PRACTICE EXAM 7: LIFE SCIENCE: BIOLOGY SIMULATION (50 QUESTIONS)

1. In science, an explanation that is supported by a large body of evidence gathered over many years and that ties together many observations is referred to as a:

A. Guess, an idea formed without using any supporting evidence at all

B. Hypothesis, a tentative explanation that has not yet been tested by experiment

C. Opinion, a personal belief that does not depend on any scientific evidence

D. Theory, a well-supported explanation that ties together many observations

2. Every living organism, from a bacterium to a whale, must obtain and use energy to stay alive. Organisms use this energy to:

A. Avoid carrying out any chemical reactions inside their cells over time

B. Power the life processes such as growth, movement, and reproduction

C. Stop their cells from ever dividing once the organism reaches adulthood

D. Prevent themselves from responding to any changes in the environment

3. The large molecules in living things are built from smaller repeating units. Which of the following correctly matches a large molecule with its smaller building block?

A. A carbohydrate is built from amino acids linked together in a chain

B. A protein is built from simple sugars joined into a branching structure

C. A protein is built from amino acids linked together in a specific order

D. A lipid is built from nucleotides arranged along a long double strand

4. Living cells rely on enzymes to carry out thousands of chemical reactions quickly enough to support life. Enzymes are able to do this because they:

A. Lower the energy needed to start a reaction, speeding the reaction up

B. Supply the cell with most of the energy it needs to power its activities

C. Become permanently used up after taking part in a single reaction

D. Carry the genetic instructions that the cell passes on to its offspring

5. A biologist studying a very active animal cell finds that it contains a large number of mitochondria. This observation suggests that the cell has a high demand for:

A. Sunlight, which the mitochondria capture to manufacture sugar for the cell

B. Genetic material, which the mitochondria copy and store within the cell

C. Energy, which the mitochondria release from food molecules as usable ATP

D. Water, which the mitochondria absorb and store inside the active cell

6. Plant cells have a rigid structure surrounding the cell membrane that animal cells lack. This structure provides support and shape to the plant cell and is called the:

A. Nucleus, which contains the genetic material that controls the cell

B. Vacuole, which stores water and dissolved substances within the cell

C. Cell wall, which surrounds the membrane and supports the plant cell

D. Chloroplast, which captures light energy to make sugar for the cell

7. A cell moves a substance from a region where it is less concentrated into a region where it is more concentrated. To move the substance in this direction, the cell must:

A. Rely only on diffusion, since particles always move toward lower concentration

B. Use osmosis, which moves water across a selectively permeable membrane

C. Wait for the concentrations to become equal before any movement occurs

D. Use energy, because the substance is moving against its concentration gradient

8. During photosynthesis, a plant changes one form of energy into another as it makes glucose. Which energy conversion takes place during photosynthesis?

A. Chemical energy in glucose is converted into the light energy of sunlight

B. Light energy from the Sun is converted into chemical energy stored in glucose

C. Heat energy from the soil is converted into the light energy used by leaves

D. Electrical energy from the air is converted into the chemical energy of sugar

9. In aerobic cellular respiration, cells break down glucose to release energy. Which two substances are the raw materials (reactants) that cells use in this process?

A. Carbon dioxide and water, which the cell combines to form new glucose

B. Light energy and chlorophyll, which the cell uses to release stored energy

C. Glucose and oxygen, which the cell breaks down to release usable energy

D. Nitrogen and carbon dioxide, which the cell absorbs from the bloodstream

10. When organisms die, decomposers break down their bodies, releasing carbon dioxide back into the air and nutrients into the soil. In the carbon cycle, this decomposition is important because it:

A. Returns carbon to the environment so it can be used by living things again

B. Removes carbon from the cycle permanently so it can never be reused

C. Converts carbon directly into the oxygen that animals need to breathe

D. Prevents producers from ever obtaining the carbon they need to grow

11. A skin cell with 46 chromosomes divides by mitosis to replace worn-out cells. Each of the two new cells produced will contain:

A. 23 chromosomes, half the number found in the original skin cell

B. 92 chromosomes, twice the number found in the original skin cell

C. A random number of chromosomes that differs in each of the new cells

D. 46 chromosomes, the same number found in the original skin cell

12. During meiosis, the way chromosomes are sorted into the sex cells is random, so each sex cell receives a different combination of chromosomes. This random sorting is important because it:

