Practice Test #1

Practice Questions

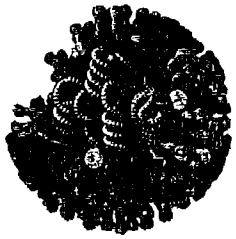
1. Scientists have discovered a single-celled organism, and need to classify it as either a prokaryote or a eukaryote. Which of the following structures, if present, would indicate that the organism is a eukaryote?

a. mitochondria
b. DNA
c. plasma membrane
d. cytoplasm

2. Cell membranes are selectively permeable. Some solutes move freely across cell membranes, while other solutes require assistance from special gates. Passive transport and active transport are methods of moving solutes across cell membranes. Which of the following accurately describes the difference between passive transport and active transport?

a. Passive transport can move molecules both in and out of a cell, but active transport cannot.
b. Passive transport works against a concentration gradient, but active transport does not.
c. Passive transport does not require energy, but active transport does.
d. Passive transport requires carrier proteins, but active transport does not.

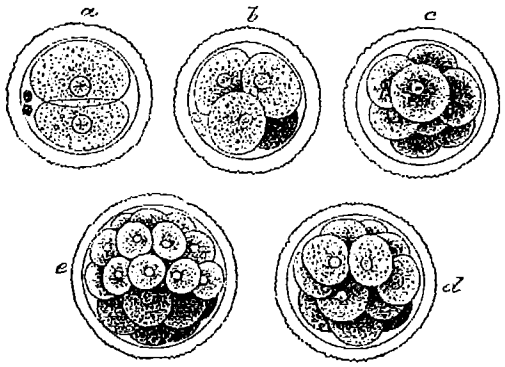
3. The U.S. Centers for Disease Control released this 3-D graphical representation of the H1N1 influenza virus. Approximately five million Americans were infected with this virus during a four-month period in 2009.



Which of the following is NOT true of the H1N1 virus?

a. It cannot reproduce on its own.
b. It lacks ribosomes.
c. It lacks both DNA and RNA.
d. It does not grow or undergo division.

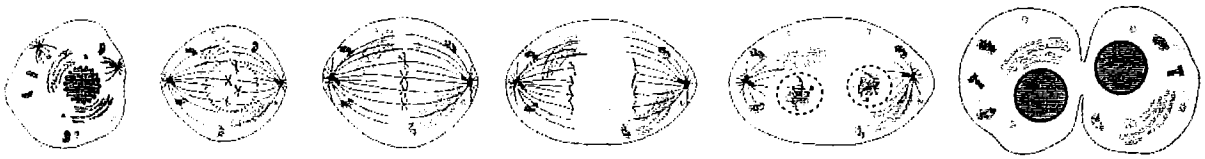
4. During human fertilization, a single-celled zygote is formed. This cell divides, and the daughter cells continue to divide until an embryo is formed.



Which of the following BEST describes this process of cell division?

a. It produces daughter cells with half the number of chromosomes as the parent cell.
b. It takes place during the S phase of interphase.
c. It takes place during the G_1 phase of interphase.
d. It produces daughter cells with the same number of chromosomes as the parent cell.

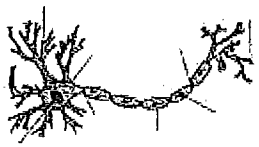
5. Most of the cells in the human body continually undergo mitosis so that dead or damaged cells can be replaced. The diagram below shows the phases of mitosis.



Which of the following lists the four basic phases of mitosis in the order in which they occur?

a. prophase, metaphase, anaphase, telophase
b. interphase, prophase, anaphase, telophase
c. interphase, metaphase, prophase, telophase
d. metaphase, anaphase, telophase, prophase

6. The nervous system of an adult human consists of more than one billion nerve cells. The diagram below shows a typical neuron.



Which of the following BEST describes the functions of the neuron's structures?

a. Dendrites carry impulses toward the cell body, and axons carry impulses away from the cell body.
b. Axons carry impulses toward the cell body, and dendrites carry impulses away from the cell body.
c. Both dendrites and axons carry impulses toward the cell body.
d. Both dendrites and axons carry impulses away from the cell body.

7. Which of the following is NOT a difference between normal cell division and cancer cell division?

a. Normal cells recognize signals that tell them to stop and start the cell cycle, but cancer cells do not.
b. Normal cells can invade other tissues, but cancer cells cannot.
c. In normal cells DNA is replicated correctly, but in cancer cells DNA is mutated.
d. Normal cells communicate with each other, but cancer cells do not.

