

Key
Teaching
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Science for the HiSet

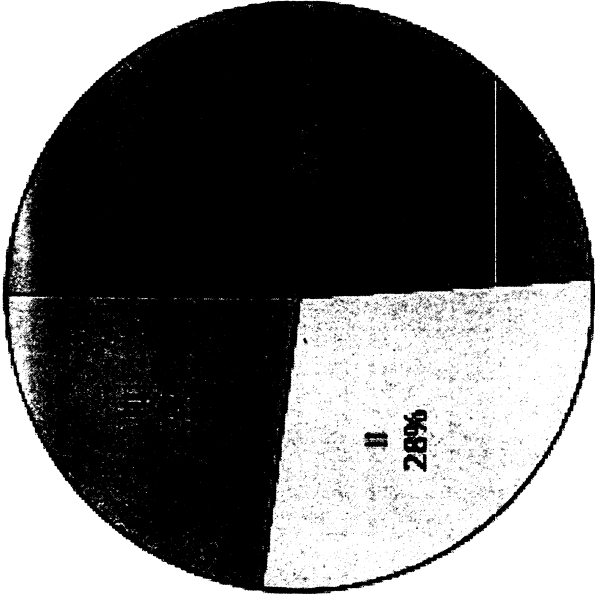
— Critical thinking and Content —

Grade
5-6

1951

1951

Science

Test Name	Science
Time	80 minutes
Number of Questions	60
Format	Multiple-choice questions
	Content Categories (Approximate Percentage of Questions)
	<ul style="list-style-type: none">I. Life Science (49%)II. Physical Science (28%)III. Earth Science (23%)
	Process Categories
	<ul style="list-style-type: none">A. Interpret and ApplyB. AnalyzeC. Evaluate and Generalize

Use the Scientific Method

The **scientific method** is a set of techniques that scientists use to investigate observable facts and occurrences and to acquire new knowledge. Here are the steps in the scientific method:

1. **Observe a phenomenon and formulate a question** about it. *I wonder...*
Formulate the question about something that you can observe and measure.
2. **Collect data** about the phenomenon you are studying. Scientific study is founded on **data**, or **observable facts**. *notice*
3. **Form a hypothesis**. A **hypothesis** is an educated guess about the answer to your question. *If... then...*
4. **Test the hypothesis through an experiment**. Your experiment should be a fair test of the hypothesis. You may need to adjust the experiment. You would do so by changing only **one factor** at a time while **controlling** other factors. You should also repeat the experiment to make sure the first **results** are valid. *data, analyze*
5. **Draw a conclusion** about the hypothesis based on the experiment. When the experiment is complete, you may conclude that your hypothesis **was supported by the data** or that it was not, in which case you may formulate a new hypothesis. *prove theory*

Scientists are careful when drawing conclusions. The fact that two events **correlate**, or happen at the same time, does not necessarily mean that one **causes** the other. Remember that causation can never be deduced from correlation alone.

Read about a scientific observation and answer the question below.

Scientists observed unusual plant and algae growth in a pond. They sampled the water and also discovered very high concentrations of bacteria. The pond was fairly close to neighboring farmland, and two streams carried water from the farm to the pond.

- What could be a sound hypothesis about the growth in the pond?
- (1) Runoff from the neighboring farm may be carrying excessive phosphates and nitrates from fertilizers into the pond.
 - (2) Proximity to farmland is the cause of plant and algae growth in ponds and other bodies of water.

Choice (1) is correct. That hypothesis is an educated guess about the reason for the unusual plant and algae growth in the pond. It could be tested by an experiment that compares samples from the pond water to samples from streams coming from neighboring fields. Choice (2) is an assertion that is very general and cannot be measured in this specific situation.

The phenomenon you are studying is called the **dependent variable**. A factor that you believe might be affecting that phenomenon is called the **independent variable**. In the example above, the unusual plant and algae growth would be the dependent variable. The runoff from the neighboring farm would be the independent variable.

KEY IDEAS

- The scientific method is used to investigate events and to acquire knowledge.
- Scientists follow a series of procedures involving observing, collecting information, and forming a hypothesis.
- After the hypothesis has been tested in an experiment or study, scientists draw a conclusion.

HiSET EXAM TIP

The Science test may present an experiment and ask you to answer multiple-choice questions interpreting it.

Watch Video - teacher's qualitative quantitative scientific method

Variables
control - "normal" state
dependent - experimenting on
independent - using to cause change

Slide show - watch video

Trial of 3 or more averaged

slide 2

Gummy Bear Experiment

1. Question-
Observations-

→ Must be able to be repeated

slide 2

2. Hypothesis (If... then...)

Independent variable-

dependent variable-

slide 3

3. Experiment steps- (materials and procedure)

- specific, detail, 3 trials or more for an average

4. Results/Data-

Control bear-

Experiment bear-①

Qualitative-

Quantitative-

②
③
+

then divide for average

5. Analyze for a conclusion- (what happened?)

slide 4

6. Report- (Tell if the hypothesis was or was not supported by the data.)

slide 5

/ Hair dye sample... what's wrong?