A. Guarantees that every offspring will be genetically identical to its parents

B. Increases genetic variation among the offspring produced by the organism

C. Doubles the number of chromosomes that each sex cell will receive

D. Removes all of the mutations from the DNA before the sex cells form

13. Before a cell can divide to form two new cells, it must first copy all of its DNA. The main reason the DNA must be copied first is so that:

A. Each new cell will receive a complete and identical set of genetic instructions

B. The new cells will each have only half of the original genetic instructions

C. The cell can change its DNA into a completely new sequence before dividing

D. The cell can avoid passing any of its genetic instructions to the new cells

14. A gene provides the instructions for making a particular protein. If a mutation changes the gene so that the wrong amino acid is added to the protein, the most likely result is that the protein:

A. Will be produced in much larger amounts than it normally would be

B. Will turn into a molecule of DNA that the cell can copy and store

C. May have a changed shape and may not be able to function properly

D. Will become a source of energy that the cell uses during respiration

15. In the first step of making a protein, the information in a gene is used to build a molecule that then carries the instructions to the ribosomes. The molecule built in this first step is:

A. A new strand of DNA, which leaves the nucleus to direct the ribosomes

B. A lipid, which forms a protective coating around the genetic instructions

C. A carbohydrate, which supplies the energy needed to build the protein

D. Messenger RNA, which carries the gene's instructions to the ribosomes

16. A dog breeder repeatedly selects the gentlest, friendliest dogs to be the parents of each new litter, and over many generations the dogs become calmer and more friendly. This is an example of:

A. Natural selection, in which the environment determines which dogs survive

B. Selective breeding, in which humans choose which animals will reproduce

C. Cloning, in which an exact genetic copy of one dog is produced in a lab

D. Mutation, in which random changes in DNA create the friendly behavior

17. Scientists can give an organism a new trait by inserting a gene from a different organism into its DNA. This technology, in which genes are moved from one organism into another, is known as:

A. Genetic engineering, in which genes are transferred between organisms

B. Natural selection, in which the best-suited organisms survive and reproduce

C. Sexual reproduction, in which two parents combine their genetic material

D. Ecological succession, in which a community changes gradually over time

18. In rabbits, brown fur (B) is dominant over white fur (b). A breeder crosses a homozygous brown rabbit (BB) with a white rabbit (bb). What is expected for the fur color of the offspring?

A. Half of the offspring will be brown and the other half will be white

B. Three-fourths of the offspring will be brown and one-fourth will be white

C. All of the offspring will be brown because each inherits one B allele

D. All of the offspring will be white because each inherits one b allele

19. Human ABO blood type is controlled by a gene that has more than two possible alleles in the population, even though each person carries only two of them. A gene that has more than two possible forms in a population is said to have:

A. A single allele, because every individual has the exact same version

B. Multiple alleles, because more than two forms exist within the population

C. No alleles, because blood type is determined only by the environment

D. Identical alleles, because all forms of the gene produce the same blood type

20. A recessive disorder is carried on the X chromosome. A woman who is a carrier (but not affected) has children with a man who is not affected. For their sons, the probability of inheriting the disorder is:

A. 0%, because sons always inherit a normal X chromosome from their father

B. 100%, because all sons of a carrier mother will inherit the disorder

C. 25%, because only one in four of all the children will be affected sons

D. 50%, because each son has an equal chance of receiving the affected X

21. In a population of beetles, some are green and some are brown. The brown beetles blend in with the soil and are eaten less often by birds than the green beetles. Over many generations, this difference in survival will most likely cause:

A. The brown beetles to become more common in the population over time

B. The green beetles to become more common because they are easier to see

C. Both colors to remain in exactly equal numbers forever in the population

D. The beetles to stop reproducing entirely to avoid being eaten by birds

22. The forelimbs of a cat, a whale, and a bat have very different uses but contain the same basic set of bones arranged in a similar pattern. Biologists interpret this similarity as evidence that these animals:

A. Live in the same habitat and developed the same bones by pure chance

B. Are members of the exact same species despite their different appearances

C. Inherited the same bone pattern from a shared common ancestor

D. Evolved their similar bones completely independently of one another

23. Two populations of squirrels become separated by a wide canyon and stop exchanging genes. Which additional outcome must occur for the two populations to be considered separate species?