8. Pepsin is an enzyme produced by the lining of the stomach that aids in the digestion of proteins. Which of the following BEST describes the role of pepsin in protein digestion?

a. Pepsin separates the nucleotides in base pairs.
b. Pepsin severs the peptide bonds between amino acids.
c. Pepsin separates the glycerol from fatty acids.
d. Pepsin separates the glucose from fructose.

9. Scientists often form hypotheses based on particular observations. Which of the following is NOT true of a good hypothesis?

a. A good hypothesis is complex.
b. A good hypothesis is testable.
c. A good hypothesis is logical.
d. A good hypothesis predicts future events.

10. During a lab activity, a biology student was instructed to examine various prepared slides under a microscope. The student noted his observations in the chart below.

Observation	Slide 1	Slide 2	Slide 3
Nuclear Membrane	Yes	No	Yes
Cell Membrane	Yes	Yes	Yes
Cell Wall	No	Yes	Yes
Chloroplast	No	No	Yes
Ribosome	Yes	Yes	Yes

Which of the following is a valid conclusion based on the student's observations?

a. Slides 1 and 2 are slides of eukaryotes, and slide 3 is a slide of a prokaryote.
b. All three slides are slides of eukaryotes.
c. Slides 1 and 3 are slides of eukaryotes, and slide 2 is a slide of a prokaryote.
d. Slides 1 and 3 are slides of prokaryotes, and slide 2 is a slide of a eukaryote.

11. A biology student completes a science fair project. The purpose of the student's project is to study the effect of soil pH on a specific type of tomato plant. She divides forty plants into four groups of ten, using one group as the control. She records her results in the table below.

Soil pH	Number of surviving plants (out of the original 10)
7	10
5	8
3	0
1	0

Which of the following is the BEST conclusion about the type of tomato plant the student used in this experiment based on the results shown in the table?

a. This type of tomato plant does best in basic soil.
b. This type of tomato plant does best in acidic soil.
c. This type of tomato plant does best in neutral soil.
d. This type of tomato plant is not affected by soil pH.

12. Deoxyribonucleic acid, DNA, is primarily found in the nuclei of human cells, and stores an individual's genetic information. Which of the following BEST describes the structure of DNA?

a. DNA is a single helix consisting of sugars, phosphates, and the bases adenine, thymine, guanine, and cytosine.
b. DNA is a single helix consisting of sugars, phosphates, and the bases adenine, uracil, guanine, and cytosine.
c. DNA is a double helix consisting of sugars, phosphates, and the bases adenine, thymine, guanine, and cytosine.
d. DNA is a double helix consisting of sugars, phosphates, and the bases adenine, uracil, guanine, and cytosine.

13. Bacteria are classified as prokaryotes because they do not contain membrane-bound nuclei. Which of the following is true of bacteria and the genetic information they contain?

a. Bacteria do not typically have DNA, but do have RNA.
b. Bacteria have DNA that is stored in plasmids located in the cytoplasm.
c. Bacteria have RNA that is stored in plasmids located in the cytoplasm.
d. Bacteria have DNA, which is typically stored in a single, circular chromosome. Some bacteria also have additional DNA in plasmids.

14. In order to survive, cells need to be able to successfully process, duplicate, and use the genetic information contained in their DNA molecules. Which of the following BEST describes the process of transcription?

a. During transcription, the cell copies genetic information from an RNA molecule onto a different RNA molecule.
b. During transcription, the cell copies genetic information from one DNA molecule onto a different DNA molecule.
c. During transcription, the cell copies genetic information from a DNA molecule onto an RNA molecule.
d. During transcription, the cell copies genetic information from an RNA molecule onto a DNA molecule.

15. Gene expression is a highly regulated process. Which of the following BEST describes the starting point of this process?

a. Gene expression begins with the transcription of a DNA molecule to an RNA molecule.
b. Gene expression begins with the translation of amino acids into a protein molecule.
c. Gene expression begins with the translocation of nonhomologous chromosomes.
d. Gene expression begins with point mutations of specific nucleotides.

