CDT Test

Practice Questions

Abiotic

Rainfall and leaves dropping from the surrounding forest greatly affect the amount and quality of water entering an ecosystem. The water quality affects the microbes and vertebrate populations within the ecosystem. Which feature of this ecosystem is an example of an abiotic factor?

A. leaves

B. rainfall

C. microbes

D. vertebrates

Characteristics of Life

Fish, frogs, and plankton are some organisms found in a pond. Which characteristic do fish, frogs, and plankton have in common?

A. They live only in water.

B. They make their own food.

C. They require energy to live.

D. They breathe air through their gills.

Observations

Observations are an important step in the design of an experiment. Which of the following is an example of an observation?

A. A fly is caught in a spider web.

B. Why does a spider spin a web?

C. A spider spins a web to catch its food.

D. What time of day is best for finding a spider web?

Level of Organization

Which level of organization **best** classifies a heart?

A. cell

B. organ

C. tissue

D. organ system

Characteristics of Life

Which characteristic do mushrooms, cats, humans, and trees have in common?

A. They have cell walls.

B. They are multicellular.

C. They have a backbone.

D. They make their own food.

Cells

Which statement **best** describes the cells of a goldfish?

A. The cells arrange to directly form organs.

B. The cells combine to directly form organelles.

C. The cells group together to directly form tissues.

D. The cells work together to directly form organ systems.

Unicellular/multicellular

Which list contains both unicellular and multicellular organisms?

A. a caterpillar, an ant, a tadpole

B. a pea plant, a maple tree, a snail

C. a bacterium, an earthworm, a lion

D. a mushroom, a strawberry plant, a lemon tree

Prokaryotic/Eukaryotic

A bacterial cell is a prokaryote, while the protist euglena is a eukaryote. Which structure is present in both organisms?

A. a nucleus that controls the actions of the cell

B. a mitochondria that provides the cell with energy

C. a cell wall that maintains a rigid structure for the cell

D. a cell membrane that holds in the contents of the cell

Classification

Use the drawings below to answer the question.

What is one way to correctly classify these two animals?

A. Put them in the same group because they both fly.

B. Put them in different groups because they both fly.

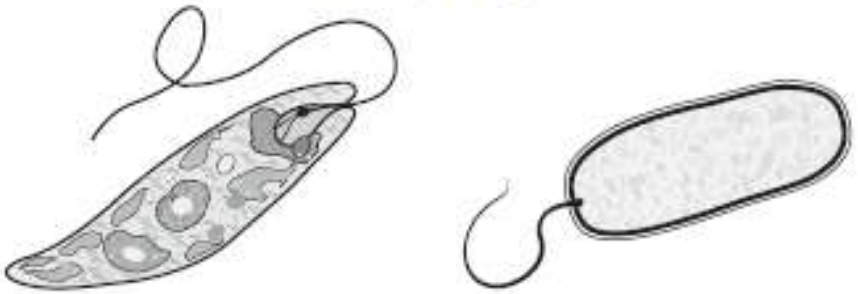
C. Put them in the same group because they have the same number of legs.

D. Put them in different groups because they have different numbers of legs.

Classification

Use the drawings below to answer the question.

Two Microscopic Organisms



protist bacterium

Which characteristic would be **most** helpful to classify these organisms into two different groups?

A. cellular structure
B. mode of transport
C. source of nutrition
D. method of reproduction

Fungi

Which characteristic **best** distinguishes fungi from plants?

A. Fungi can reproduce asexually.

B. Fungi respond to their environment.

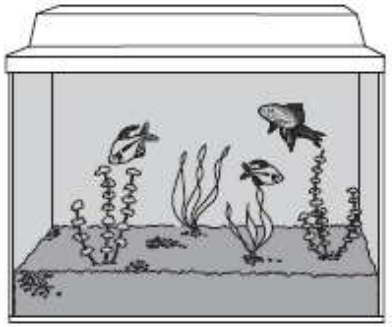
C. Fungi have a eukaryotic cell structure.