A. They must both move back together and live in the same area once again

B. They must remain genetically identical despite being separated for so long

C. They must increase to exactly the same population size on each side

D. They must become unable to interbreed and produce fertile offspring together

24. A geologist examining layers of undisturbed sedimentary rock finds simpler fossils in the deeper layers and more complex fossils in the upper layers. This pattern provides evidence that:

A. All living things appeared on Earth at exactly the same point in time

B. Life on Earth has changed over time, with newer forms appearing later

C. Complex organisms existed on Earth long before any simple organisms

D. Fossils form only in the deepest layers and never in the upper ones

25. A single oak tree may release thousands of acorns in a year, yet only a few ever grow into mature trees. From the standpoint of natural selection, the acorns that do grow into trees are most likely those that:

A. Happened to land in conditions well suited to their survival and growth

B. Were chosen by the parent tree to be the only ones allowed to grow

C. Contained completely different genes from every other acorn produced

D. Were the very last acorns to fall from the tree at the end of the season

26. In a simple food chain, grass is eaten by a rabbit, and the rabbit is eaten by a fox. The arrows in a diagram of this food chain would point in the direction that:

A. The organisms physically move as they travel around their habitat

B. Water flows as it cycles through the living parts of the ecosystem

C. Energy flows, from the grass to the rabbit and then to the fox

D. The organisms first appeared in time during the history of life

27. Mushrooms growing on a rotting log obtain their nutrients by breaking down the dead wood. Based on how they obtain nutrients, mushrooms are best classified as:

A. Producers, because they make their own food using energy from the Sun

B. Decomposers, because they break down dead matter to obtain nutrients

C. Primary consumers, because they feed directly on living green plants

D. Top predators, because they hunt and capture other living organisms

28. Bees visit flowers to gather nectar for food, and as they move from flower to flower they carry pollen that the plants need to reproduce. Because both the bees and the plants benefit, this relationship is an example of:

A. Competition, in which the bees and plants struggle over the same resource

B. Predation, in which the bees capture and consume the flowering plants

C. Parasitism, in which the bees benefit while seriously harming the plants

D. Mutualism, in which both the bees and the flowering plants benefit

29. A population of fish in a lake grows rapidly and then levels off at a fairly steady number that the lake's resources can support. This steady number is known as the lake's:

A. Carrying capacity, the largest population the environment can support

B. Biotic potential, the fastest possible rate at which the fish could breed

C. Pioneer stage, the earliest community to appear in a new environment

D. Trophic level, the feeding position the fish occupy in the food chain

30. A population of plants in a desert is unable to grow beyond a certain size, mainly because there is very little rainfall. In this desert ecosystem, the scarce water is best described as a:

A. Producer that supplies energy to the plants at the base of the food chain

B. Decomposer that recycles nutrients from dead plants back into the soil

C. Limiting factor that restricts how much the plant population can grow

D. Climax community that represents the final, stable stage of succession

31. A species of fish is introduced into a lake where it has no natural predators. It reproduces rapidly and eats the eggs of the native fish, causing the native fish populations to decline. The introduced fish is acting as a(n):

A. Producer that increases the total amount of food available in the lake

B. Decomposer that recycles the nutrients found in the native fish eggs

C. Keystone species that the entire lake ecosystem depends upon to survive

D. Invasive species that disrupts the balance of the native lake ecosystem

32. When a large area of forest is cleared, many of the animals that depended on the trees for food and shelter disappear from the area. This loss of living space for organisms is best described as:

A. Succession, in which one community gradually replaces another over time

B. Habitat destruction, in which organisms lose the living space they need

C. Eutrophication, in which excess nutrients deplete the oxygen in water

D. Natural selection, in which the best-suited organisms survive and reproduce

33. After a person eats a candy bar, the level of glucose in the blood rises. To keep the blood glucose level from staying too high, the pancreas releases a hormone that signals body cells to take in glucose. This hormone is:

A. Adrenaline, which prepares the body to respond to sudden danger or stress

B. Glucagon, which raises blood glucose by releasing stored sugar from the liver

C. Insulin, which lowers blood glucose by signaling cells to take in glucose

D. Thyroxine, which controls the overall rate of metabolism in body cells

34. Blood travels through a network of vessels in the human body, carrying materials to and from the cells. One important material the blood delivers to the body's cells is:

A. Oxygen, which the cells need in order to release energy from food

B. Sunlight, which the cells use directly to manufacture their own food

C. Soil nutrients, which the cells absorb to build new genetic material

D. Pollen, which the cells use to reproduce and form new organisms

35. As cells carry out their life processes, they produce wastes that can be harmful if they build up. The excretory system, including the kidneys, helps the body by:

A. Pumping blood through the vessels to deliver oxygen to all of the cells

B. Breaking down large food molecules into smaller, absorbable nutrients

C. Sending electrical messages that allow the body to respond to its surroundings

D. Removing wastes from the body to keep the internal environment stable

36. The inside of each human lung is divided into millions of tiny air sacs rather than forming one large open space. This arrangement benefits the body because it:

A. Reduces the amount of surface area, which slows the exchange of gases

B. Allows the lungs to store oxygen for several days at a time without breathing

C. Prevents carbon dioxide from ever leaving the blood and entering the lungs

D. Greatly increases the surface area available for the exchange of gases

37. The human body is constantly exposed to bacteria and viruses that can cause disease. The body system mainly responsible for defending against these disease-causing organisms is the:

A. Digestive system, which breaks down food into absorbable nutrients

B. Circulatory system, which transports oxygen and nutrients to the cells

C. Immune system, which defends the body against disease-causing organisms

D. Skeletal system, which supports the body and protects its internal organs

38. A person steps from a warm room into freezing cold air, and within seconds begins to shiver. The shivering, which generates heat, is triggered by the nervous system to help the body:

A. Maintain a stable internal temperature despite the cold surroundings

B. Lower its internal temperature to match the cold air outside the body

C. Stop all of its chemical reactions until the person returns to the warm room

D. Permanently change its DNA so the person can survive in the cold

39. A fertilized human egg divides many times, and the resulting cells gradually develop into different types, such as muscle, nerve, and blood cells. The process by which cells become specialized for particular jobs is called:

A. Fertilization, in which a sperm cell and an egg cell join into one cell

B. Excretion, in which the body removes the wastes produced by its cells

C. Respiration, in which the cells release the energy stored in food molecules

D. Differentiation, in which cells develop into specialized types for specific jobs

40. In an energy pyramid, the producers at the bottom contain far more available energy than the top-level consumers at the top. The best explanation for this difference is that:

A. Producers reproduce far more slowly than the consumers above them

B. Energy is created at the top of the pyramid and used up at the bottom

C. Energy is lost at each level, so less is available at each higher level

D. Top consumers are much larger and therefore store the most energy

41. A scientist tests how the concentration of salt in water affects the survival of brine shrimp. She places shrimp in solutions with different salt concentrations and counts how many survive. In this experiment, the salt concentration is the:

A. Dependent variable, the factor measured as the result of the experiment

B. Independent variable, the factor the scientist deliberately changes

C. Control group, the group that receives no treatment for comparison

D. Constant, a factor kept exactly the same in every part of the experiment

42. In an experiment testing a new plant food, one group of plants receives the plant food and another identical group receives none. The purpose of including the group that receives no plant food is to:

A. Provide a comparison that shows whether the plant food made a difference

B. Make sure that all of the plants in the experiment grow as tall as possible

C. Guarantee that every plant in the experiment survives until the very end

D. Prove that the scientist's hypothesis was correct before collecting any data

43. Three different research teams in different parts of the world perform the same experiment and all obtain very similar results. Because the results can be repeated by others, scientists consider the results to be:

A. Incorrect, because the same result should never occur in different places

B. Unimportant, because results only matter if they come from a single team

C. Impossible, because no two experiments can ever produce the same result

D. Reliable, because results that can be repeated are more trustworthy

44. A student needs to measure the exact volume of a liquid sample for an experiment. The most appropriate tool for measuring the volume of a liquid is a:

A. Balance, which measures the mass of an object placed on its pan

B. Thermometer, which measures the temperature of a substance or surroundings

C. Graduated cylinder, which measures the volume of a liquid sample

D. Microscope, which magnifies very small objects so they can be seen

45. In an ecosystem, the atoms that make up living things are used over and over again, while energy must be constantly resupplied. Which statement correctly describes this difference?