Scientific Method and Life Science Practice

Cause → effect

x correlation → y

A farmer noticed that one pond on his farm had no algae growing in it. The other pond had a thick growth of algae. He hypothesized that the pond without algae contained very little nitrogen, a nutrient needed by algae. He collected a sample of water from each pond and had the samples analyzed for their nitrogen content. The analysis showed that the sample from the pond with algae contained much more nitrogen than the sample from the pond without algae. This result supported the farmer's hypothesis.

1. What observation led to the farmer's hypothesis?

- (1) There were two ponds on the farm.
- (2) One pond contained very little nitrogen.
- (3) One pond had no algae growing in it.
- (4) Both ponds contained water.
- (5) Nitrogen is a nutrient needed by algae.

Question 2 refers to the following information.

Tiny organisms called yeasts and bacteria are used to make many foods. For example, leavened bread is made by adding yeast to dough. The yeast produces carbon dioxide gas, which makes the dough rise. Cheese is made by adding certain bacteria to milk. The bacteria produce lactic acid, which sours the milk.

2. What is the effect of adding yeast to dough?

- (1) The dough rises.
- (2) The dough produces carbon dioxide gas.
- (3) The dough turns into cheese.
- (4) The yeast turns into bacteria.
- (5) The yeast produces lactic acid.

A majority of teenagers develop acne, but scientists still struggle to explain its cause. It has long been thought that bacteria play a role, although until recently it was assumed that role was purely detrimental—contributing to acne. However, a team of researchers began to wonder whether different strains of bacteria might impact acne in different ways.

The research team studied 49 individuals with acne and 52 individuals without acne, and the researchers collected samples of bacteria from the nasal pores of all those individuals. The researchers found that some combinations of bacterial strains were highly likely to be found in clear-skinned individuals, while other combinations were highly likely to be found in individuals with acne.

After carefully analyzing their data, the scientists concluded that, while some bacterial combinations likely contribute to acne, other bacterial combinations may actually help to ward it off. The researchers suggested that, if further studies confirm these findings, we may want to treat acne by encouraging the growth of helpful bacteria.

3. What question is being investigated in this experiment?

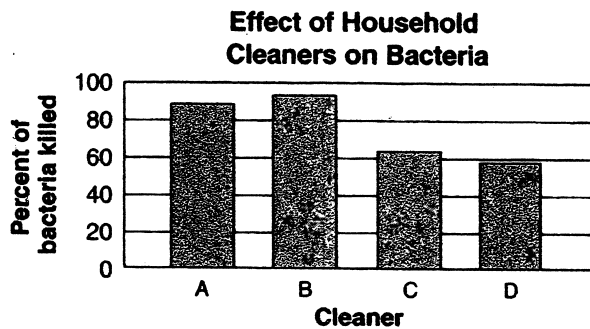
- A. What causes bacteria to collect in people's facial pores?
- B. What are all the contributing factors to the development of acne?
- (C) What role do bacteria play in the development of acne?
- D. What is the best way to treat acne?

4. What was the researchers' hypothesis?

- A. Combinations of bacteria are a major cause of acne.
- (B) Different kinds of bacteria may impact acne differently.
- C. We may want to change the way we treat acne, treating it by encouraging the growth of beneficial bacteria.
- D. Some combinations of bacteria may actually help ward off acne.

Scientific Method and Life Science Practice

A scientist tested four household cleaners for their ability to kill bacteria. Cleaners A and B contained antibiotics. Cleaners C and D did not. The results are shown in the graph below.



5. What hypothesis did the scientist test?
- (1) Bacteria are resistant to most antibiotics.
 - (2) Cleaners with antibiotics are used more than other cleaners.
 - (3) Most household cleaners contain bacteria.
 - (4) Cleaners with antibiotics are more effective at killing bacteria.
 - (5) Household cleaners come in several varieties.
6. Which of the following restates a result shown in the graph?
- (1) There was no difference in the ability of the cleaners to kill bacteria.
 - (2) Cleaners with antibiotics were most effective at killing bacteria.
 - (3) Cleaners C and D were most effective at killing bacteria.
 - (4) Cleaner C killed the most bacteria.
 - (5) Less than half of the bacteria were killed by any of the cleaners tested.

Sunlight can be converted directly into electricity through the photovoltaic process. In this process, light is absorbed by a thin layer of silicon or a similar material. The absorbed light causes electrons to move through the material, producing an electric current. The photovoltaic process is often used to supply electricity to devices that cannot be connected to power lines, such as satellites and buoys.

7. Which device involves an application of the photovoltaic process?
- (1) a corded telephone
 - (2) a solar-powered calculator
 - (3) a remote-control light switch
 - (4) a battery-powered cell phone
 - (5) a battery-powered laptop computer

Question 8 refers to the following information.