D. Fungi need other organisms for energy.

Plant vs. Animal

Use the drawing below to answer the question.

Aquarium



Which statement **best** describes a need that is different between the fishes and the plants?

A. Only the plants need water to grow.
B. Only the plants need food for energy.
C. Only the fishes need oxygen to breathe.
D. Only the fishes need sunlight to make food.

Water

Students observe that they can float easier in an ocean than they can in a lake. Which statement **best** supports their observation?

A. Ocean water is deeper than lake water.

B. Ocean water is warmer than lake water.

C. Ocean water is more dense than lake water.

D. Ocean water is less conductive than lake water.

Water

Many marine organisms are able to survive freezing winters in their habitat. Which statement describes a property of water that allows these organisms to withstand extreme temperature conditions?

A. Water sticks to things it cannot dissolve.

B. Water is able to exist in three states of matter at room temperature.

C. Water is able to dissolve a large variety of chemicals because it is a polar molecule.

D. Water can absorb large amounts of energy without significant changes in temperature

Biochemistry

Chymotrypsin is a chemical found in human digestive juices within the stomach. This chemical assists in digestion of protein molecules present in ingested food but remains unchanged structurally in the process. Which term **best** identifies the role of this chemical in protein digestion?

A. reactant

B. product

C. catalyst

D. cofactor

Biochemistry

Cellulose is a carbohydrate polymer which contains repeating units of glucose bonded together. Which type of reaction helps form the bonds between the glucose monomer units?

A. reduction

B. hydrolysis

C. respiration

D. dehydration

Macromolecules

Cellulose and phospholipids are two biological macromolecules that help provide structural support for a cell. Which statement describes a physical characteristic of cellulose?

A. It is a monomer.

B. It has a carbon backbone.

C. It contains long fatty acid chains.

D. It has one end that is water-repellent.

Macromolecules

All biological macromolecules have a carbon backbone in common. Which statement **best** explains why carbon is well suited for this role?

A. Carbon has four electrons in its outer shell.

B. Carbon is the most abundant element in nature.

C. Carbon forms covalent bonds with other atoms.

D. Carbon can exist in a solid state at room temperature.

pH

Digestive activity in the stomach occurs at an acidic pH of 2. Which statement **best** explains the role that pH has in digestion?

A. The acidic pH presents the substrate to the digestive juices.

B. The acidic pH facilitates the absorption of food within the stomach.

C. The acidic pH protects the stomach lining from the digestive juices.

D. The acidic pH alters the active sites of the enzymes in the stomach.

Golgi Apparatus

How does the Golgi apparatus prepare proteins for use by an organism?

A. the Golgi apparatus sorts proteins and sends them to their appropriate destination in a cell

B. the Golgi apparatus folds, processes, assembles, and stores proteins for future cell needs

C. the Golgi apparatus translates the genetic code into the amino acids that form the proteins

D. the Golgi apparatus sequences nucleotides to form RNA codons that instruct protein formation

Plasma Membrane

The plasma membrane of a eukaryotic cell has many transmembrane proteins that cross the lipid bilayer. Which statement **best** describes the function of these proteins in the plasma membrane?

A. They create a rigid barrier for the cell.

B. They make the membrane impermeable to water.

C. They transport undigested material to the outside of the cell.

D. They provide channels of movement for some ions and molecules.

Structure of living things

For human organs to function, they must receive oxygen. Which tiny structures in the blood carry oxygen from the lungs to the organs where it is needed?

A. fats

B. cells

C. tissues

D. vessels

Chloroplasts

Which of the following **best** describes one function of chloroplasts in a plant cell?

A. storage of wastes

B. capture of solar energy

C. regulation of water transport

D. release of energy from carbohydrates.

Proteins

Proteins are very important in the structure and function of living things and are synthesized within the cell. Which cell structure is responsible for reading the DNA instructions in the cytoplasm and assembling the proteins?