A. Both matter and energy are recycled endlessly and never need resupplying

B. Matter is recycled within the ecosystem, while energy flows through and is lost

C. Energy is recycled within the ecosystem, while matter flows through and is lost

D. Both matter and energy flow through the ecosystem once and are then lost

46. Scientists group organisms based on shared characteristics. Two organisms that are classified into the same kingdom, phylum, and class are expected to:

A. Share many characteristics because they are closely related to each other

B. Share no characteristics at all despite being grouped closely together

C. Be unable to survive in any of the same kinds of environments

D. Be completely unrelated even though they are placed in the same groups

47. Bacteria can reproduce very rapidly, with a single bacterium dividing into two every twenty minutes under good conditions. This rapid reproduction is important to understand because it allows a bacterial population to:

A. Stop growing entirely as soon as antibiotics are introduced to it

B. Become a multicellular organism with many specialized tissues

C. Convert itself into a virus when conditions become unfavorable

D. Increase in number quickly and spread resistance traits through the population

48. A person with a cold caused by a virus is told that antibiotics will not help. The reason antibiotics do not work against the cold virus is that:

A. Viruses lack the cell structures and processes that antibiotics are designed to attack

B. Viruses are much too large for the antibiotic molecules to reach inside the body

C. Antibiotics make viruses reproduce more quickly instead of stopping them

D. Viruses are already dead, so there is nothing left for the antibiotic to destroy

49. Scientists encourage protecting the wide variety of species found in rainforests partly because some of those species are sources of medicines, foods, and other useful products. This reasoning highlights that biodiversity:

A. Has no real value to humans and should be reduced wherever possible

B. Can provide humans with valuable resources such as medicines and foods

C. Always makes ecosystems weaker and less able to recover from disturbance

D. Is important only in rainforests and has no value in any other ecosystem

50. A coastal town is deciding whether to allow a large amount of new development along its shoreline. To make a responsible long-term decision, the town should mainly consider:

A. Only the immediate profits that the new development would create this year

B. The benefits of the development weighed against its impact on the environment

C. Only the opinions of the developers who want to build along the shoreline

D. Nothing at all, since human activities cannot affect the coastal environment

ANSWER KEY – Practice Exam 7: Life Science: Biology Simulation

1. D — A theory is a well-supported explanation backed by a large body of evidence that ties together many observations. Unlike a hypothesis, which is a tentative and untested idea, a theory has withstood extensive testing. This is why scientific theories carry great explanatory weight.
2. B — Organisms obtain and use energy to power life processes such as growth, movement, and reproduction. Energy is required to keep these activities going. Without a constant energy supply, an organism could not sustain the functions of life.
3. C — Proteins are built from amino acids linked together in a specific order, which determines the protein's shape and function. Each macromolecule has its own building block, and amino acids are the units of proteins. The correct order of amino acids is essential to how a protein works.
4. A — Enzymes speed up reactions by lowering the energy needed to start them, allowing reactions to proceed quickly at body temperature. This catalytic role lets cells carry out thousands of reactions fast enough to support life. Enzymes are not used up and can act repeatedly.
5. C — Mitochondria release energy from food molecules in the form of ATP, so a cell with many mitochondria has a high demand for energy. The large number matches the cell's high activity level. Structure reflects function in energy-demanding cells.
6. C — The cell wall is the rigid structure surrounding the membrane of a plant cell, providing support and shape that animal cells lack. Its rigidity helps the plant cell keep its form. This feature distinguishes plant cells from animal cells.
7. D — Moving a substance against its concentration gradient, from lower to higher concentration, requires active transport, which uses energy. Diffusion and osmosis move particles only down their gradients without energy. The need for energy is what makes this uphill movement possible.
8. B — In photosynthesis, light energy from the Sun is converted into chemical energy stored in the bonds of glucose. This energy transformation captures sunlight in a usable chemical form. The stored chemical energy later powers living things.
9. C — Aerobic respiration uses glucose and oxygen as its reactants, breaking glucose down to release usable energy. These inputs are combined to produce carbon dioxide, water, and ATP. Identifying glucose and oxygen as reactants is key to understanding the process.
10. A — Decomposition returns carbon to the environment, releasing carbon dioxide to the air and nutrients to the soil so living things can use them again. This recycling keeps carbon cycling through the ecosystem. Without it, carbon would remain locked in dead matter.
11. D — Mitosis produces two cells that each have the same chromosome number as the original, so a 46-chromosome cell yields cells with 46 chromosomes each. This maintains genetic continuity for growth and repair. Halving the number occurs in meiosis, not mitosis.
12. B — The random sorting of chromosomes during meiosis (independent assortment) gives each sex cell a different combination, increasing genetic variation among offspring. This variety is a major benefit of sexual reproduction. Such variation provides material for natural selection.
13. A — DNA is copied before division so that each new cell receives a complete and identical set of genetic instructions. Without this copying, the daughter cells could not both have a full genome. Accurate copying preserves genetic continuity.
14. C — Adding the wrong amino acid can change a protein's shape, and because shape determines function, the protein may no longer work properly. The link between sequence, shape, and function explains this outcome. This shows how a small mutation can have a large effect.