Metamorphosis is a process in which some young animals change their form and function as they become adults. The changing of a caterpillar into a butterfly is an example of metamorphosis. The caterpillar has a wormlike body and eats leaves. It becomes an adult butterfly that has wings and drinks nectar.

8. Which of the following is an application of metamorphosis in another animal?
- (1) the growth of a puppy into an adult dog
 - (2) the changing of fur color from brown to gray on an old dog
 - (3) the development of a legless, fishlike tadpole into a frog
 - (4) the changing of color by a chameleon to blend with its surroundings
 - (5) the shedding of skin by a snake as it grows

Vocabulary defined for you.

Apply the info through scientific thinking.

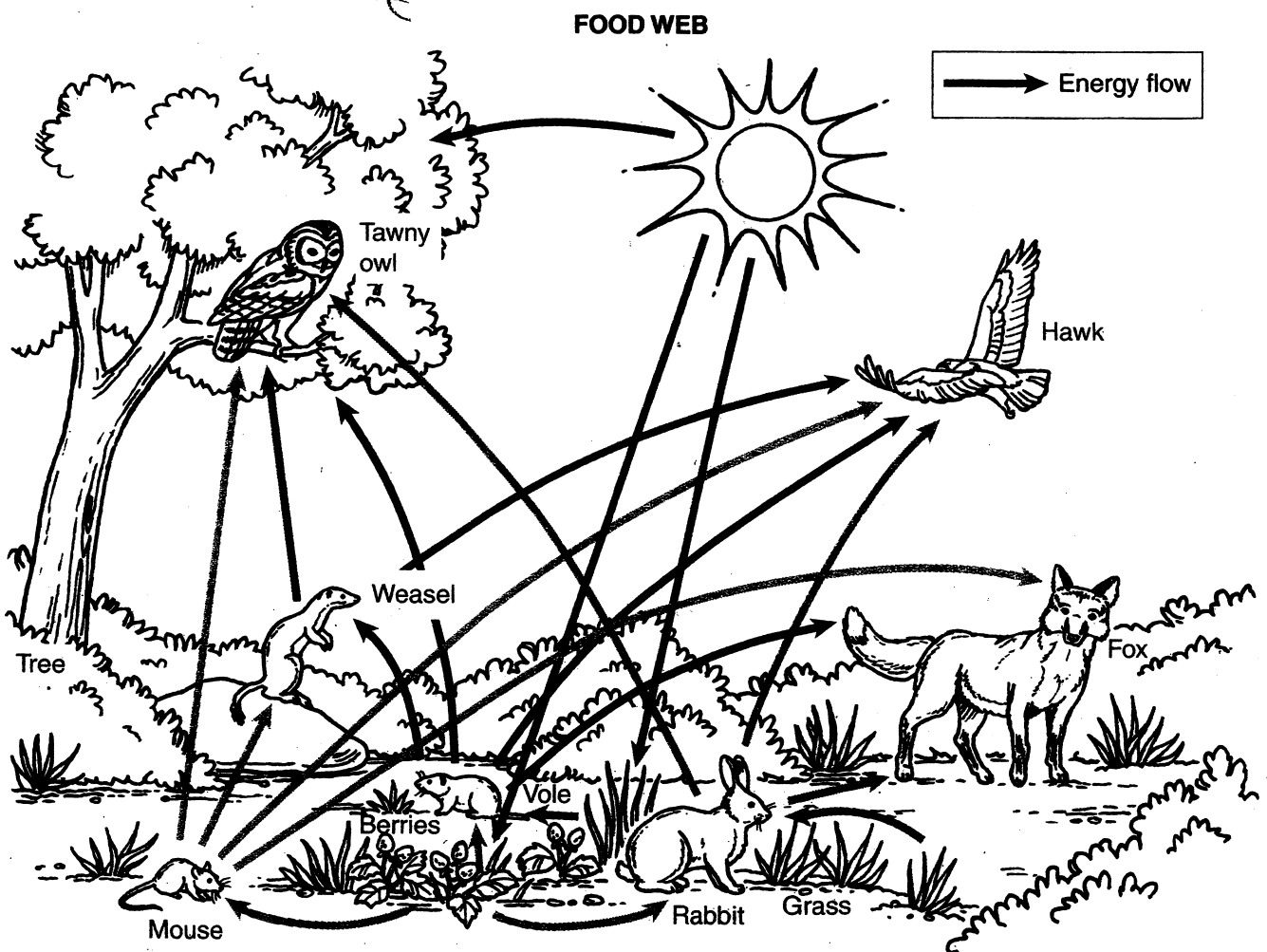
explained for you.

Apply...