A. nucleus

B. ribosome

C. Golgi apparatus

D. endoplasmic reticulum

Epithelial Tissue

2. A certain type of epithelial tissue consists of layers of cells tightly bound together. This tissue lacks blood vessels and has a high rate of cell replacement. Which statement describes the **most likely** function of this tissue in the human body?

A. It allows for movement of limbs.

B. It provides cushioning to internal organs.

C. It provides physical protection against injury.

D. It transports various nutrients throughout the body.

Molecular Movement

Salt concentration in the body fluids of most saltwater fish is low compared to their surroundings. Which ability helps these fish to live in their high salt concentration environment?

A. passing concentrated urine

B. taking in water through their gills

C. active transport of salt out of their bodies

D. avoiding intake of water by closing their mouths

Molecular movement

Cell membrane proteins are involved in the movement of some substances across the cell membrane. Which type of molecular movement requires cellular energy in addition to the membrane proteins?

A. osmosis

B. endocytosis

C. active transport

D. facilitated diffusion

Energy

Life on Earth is maintained through energy transformations. Which of the following is the original source of energy for **most** of these transformations?

A. soil

B. sugar

C. plants

D. sunlight

Energy Sources

Most anabolic reactions, such as fat and polysaccharide synthesis, require energy to build macromolecules. Which source provides the usable form of energy to the cell for these reactions?

A. ATP

B. DNA

C. glucose

D. sunlight

Photosynthesis/Respiration

Which statement **best** compares the energy transformations of photosynthesis and cellular respiration?

A. Only photosynthesis uses oxygen to create energy.

B. Only photosynthesis causes an increase in kinetic energy.

C. Photosynthesis and respiration both store energy in chemical bonds.

D. Photosynthesis and respiration both require chemical energy to make food.

Reproduction

Under favorable conditions, the bacterium, *E. coli*, can divide to form two genetically-identical daughter cells in less than an hour. Which characteristic **best** describes how the genetically identical daughter cells of *E. coli* are produced?

A. Bacterial cells have no nucleus.

B. *E. coli* has a single chromosome.

C. DNA replication is semi-conservative.

D. One cell maintains the original chromosome.

Diploid

Fertilization of an egg leads to a diploid genome as a zygote is formed. Which characteristic is true of diploid genome?

A. There are two alleles per gene.

B. There are two genes per allele.

C. There are two genes per chromosome.

D. There are two chromosomes per allele.

Cell Cycle

Which list of events occurs during the interphase stage of the cell cycle?

A. chromosomes align at the center of the cell, spindle fibers shorten, and chromatids begin moving to cell poles

B. chromatids arrive at opposite poles of cell, new membranes form around daughter nuclei, and chromosomes disperse

C. DNA replicates, centrioles divide, and proteins are actively produced

D. cytoplasm divides and a contractile ring separates cell into two daughter cells

Cells

A human is typically composed of trillions of cells. Which process directly causes this large number of cells in humans?

A. circulation

B. respiration

C. cell division

D. cell mutation

Budding

The kalanchoe is a plant that produces tiny buds from the tips of its leaves. These buds fall off the plant. When the buds land on a suitable growing surface, the buds then develop into mature plants. How is reproduction by budding different from sexual reproduction in plants?

A. Budding adds greater diversity to the kalanchoe plant species.

B. Budding requires that two parents be involved in reproduction.

C. Budding produces offspring plants that are identical to the parent plants.

D. Budding depends on another organism to transfer pollen for bud development.

Meiosis

In one stage of a fern plant's life cycle, a cell undergoes meiosis, and the resulting cells grow into new plants. How are these plants different from the parent plant?

A. The offspring plants grow twice as fast.

B. The offspring plants are smaller at maturity.

C. The offspring plants have half the amount of genetic material.

D. The offspring plants contain genetic material from multiple plants.

Unit of inheritance

Which term **best** describes the basic unit of inheritance passed from a parent to offspring?

A. traits

B. genes

C. genotypes

D. phenotypes

Genetics

Which of the following best describes an acquired trait of a cat?