15. D — In the first step of protein synthesis, the gene's information is used to build messenger RNA, which carries the instructions to the ribosomes. This step is transcription. The mRNA serves as the message that the ribosome later reads.
16. B — Choosing which animals reproduce in order to promote desired traits is selective breeding, a human-directed process. Over generations, this shifts the traits of the population, as with calmer dogs. It relies on existing variation rather than altering DNA directly.
17. A — Genetic engineering transfers genes from one organism into another to give it a new trait. This direct movement of genes distinguishes it from breeding or natural processes. It allows organisms to gain traits they could not acquire naturally.
18. C — Crossing homozygous brown (BB) with white (bb) produces all Bb offspring, each carrying one dominant B allele, so all are brown. The single dominant allele determines the brown phenotype. No white offspring are possible from this cross.
19. B — A gene with more than two possible forms in a population, like the ABO blood-type gene, is said to have multiple alleles. Although each person carries only two, several versions exist across the population. Multiple alleles increase the variety of possible genotypes.
20. D — A carrier mother has one affected X and one normal X, so each son has a 50% chance of inheriting the affected X and the disorder. Sons receive their single X from the mother. This 50% risk is typical of X-linked recessive inheritance through a carrier mother.
21. A — Because brown beetles survive predation better, they reproduce more and become more common in the population over generations. Natural selection favors the better-camouflaged individuals. This differential survival shifts the population toward brown coloration.
22. C — The shared bone pattern in differently used forelimbs indicates that the animals inherited that pattern from a common ancestor. These homologous structures point to shared ancestry. Such anatomical evidence supports evolutionary relationships.
23. D — To be separate species, the two populations must become unable to interbreed and produce fertile offspring. Geographic separation alone is not enough; reproductive isolation must develop. This inability to interbreed is the defining criterion of separate species.
24. B — Simpler fossils in deeper (older) layers and more complex fossils in upper (newer) layers show that life has changed over time, with newer forms appearing later. This pattern records the gradual change of life. It provides strong evidence for evolution.
25. A — The surviving acorns are most likely those that happened to land in conditions well suited to their growth and survival. Natural selection acts on which individuals survive in their environment. This illustrates how chance circumstances and fitness shape survival.
26. C — Food-chain arrows point in the direction that energy flows, from the organism being eaten to the one that eats it. They trace the movement of food energy through the community. Reading the arrows correctly shows how energy moves up the chain.
27. B — Mushrooms that obtain nutrients by breaking down dead wood are decomposers. They recycle the nutrients in dead matter back into the ecosystem. This mode of feeding distinguishes decomposers from producers and consumers.
28. D — Because both the bees and the plants benefit, with bees getting food and plants getting pollinated, the relationship is mutualism. Both partners gain an advantage. This reciprocal benefit defines mutualism.
29. A — The steady maximum number a lake's resources can support is its carrying capacity. A population that grows and then levels off has reached this limit. Carrying capacity explains why populations cannot grow indefinitely.