Energy Flow in Ecosystems

The flow of energy from producers to consumers is generally more complex than a single food chain. Most plants and animals have energy relationships with many other organisms in their environments. For example, a primary consumer is called an **herbivore** because it eats only grasses, berries, or other plant foods. Some secondary consumers are **carnivores** and eat only other animals. Other secondary consumers are **omnivores** and eat both animals and plants. Finally, **decomposers** break down dead plants and animals to obtain energy.

The flow of energy among a group of plants and animals can be shown in a **food web**. A food web shows the energy relationships in an **ecosystem**, a natural community of organisms and its surroundings. Ecosystems like deserts can be sparse, with few organisms. Ecosystems like forests can be rich, with many organisms. This simplified food web shows energy relationships in a woodland ecosystem.



Ecosystems

Directions: Choose the one best answer to each question.

Questions 9 through 14 refer to the passage and the diagram on page 84.

9. What does a food web show?

- (1) the energy relationships among organisms in an ecosystem
- (2) the energy relationships among animals in an ecosystem
- (3) the relationship between energy and matter
- (4) the food that can be found in wilderness areas
- (5) the food that is no longer available to organisms in an ecosystem

10. Which of the following is one of the consumers shown at the highest level in the food web?

- (1) the grasses
- (2) the rabbit
- (3) the mouse
- (4) the tawny owl
- (5) the vole

11. If all the grasses, berries, and trees in this food web disappeared, the immediate result would be that which of the following would have nothing to eat?

- (1) tawny owls
- (2) hawks
- (3) foxes
- (4) weasels
- (5) rabbits

TIP

12. Which of the following is a supporting detail rather than a conclusion?

- (1) Omnivores can be both primary and secondary consumers.
- (2) Without energy from the sun, no life on Earth would be possible.
- (3) In ecosystems, an herbivore is always a primary consumer.
- (4) Weasels get energy by eating mice.
- (5) The energy relationships in ecosystems can be very complex.

13. A backpacker gets lost in the woodland ecosystem. After some time, the food supply he brought with him runs out. As the backpacker looks for food in the woodlands, what role is he likely to take on in the food web of the ecosystem?

- (1) energy source
- (2) producer
- (3) decomposer
- (4) carnivore
- (5) omnivore

14. Which statement is a conclusion rather than a supporting detail?

- (1) Energy is constantly flowing through the woodland ecosystem.
- (2) The sun provides energy for the process of photosynthesis.
- (3) Grasses and berries are producers in the woodland ecosystem.
- (4) Mice, voles, and rabbits are all herbivores common in the woodland ecosystem.
- (5) Foxes and weasels are both carnivores that can be found in the woodlands.

Answers start on page 278.

Cells

Make Inferences

Directions: Choose the one best answer to each question.

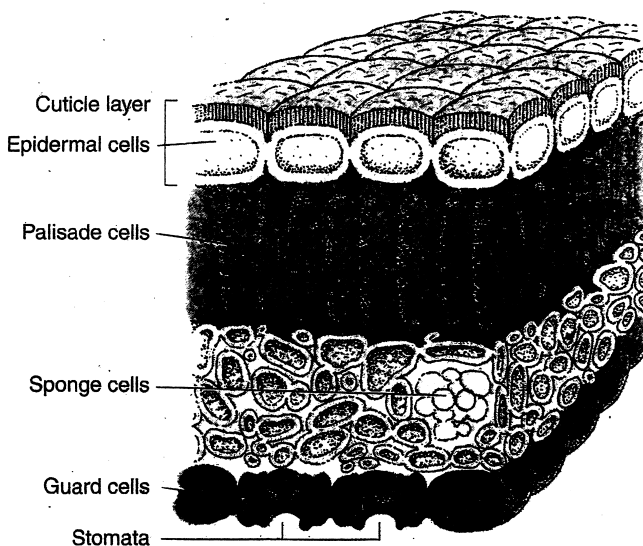
Questions ¹⁸ 1 and ¹⁹ 2 refer to this passage and diagram.

A leaf's structure, with layers of tissue cells, supports its role as a center for photosynthesis. The cuticle consists of a single layer of epidermal cells that secrete a waxy substance. It is almost waterproof, so even on hot days a leaf rarely dries out completely. The cuticle is also transparent, so light passes through it to the second layer of tissue.

The second layer, the palisade layer, consists of cells that contain most of the plant's chlorophyll. Photosynthesis takes place in the palisade layer.

The sponge cells of the third layer soak up most of the water that reaches the leaf. Spaces between water-logged sponge cells are filled with water vapor and carbon dioxide. These substances are needed for photosynthesis.

Like the cuticle, the guard cells are waxy and transparent. However, the layer of guard cell is filled with pores called stomata. The stomata allow carbon dioxide to enter the leaf and oxygen to leave. By opening and closing, the stomata also control the rate at which water evaporates from the leaf.



systems parts work together

18 What can you infer about how palisade cells and sponge cells interact in a leaf?

- (1) Photosynthesis takes place in both types of cells.
- (2) They are in different layers, so they do not interact at all.
- (3) Sponge cells protect palisade cells.
- (4) Sponge cells store the materials that palisade cells use during photosynthesis.
- (5) The palisade cells and the sponge cells protect the epidermal cells.