A. eye color because it is passed on from the previous generation

B. fur length because it is passed on from the previous generation

C. long tail because it develops during the lifetime of the organism

D. chipped tooth because it develops during the lifetime of the organism

Acquired traits

Which trait is an acquired trait?

A. red hair

B. dimples

C. brown eyes

D. bruise on leg

Translocation

How can translocation affect chromosomes?

A. Translocation can result in chromosomes having very different lengths.

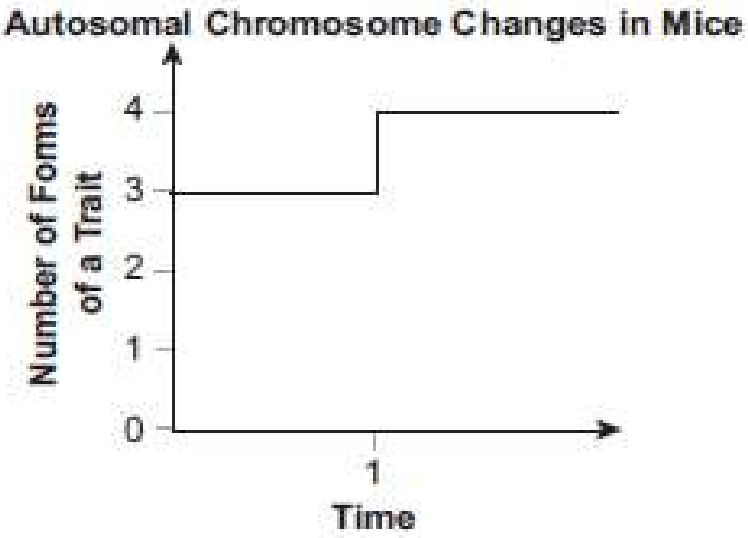
B. Translocation can cause duplication of certain sections of chromosomes.

C. Translocation can cause the exchange of genetic material between homologous chromosomes.

D. Translocation can result in the failure of homologous chromosomes to separate during meiosis.

Chromosome Changes

Use the graph to answer the question.



1. The graph represents changes in an autosomal trait of a mouse population over time. Which statement **best** describes the occurrence at time 1?

   A. A mutation produced a new allele for the gene controlling the trait.

   B. An invasive species with a new form of the trait moved into the habitat.

   ★ C. A change in the environment resulted in an increase in the mouse population.

   D. A selection pressure change resulted in a new form of the trait being beneficial.

Gene expression

Scientists have been able to grow transgenic plants that contain and express genes from many different sources, including microbes, plants, and animals. Which characteristic makes this gene expression possible?

A. Only plant enzymes are substrate-specific.

B. Plants do not depend on proteins for gene expression.

C. The process of protein synthesis is common to all organisms.

D. Transferred genes carry information needed for their expression.

Selective breeding

Which outcome is **most likely** a result of selective breeding?

A. the formation of new genes

B. an increase in natural selection

C. a development of new ecosystems

D. the expression of favored genotypes

Mutations

A species of pea plants usually produces flowers with five petals. One offspring plant has three petals. Which event would **most likely** cause the offspring plant to have three petals?

A. DNA is inherited from two different parent plants

B. high temperatures during the flower production season

C. low water levels in the soil surrounding the parent plants

D. mutation in the gene coding for petal number in the parents' DNA

Blood Types

The four blood types in human ABO blood typing result from various combinations of alleles that code for different versions of a gene. This gene codes for an enzyme which attaches carbohydrate A or B to the red blood cells. Which pattern of inheritance is blood type in humans?

A. polygenic

B. co-dominance

C. multiple alleles

D. autosomal recessive

Mutations

A mutation is a change in DNA that usually occurs during replication. Which mutation is the **most likely** to result in no effect to the phenotype of a cell?