30. C — Scarce water that restricts how large the desert plant population can grow is a limiting factor. Such factors hold a population below unlimited growth. Limiting factors keep populations near the environment's capacity.
31. D — A non-native fish that spreads rapidly without predators and harms native species is an invasive species. Its disruption of the native ecosystem is the hallmark of invasive behavior. Such species can severely unbalance the communities they enter.
32. B — Clearing forest and removing the living space organisms depend on is habitat destruction. The loss of habitat causes the animals to disappear from the area. This destruction is a major threat to wildlife.
33. C — Insulin is the hormone the pancreas releases when blood glucose rises, signaling cells to take in glucose and lowering blood sugar. Its action opposes that of glucagon. This response is part of the body's homeostatic control of blood sugar.
34. A — Blood delivers oxygen to the body's cells, which the cells need to release energy from food during respiration. This delivery is a central role of the circulatory system. Oxygen transport supports the energy needs of every cell.
35. D — The excretory system, including the kidneys, removes wastes from the body to keep the internal environment stable. This waste removal helps maintain homeostasis. Without it, harmful wastes would build up in the body.
36. D — Dividing the lungs into millions of tiny air sacs greatly increases the surface area available for gas exchange. More surface area lets oxygen and carbon dioxide be exchanged efficiently. This structure supports effective breathing.
37. C — The immune system is the body system mainly responsible for defending against disease-causing bacteria and viruses. It recognizes and fights off pathogens. This defense protects the body from infection.
38. A — Shivering generates heat to help the body maintain a stable internal temperature despite the cold surroundings. The nervous system triggers this response to counteract heat loss. Keeping temperature steady is an example of homeostasis.
39. D — Differentiation is the process by which the cells from a fertilized egg develop into specialized types such as muscle, nerve, and blood cells. This specialization allows one cell to give rise to a complex body. It is essential to development.
40. C — Producers hold more available energy than top consumers because energy is lost at each level, leaving less for each higher level. This loss is why the base of the pyramid has the most energy. It also limits the length of food chains.
41. B — The salt concentration is the independent variable because it is the factor the scientist deliberately changes. The number of surviving shrimp measured in response is the dependent variable. Identifying the manipulated factor is key to the experiment's design.
42. A — The untreated group provides a comparison that shows whether the plant food actually made a difference. This control establishes a baseline against which the treated group is measured. A proper control is essential for valid conclusions.
43. D — Results that can be repeated by independent teams are considered reliable, because reproducibility increases trust in the findings. Consistent results across labs strengthen confidence. Reproducibility is a cornerstone of sound science.
44. C — A graduated cylinder is the appropriate tool for measuring the volume of a liquid sample. It is designed to read liquid volumes accurately. Other tools measure mass, temperature, or magnification instead.

45. B — In an ecosystem, matter is recycled and reused while energy flows through and is ultimately lost as heat. This contrast captures a fundamental rule of ecosystem function. Recognizing that matter cycles but energy flows is essential to understanding ecology.
46. A — Organisms grouped together in the same kingdom, phylum, and class share many characteristics because they are closely related. The closer the classification, the more traits and ancestry shared. This reflects how classification is based on relatedness.
47. D — Rapid bacterial reproduction allows a population to increase in number quickly and spread traits such as antibiotic resistance throughout the population. Fast division means advantageous traits can become common rapidly. This is why resistance can spread so quickly.
48. A — Antibiotics target cell structures and processes found in bacteria, which viruses lack, so they cannot act on viruses. Because viruses differ fundamentally from bacteria, antibiotics are ineffective against them. This is why antibiotics do not treat colds.
49. B — Protecting biodiversity is valuable in part because diverse species can provide humans with resources such as medicines and foods. The variety of life is a source of useful products. This practical benefit is one reason to preserve biodiversity.
50. B — A responsible long-term decision requires weighing the benefits of the development against its impact on the environment. Considering both sides leads to a balanced choice. Evaluating such trade-offs is central to sound environmental decision-making.