19 Which human organ performs a function most similar to that of a leaf's cuticle?

- (1) eyes
 - (2) lungs
 - (3) stomach
 - (4) skin
 - (5) bones
- Apply*

Matter Cycles *solid, liquid, gas

When water evaporates, it absorbs energy in the form of heat. The added energy causes the water molecules to move faster. If they gain enough energy, their energy of motion exceeds the forces that hold them together in the liquid. These molecules then become water vapor, the gas phase form of water.

20 Which of the following is not directly stated but can be inferred from the passage?

- (1) Molecules in liquid water are in motion.
- (2) Water can evaporate only at 100°C.
- (3) Water in its liquid phase is called water vapor.
- (4) During evaporation, water molecules release energy into the environment.
- (5) Water is an essential material for all living things.

Water cycle - w/hands
cellulose vs. lignin
100° + 212°
0° + 32°

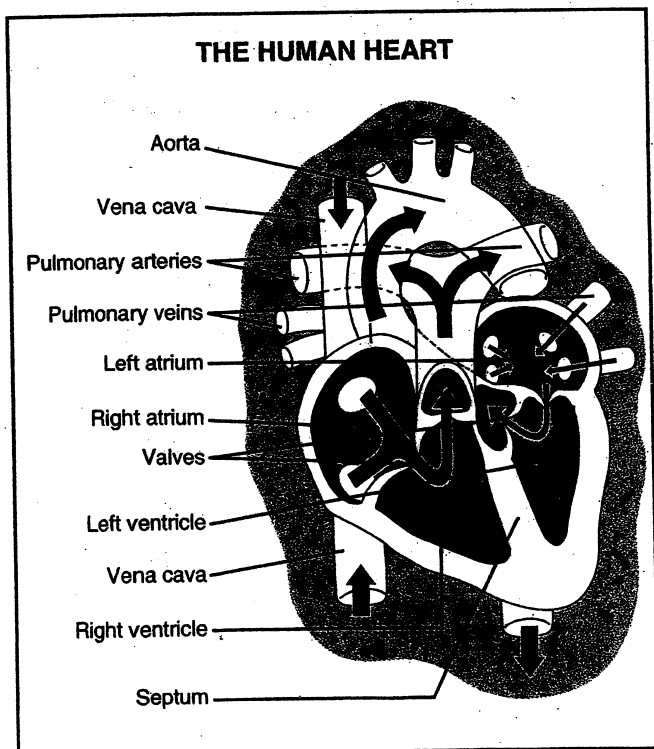
Human Body Systems

Directions: Choose the one best answer to each question.

Questions ¹⁵ through ¹⁷ refer to the following passage and diagram.

The major organ of the **circulatory system** is the heart, which pumps blood throughout the body. The right and left sides of the heart are divided by a wall called the **septum**. Each side is divided into two chambers called the **atria** and the **ventricles**.

Oxygen-poor blood from the body enters the right atrium through large **veins** called the **venae cavae**. When the atrium contracts, it forces the blood into the right ventricle. Next the right ventricle contracts, forcing the blood into the **pulmonary arteries**, which carry it to the lungs. In the lungs the blood picks up oxygen. The oxygen-rich blood then flows through the **pulmonary veins** and back to the heart where it enters the left atrium. The left atrium contracts and forces the blood into the left ventricle. As the left ventricle contracts, it forces the blood into a large artery called the **aorta**. From the aorta, blood flows into a system of blood vessels that carry it throughout the body.



15 Which chamber sends blood from the heart through the body?

- (1) the right ventricle
- (2) the right atrium
- (3) the left ventricle
- (4) the left atrium
- (5) the venae cavae

16 What would be most likely to happen if the aorta were partially blocked?

- (1) Too much blood would enter the left ventricle.
- (2) Not enough oxygen-poor blood would enter the heart.
- (3) Oxygen-poor blood would not be able to reach the lungs.
- (4) The body would not get enough oxygen-rich blood.
- (5) Oxygen-rich blood would enter the venae cavae.

17 Which of the following does the writer assume the reader already knows?

- (1) The arteries and veins are blood vessels, and they are part of the circulatory system.
- (2) The atria are the upper chambers of the heart, and the ventricles are the lower chambers.
- (3) The pulmonary veins carry blood from the lungs to the left atrium of the heart.
- (4) The septum separates the left and right sides of the heart.
- (5) In the heart, blood flows from the atria to the ventricles.

TIP

aorta's purpose?
4 points

Lesson Practice

TEST STRATEGY

Cover the answers to the question. Think of what you would write if the answers weren't there, and then uncover the answers. Choose the one that best matches your own answer.

experiment
 H₂O - control
 pH 7.0

highest carbon dioxide → pH 3.0 most acidic

KEY POINT!