A. the replacement of a single base by another base

B. the insertion or deletion of one or two base pairs

C. an amino acid codon is changed into a stop codon

D. one codon is replaced by another codon for the same amino acid

Genetically Modified

Researchers have developed a genetically modified mosquito which has a gene that makes it immune to a certain disease. Which statement **best** describes the intended impact of this development on the field of medicine?

A. It was developed to stop the spread of the disease.

B. It was developed to eliminate mosquito populations.

C. It was developed to increase biodiversity in parasite populations.

D. It was developed to increase human resistance to the same disease.

Evolution

The frequency of an allele in a fly population changes from 89% to 20% over three generations. Which other events **most likely** occurred during the same time period?

A. an environmental change and a fly population increase

B. an environmental change and a fly population decrease

C. interbreeding of flies with an invasive species, and fly population speciation

D. interbreeding of flies with an established local species, and fly population speciation

Survival of Fittest

Which statement **best** explains how different adaptations in individuals of the same species increase their survival?

A. thicker fur on black bears helps in colder temperatures

B. thinner fur on black bears helps in colder temperatures

C. longer beaks on rufous hummingbirds help in warmer temperatures

D. shorter beaks on rufous hummingbirds help in warmer temperatures

Speciation

A population of beetles has lived in a forest for many generations. Which scenario would **most** rapidly encourage formation of a new species from this beetle population?

A. a random mutation in one of the beetles

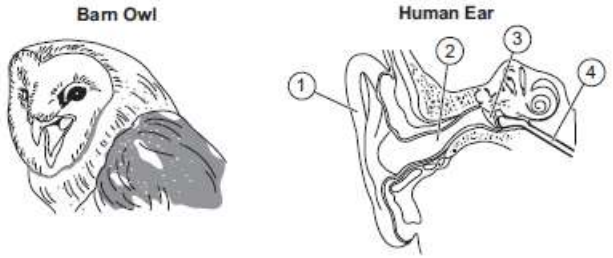
B. a small group of beetles finding an area with a new food source

C. a non-native predator of the beetle being introduced into the forest

D. a geographic barrier separating the beetle population into two different locations

Homologous Structures

Use the drawings below to answer the question.



This owl's disk-shaped face helps direct sound waves into the owl's ears. This helps the owl to hear better. Which numbered part of a human ear has a similar function?

A. part 1
B. part 2
C. part 3
D. part 4

Homologous Structures

The pitcher plant and venus fly trap plant have leaves that are modified to catch insects. In cacti plants, the leaves are shaped like spines. Leaves on each of these plants are homologous structures. What type of evidence does the presence of homologous structures provide?

A. Some plants are more closely related to animals

B. Insects and plants evolved around the same time.

C. Only some plants are capable of photosynthesis.

D. Plants have evolved from a common ancestor.

Environmental Effects

Rice cultivation, cattle ranching, the filling of landfills, and coal mining are some of the activities that lead to increased levels of methane gas in the atmosphere. Which statement describes how increased levels of methane gas will **most likely** affect the global environment?

A. It can cause ozone depletion.

B. It can cause acid rain formation.

C. It can pollute renewable resources.

D. It can contribute to climate changes.

Ecology

At the bottom of a stream, various bacteria, fungi, protozoans, vertebrates, and invertebrates all live in one common area. Which terms **best** defines this group of organisms?

A. biome

B. population

C. ecosystem

D. community

Ecology

The passenger pigeon is a bird that has been extinct since the early 1900s. This bird was one of the most abundant birds in the United States. Which factor **most likely** caused the extinction of the passenger pigeon?

A. a decrease in predators

B. an increase in food sources

C. the invention of automobiles

D. the destruction of forest habitats

Ecology

A researcher observes that very few plants grow at the bottom of oceans. Which condition found on the ocean floor **best** explains this observation?

A. decreased oxygen

B. decreased sunlight

C. increased predation

D. increased competition

Trophic Levels

A large amount of organic matter remains unused at each trophic level within an energy pyramid. Which statement correctly explains what happens to most of this organic matter?

