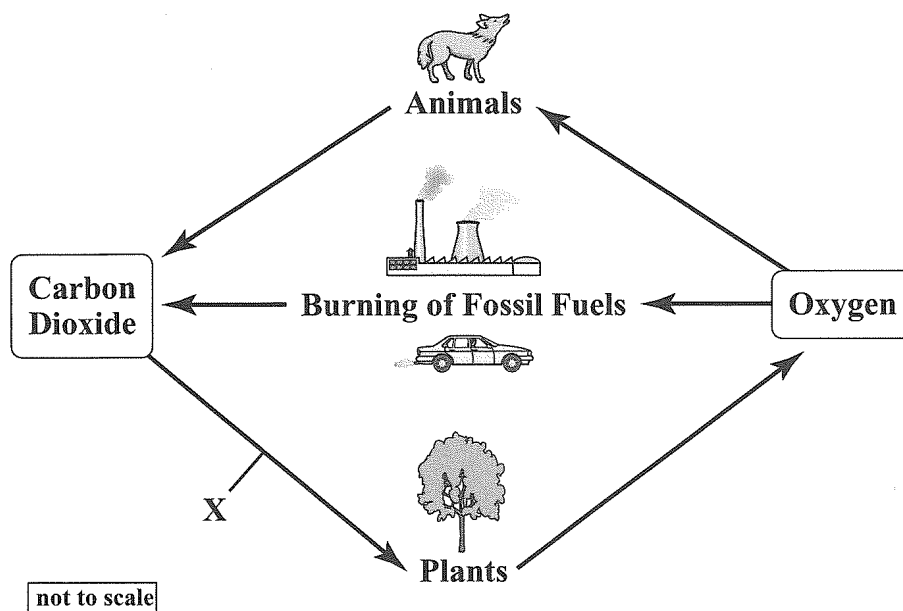
Hint Elevation is height above sea level. Weight is a measure of the pull of gravity.

- 63 Energy travels through space as electromagnetic energy, which includes a range of types. Which type of electromagnetic energy is made up of a spectrum of many different colors?

A. ultraviolet light
B. infrared light
C. visible light
D. X-rays

Hint Which of the answer options includes red, yellow, blue, and violet light?

- 64 Carbon cycles among Earth's air, ground, and organisms. The diagram below models part of the carbon cycle.



Which of the following **best** describes the process that occurs at arrow X?

- F. Plants release carbon dioxide into the air through decomposition.
- G. Plants take in carbon dioxide from the air to perform photosynthesis.
- H. Plants release carbon dioxide into the air as a waste product of photosynthesis.
- I. Plants release carbon dioxide into the air as a waste product of cellular respiration.

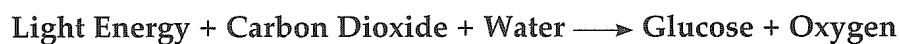
Hint Look carefully at the direction of the arrows shown in the diagram.

- 65 Alexander wants to conduct an investigation of friction between two objects. Which of the following would be the **best** objects to include in his investigation?

A. a skateboard and the ramp it rolls on
B. an electrically charged balloon and his hair
C. a bar magnet and a nearby horseshoe magnet
D. a falling basketball and the pavement below it

Hint Friction is a contact force.

- 66 Through the process of photosynthesis, a lemon tree uses sunlight to make food. The equation below shows this process.



The carbon dioxide in this equation contains carbon atoms. What happens to these carbon atoms during photosynthesis by the lemon tree?

F. They remain part of carbon dioxide molecules.
G. They become part of glucose molecules.
H. They are destroyed during the reaction.
I. They are transformed into light energy.

Hint All the atoms present before a chemical reaction takes place are still present after the reaction.