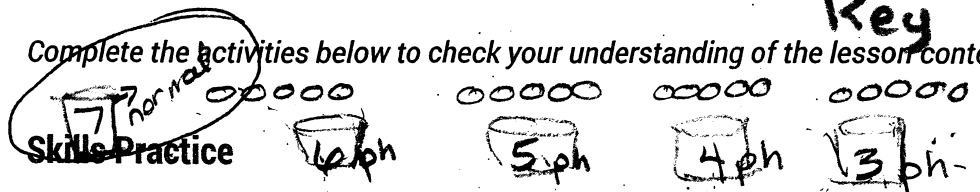
The researcher knows the values of the independent variable before starting the experiment.

KEY POINT!

The control is a trial in which the independent variable is not changed.

Key

Complete the activities below to check your understanding of the lesson content.



Use the following description of an experiment to answer the questions.

A student wanted to see if carbonating water, to make soda water, made it more acidic. He added four different amounts of carbon dioxide to 100 mL of distilled water at 25°C and then measured the pH of the solution. He mixed five solutions for each concentration. The pH of the water with no carbon dioxide was 7.0, and the pH for the highest concentration was 3.0. A pH of 7.0 is neutral; the lower the pH of the solution, the more acidic it is. The student wrote that carbonating water did make it more acidic, because the more carbon dioxide he added, the more the pH of the solution decreased. He finished by saying that the pH decreased because the carbon dioxide reacted with the water to produce carbonic acid. The hypothesis was supported!

1. What inference did the student make in his report?

- A that adding carbon dioxide to water lowers the pH
- B that the pH was lowered by the carbonic acid that formed
- C that the lower the pH of a solution, the more acidic it is
- D that carbon dioxide dissolves in water

2. How many trials did the student run in the experiment?

- A 4
- B 5
- C 10
- D 20 → 4 concentrations, 5 samples each
 $4 \times 5 = 20$ trials

3. What was the student's conclusion? → relates back to hypothesis

- A that carbon dioxide forms carbonic acid in water
- B that different solutions of carbonated water have different pH values
- C that more acidic solutions have a lower pH
- D that carbonating water makes it more acidic.

4. Which was the independent variable in the experiment?

- A the amount of carbon dioxide dissolved in the water
- B the pH of the solutions
- C the temperature of the water — change agent
- D the pH of pure water with no carbon dioxide — control

Earth Resources

To survive on Earth, we rely on substances called natural resources. There are two kinds of resources. A renewable resource can be replaced in nature after it is used. Renewable resources include air, sunlight, water, and plants.

Nonrenewable resources cannot be replaced. They are in limited supply because the processes that form them can take billions of years. Metals, minerals, coal, natural gas, and oil are all examples of nonrenewable resources.

31. Which of the following is an accurate statement that adequately supports the conclusion that trees are a renewable resource?

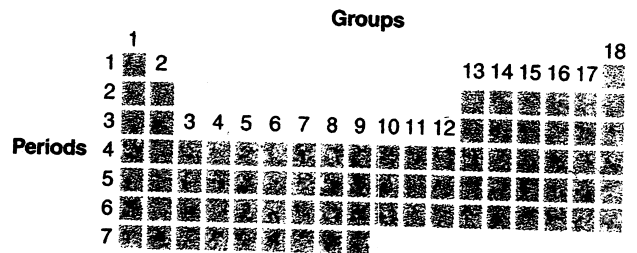
- (1) There are a large number of trees.
- (2) Trees only grow on Earth.
- (3) New trees can be planted to replace those that are cut down.
- (4) The processes that form renewable resources can take billions of years.
- (5) Trees require billions of years to grow.

32. Which of the following is an accurate statement that is adequately supported by the passage?

- (1) If we keep using Earth's nonrenewable resources, they will eventually be gone.
- (2) Metals and oil are renewable resources.
- (3) Nonrenewable resources are not distributed evenly on Earth's surface.
- (4) One of our nonrenewable resources comes from outside Earth.
- (5) All of our resources are produced only on Earth.

H_2O
Hydrogen - Oxygen - Hydrogen

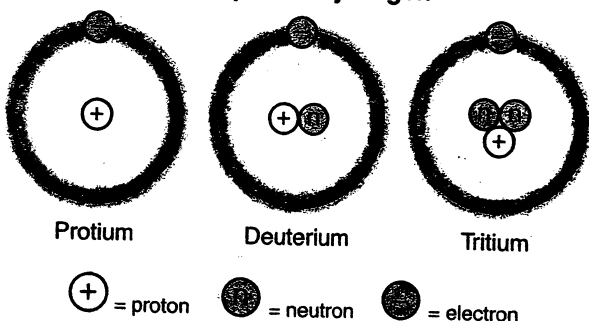
Scientists organize all the known elements in order of increasing atomic number on a table known as the periodic table. On the periodic table, elements are arranged in horizontal rows called periods and in vertical columns called groups. Elements in the same period have electrons located in the same energy level, or electron shell. Elements in the same group have the same number of electrons in their outer shell, as well as similar chemical and physical properties.