A. It is absorbed by consumers.

B. It is recycled by decomposers.

C. It is lost as heat to the environment.

D. It is used by producers to make more food.

Symbiosis

A deer tick feeds on the blood of a white-tailed deer and the deer survives. The deer tick can spread disease to the deer through its blood. Which relationship **best** describes the interaction between the tick and the deer?

A. parasitism

B. mutualism

C. competition

D. commensalism

Ecological Cycles

Burning coal releases ash particles, sulfur dioxide, nitrogen oxides, and mercury into the atmosphere. Which statement about one or more of these substances is accurate?

A. Mercury is harmless to the environment.

B. Ash particles on leaves benefit plant life.

C. Particles and chemicals can pollute the air but cannot harm water sources.

D. Sulfur dioxide and nitrogen oxides can pollute water sources by forming acid rain.

Ecology

Many hummingbirds are attracted to orange flowers. Which statement describes how a plant most likely benefits from having orange flowers?

A. The plant's rate of growth would increase.

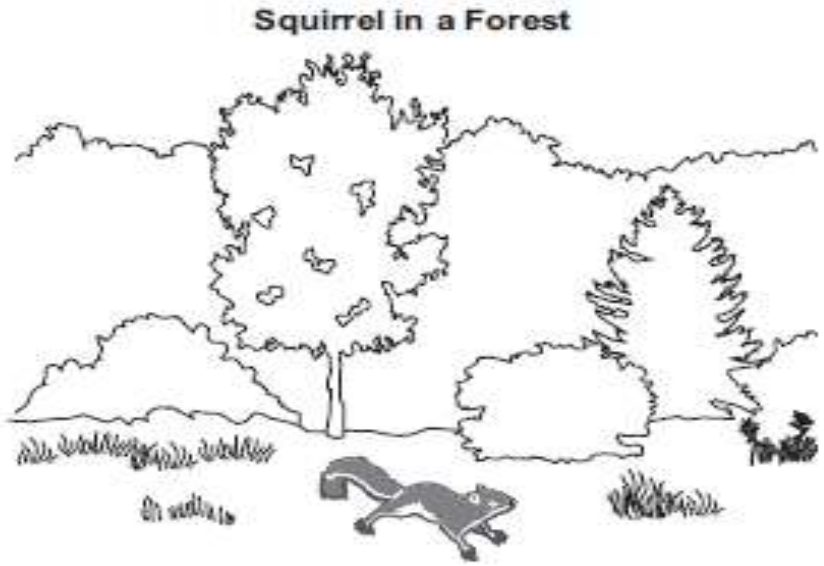
B. The plant's chances of successful reproduction would increase.

C. The plant's life span would be longer than other plants' life spans.

D. The plant's seeds would be more likely to spread to distant locations.

Ecology

Use the picture below to answer the question.



Which statement describes how cutting down trees in the forest would **most likely** affects the squirrel?

A. Cutting down trees reduces light in the forest.
B. Cutting down trees makes food less available.
C. Cutting down trees reduces rainfall in the forest.
D. Cutting down trees makes shelter more available.

Water cycle

Which process is responsible for the movement of water through soil layers?

A. infiltration

B. precipitation

C. transpiration

D. condensation

Nitrogen Cycle

Which change is a negative impact of using nitrogen-based fertilizers?

A. an increase in biomass

B. an increase in water pollution

C. a decrease in the size of the ozone layer

D. a decrease in emissions of greenhouse gases

Processes

Application of insecticides in an agricultural field causes a decrease in the earthworm population of that field. This change in the earthworm population affects nutrient cycling and decreases the wheat-crop yield. Which part of the system in the agricultural field is an example of a process?

A. nutrient cycling

B. the insecticides

C. reduced wheat-crop yield

D. decreased earthworm population

Energy

The total amount of energy stored in a population of toads is far less than the total energy stored in the insect population they eat. Which statement **best** explains the difference in total available energy between the toads and insects?

A. Insects are more efficient at using energy than toads.

B. Total available energy decreases with an increase in trophic level.

C. Insects make their own food so they don't have to use up energy to hunt.

D. Total available energy is reduced for each toad since there are more toads than insects.

Biomes

Which biome is characterized by large trees, lush vegetation, and a wide variety of animals living in a tropical region?

A. taiga

B. desert

C. rainforest

D. grassland

Pesticides

Microbial pesticides contain microscopic organisms that produce proteins harmful to specific pests. Which statement **best** describes a reason a farmer would choose a microbial pesticide rather than a chemical pesticide?

A. Microbial pesticides protect crops from pests.

B. Microbial pesticides protect crops from a wider variety of pests.

C. Microbial pesticides are less likely to affect beneficial organisms.

D. Microbial pesticides are less likely to be carried by the wind to new locations.

Burning of Wastes

How does the burning of waste **most likely** affect the environment?

A. nutrient cycling in the soil is reduced

B. toxins are released into the air and soil

C. biodiversity of the surrounding area is increased

D. household garbage takes up more space in landfills

Runoff

Water runoff is greatly influenced by the landscape over which it flows. Which landscape surface will **most likely** have the highest rate of water runoff?

A. old growth forest

B. sandy flood plain

C. rocky, mountainous area

D. meadow with an adjacent wetland

Environmental Destruction

Some snakes live in a wetland habitat. They eat small fish, worms, frogs, and crayfish. Which statement describes what would **most likely** happen to these snakes if humans changed the wetland habitat into dry land?

A. The snakes would grow bigger.

B. The snakes would leave the area.

C. The snakes would eat more food.

D. The snakes would hibernate in winter.

Survival

Many bats live in caves during the winter. How do the caves **most likely** help the bat survive?

A. it provides air

B. it provides food

C. it provides light

D. it provides shelter

Perennials

Annuals are plants that grow, fully mature, and reproduce in a single growing season. Most grains and many garden vegetables are annuals. Perennials are plants that usually have a longer life span. Which statement **best** explains why perennial plants have a longer life span than annual plants?

A. They grow faster than annuals.

B. They are more common than annuals.

C. They produce more flowers than annuals.

D. They produce seeds at a different rate than annuals.

Seeds

Use the drawing below to answer the question.

Red Maple Seeds

Which characteristic of these seeds **best** helps red maple trees populate an area?

A. color
B. shape
C. weight
D. texture

Water and Soil

Which activity depends **most** on water and soil from the natural environment?

A. driving cars

B. growing food

C. washing clothes

D. making electricity

Resources

In a garden, insects were found on the leaves of some plants. The plants with insects were not as healthy as the other plants. Which resource used by humans is reduced by the insects?

A. food

B. water

C. fossil fuel

D. living space

Exoskeletons

Use the drawing below to answer the question.

Pillbug

A pillbug has a hard skeleton on the outside of its body. What is the main function of this skeleton?

A. breaking down food
B. helping the heart beat
C. bringing air into the body
D. protecting soft body parts

Air Pressure

When a cold front passes over a region, the air pressure in that region increases. Which statement **best** explains the reason for the change in air pressure?

A. Cold air is lighter than hot air.

B. Cold air is more dense than hot air.

C. Hot air is less buoyant than cold air.

D. Hot air can hold more moisture than cold air.

Single celled Life

Bacteria are single-celled organisms. How does a bacterium perform all of its life functions in a single cell?

A. A bacterium uses the DNA in the cell to control life functions.

B. A bacterium attaches to a host that will support its life functions.

C. A bacterium needs to live in a colony to carry out its life functions.

D. A bacterium has organelles that work together to complete its life functions.

Genetics

The fur color of an animal species is determined by one gene. Two parent animals of this species have dark gray fur. They produce three offspring with dark gray fur and one offspring with light gray fur. Which statement best describes how these two parents could produce an offspring with light gray fur?

A. Both parents have recessive alleles.

B. Both parents have two dominant alleles.

C. Only one of the parents has a dominant allele.

D. Only one of the parents has a recessive allele.