33. How could you best restate the information in the passage and diagram?

- (1) The periodic table contains seven periods and eighteen groups.
- (2) Each square of the periodic table represents an element, and the squares are organized based on structures and properties of the elements.
- (3) The periodic table includes all of the known information about each element.
- (4) Elements in a group of the periodic table have the same number of electrons in their outer shell.
- (5) All matter is made of about 100 different elements, which are shown on the periodic table.

Isotopes of Hydrogen



34. Which statement is supported by the information in this diagram?

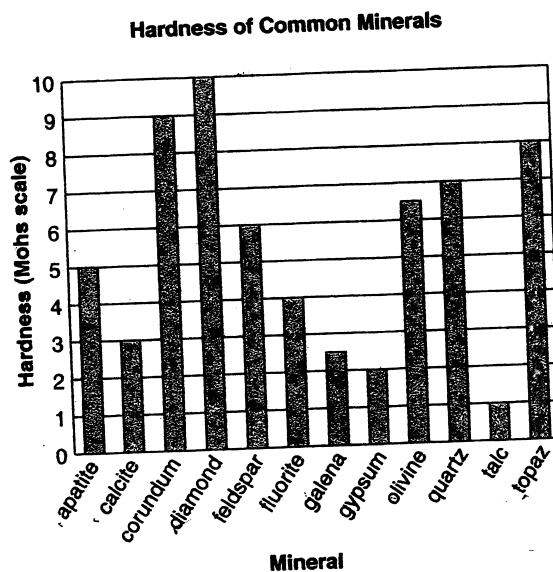
- (1) Hydrogen is an element.
- (2) Deuterium is not a type of hydrogen.
- (3) All hydrogen atoms have only one neutron.
- (4) Hydrogen is the only element that has different isotopes.
- (5) Isotopes have the same number of protons but different numbers of neutrons.

Geology

Dinosaurs appeared on Earth about 230 million years ago. They became extinct about 65 million years ago. Several ideas have been proposed to explain why dinosaurs became extinct. One is that the environment changed gradually and dinosaurs could not adapt to the change. Another idea, called the "impact hypothesis," says that an asteroid or comet collided with Earth. According to this hypothesis, the collision caused rapid environmental changes by throwing large amounts of dust into the atmosphere. Scientists looked for evidence of such a collision and found a huge underwater crater off the coast of Mexico. Using techniques to date the crater, they found that it was formed about 65 million years ago.

- 35 How did scientists test the impact hypothesis?
- (1) They examined dinosaurs that lived in Mexico.
 - (2) They created a crater in Mexico.
 - (3) They looked for evidence of a huge asteroid or comet collision.
 - (4) They created a large asteroid or comet collision on computers.
 - (5) They began studying the fossils of dinosaurs.
- 36 What information presented in the passage supports the impact hypothesis?
- (1) A large crater was formed about 65 million years ago.
 - (2) No comets have collided with Earth for 65 million years.
 - (3) Dinosaurs appeared about 230 million years ago.
 - (4) Comets are made of ice and dust.
 - (5) No other animals have become extinct.

When two minerals are rubbed together, the harder mineral will scratch the softer one. The harder a mineral is, the more durable it is. The hardness of minerals is measured by the Mohs scale.



- 37 Which of the following restates a fact shown in the graph?
- (1) Calcite is harder than olivine.
 - (2) Fluorite is harder than corundum.
 - (3) Topaz is harder than diamond.
 - (4) Gypsum is softer than feldspar.
 - (5) Apatite is softer than galena.
- 38 Which mineral would make the longest-lasting grinding surface?
- (1) apatite
 - (2) diamond
 - (3) quartz
 - (4) talc
 - (5) topaz

Motion and Forces

KEY IDEAS

- Speed is the rate at which an object moves; velocity is speed in a given direction; acceleration is the rate at which velocity changes.
- A force is anything that changes the state of rest or motion of an object.
- Newton stated three laws of motion that explain the inertia, acceleration, and momentum of objects.

HiSET EXAM TIP

If you are asked to apply a general law or principle of science to a particular situation, ask yourself: "What is similar about this situation and the general principle?"

Everything in the universe is in motion. Even objects that seem to be at rest, like a building, are moving with Earth's rotation. **Speed** is the rate at which an object moves; **velocity** is its speed in a particular direction. **Acceleration** is the rate at which velocity changes. So a car's speed may be 40 miles per hour; its velocity may be 40 miles per hour toward the north; and it may accelerate by 10 feet per second until its velocity is 50 miles per hour to the north. A **force** is anything that tends to change the state of rest or motion of an object. A push or a pull on an object is a force, as are gravity and friction. So, for example, if you allow a car to coast on a level road, the force of friction will eventually bring it to a stop.

Sir Isaac Newton (1642–1727), an English physicist and mathematician, set down three laws by which the planets and all other objects move when acted upon by a force. These are called the **laws of motion**.

Newton's first law of motion, the **law of inertia**, states that an object at rest will stay at rest until a force acts upon it, and an object in motion will stay in motion at a constant speed in a straight line until a force acts upon it. Objects moving on Earth eventually slow down and stop because of the forces of friction and gravity. A bullet, for example, would continue its forward motion in a straight line, but friction from the air slows it down and the force of gravity pulls it toward the ground.

The second law of motion, sometimes called the **law of motion or acceleration**, states that the acceleration of an object depends on its mass and the force acting upon it. The greater the force, the greater the acceleration. The more massive the object, the more force it takes to accelerate it. Additionally, if a constant force acts upon an object, the object will move with constant acceleration in the direction of the force. This is why truck engines are more powerful than car engines: it takes more force to accelerate an object with more mass (a truck) than an object with less mass (a car).

Newton's third law of motion states that for every action, there is an equal and opposite reaction. This law was used to derive the law of conservation of momentum. **Momentum** is related to the amount of energy that a moving object has, and it depends on the mass of the object and its velocity. In fact, momentum is defined as an object's mass multiplied by its velocity. Newton's third law states that when an object is given a certain amount of momentum in a particular direction, some other object must receive an equal momentum in the opposite direction. Another way to state this is to say that all forces exist in pairs, and that all forces are interactions between objects. So, for example, when a bullet is fired out of a gun, the bullet's forward momentum causes the gun to recoil, or move backward.

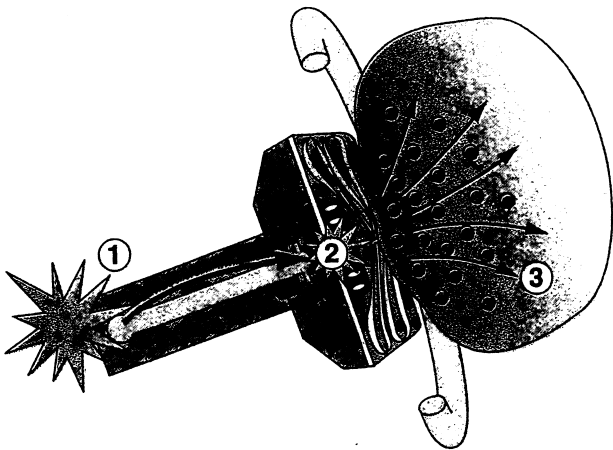
Forces

39 What is a force?

- A. the rate at which an object moves in a particular direction
- B. any change in an object's acceleration or deceleration
- C. the inertia and momentum of an object at rest
- D. anything that changes the rest or motion of an object

How an Air Bag Works

1. The crash sensor detects the crash.
2. The inflator starts a chemical reaction.
3. The chemical reaction makes nitrogen gas, which fills the air bag.



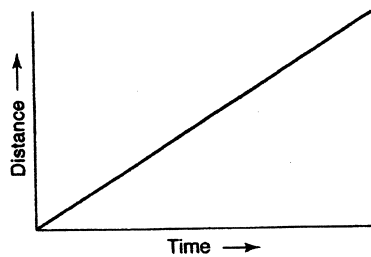
40 According to the diagram, which of the following happens last?

- (1) The crash detector triggers the chemical reaction.
- (2) The chemical reaction begins in the inflator.
- (3) The crash detector senses a crash.
- (4) The air bag inflates with nitrogen gas.
- (5) The chemical reaction produces nitrogen gas.

41 Which of the following is a direct effect of the nitrogen gas in the diagram?

- (1) The chemical reaction triggers a crash.
- (2) The air bag senses a crash.
- (3) The crash sensor triggers the inflator.
- (4) The chemical reaction begins.
- (5) The air bag inflates.

Graphs are often used to convey information about motion. One type of motion graph shows distance and time. Distance is measured from a particular starting point. If the distance graph has a straight, horizontal line, the distance is unchanging and the object is not moving. If the distance graph has a straight line with an upward slope, the distance is changing at a constant rate; this means that the object is moving at a constant speed. If the distance graph is a curve, the object is accelerating or decelerating, depending on the shape of the curve.



42 What does the graph above show?

- A. an object that is not moving
- B. an object that has a constant speed
- C. an object that is accelerating
- D. an object that is decelerating

43 A machine is a device that transmits a force, changing the direction or size of the force and doing work. The force applied to a machine is the effort force; the force it overcomes is the load. Types of simple machines include the inclined plane, wedge, lever, pulley, and wheel-and-axle.

Which of the following statements is supported by the information given?

- A. The force a machine overcomes is called the effort force.
- B. Work can be done only with machines.
- C. Some machines simply change the direction of a force.
- D. All machines change both the direction and size of a force.

Review your work using the explanations that start on page 782.