16. Random and permanent changes in DNA are called mutations. Which of the following is the term used to describe a mutation in which a segment of a chromosome breaks off and reattaches in the same position, but the order of the genes is reversed?

a. substitution
b. translocation
c. inversion
d. deletion

17. In the 1900s, Gregor Mendel, an Austrian monk, experimented with pea plants in his garden. The Punnett square below shows the genetic combinations that could have resulted when he crossed a pure tall pea plant (TT) with a hybrid tall pea plant (Tt).

	T	T
T	TT	TT
t	Tt	??

Which of the following correctly completes the square?

a. TT
b. tt
c. Tt
d. none of the above

18. Hedgehogs have 88 chromosomes in their somatic cells. If one of these cells undergoes meiotic cell division, how many chromosomes will each daughter cell contain?

a. 88
b. 44
c. 176
d. 22

19. Black hair is dominant over white hair in rabbits. If a heterozygous, black-haired male is crossed with a white-haired female, what is the probability that their offspring will have white hair?

a. 100%
b. 75%
c. 50%
d. 0%

20. Certain flowers exhibit non-Mendelian inheritance patterns. Japanese four o'clock plants exhibit incomplete dominance. If a Japanese four o'clock plant with red flowers is crossed with a Japanese four o'clock plant with white flowers, what will MOST LIKELY be the outcome?

a. All of the offspring will have pink flowers.
b. All of the offspring will have red flowers.
c. All of the offspring will have white flowers.
d. Half of the offspring will have red flowers, and half will have white flowers.

21. Which of the following is MOST associated with the stage of mitosis known as metaphase?

a. The cell's chromosomes are lined up along the equatorial plane.
b. The nucleolus is dismantled.
c. The chromatids are moved to opposite ends of the cell.
d. The cell's DNA is replicated.

22. Which of the following is true of skeletal muscle tissue?

a. Skeletal muscle tissue consists of elongated, spindle-shaped cells, each of which contains a single nucleus.
b. Skeletal muscle tissue consists of cross-striated, quadrangular cells, each of which contains a single nucleus.
c. Skeletal muscle tissue consists of striated, cylindrical fibers, each of which contains nuclei located towards the outer edges of the fiber.
d. Skeletal muscle tissue consists of tightly packed, cuboidal cells, each of which contains a single nucleus.

23. Comparison of the anatomy of different species of mammals reveals that many mammals have similar skeletal structures. Which of the following is the MOST LIKELY explanation for these similarities?

a. The similarities are most likely due to similar reproductive processes.
b. The similarities are most likely due to a common ancestor.
c. The similarities are most likely due to a common environment.
d. The similarities are most likely due to a common food source.

24. The Northern Flicker is a medium-sized member of the woodpecker family. Red-shafted flickers live on the West Coast, and yellow-shafted flickers live on the East Coast. Which of the following is the MOST LIKELY explanation for these color differences?

a. The color differences are most likely due to natural selection.
b. The color differences are most likely due to different ancestors.
c. The color differences are most likely due to different environments.
d. The color differences are most likely due to different food sources.

25. Two companion models, gradualism and punctuated equilibrium, dominate evolutionary theory. Which of the following statements is MOST consistent with the theory of punctuated equilibrium?

a. Fossils show changes over large periods of time.
b. Fossils showing intermediate characteristics may not necessarily be found.
c. Speciation occurs gradually.
d. Evolution is a slow, steady process.

26. Carolus Linneaus was a Swedish naturalist who devised the binomial naming system used in taxonomy today. According to the seven category system devised by Linnaeus, which of the following is the broadest category?

a. order
b. genus
c. family
d. class

27. Today, many biologists classify organisms as members of one of six kingdoms: **Animalia, Plantae, *Fungi*, *Protista*, *Archaea*, and *Bacteria***. Which of the following is true of organisms that are part of Kingdom Plantae (plants)?

a. They are multicellular and autotrophic.
b. They are multicellular and heterotrophic.
c. They are unicellular and autotrophic.
d. They are unicellular and heterotrophic.

28. According to modern taxonomic classification, which of the following organisms are MOST CLOSELY related?

a. roses and toadstools
b. Gila monsters and clams
c. bacteria and paramecia
d. sponges and bacteria

29. If an individual was describing various organisms using a six kingdom classification system, which of the following statements would BEST describe fungi?

a. All fungi are unicellular heterotrophs.
b. All fungi are macroscopic, and use spores to reproduce.
c. All fungi are heterotrophs, and use spores to reproduce.
d. All fungi are unicellular decomposers.

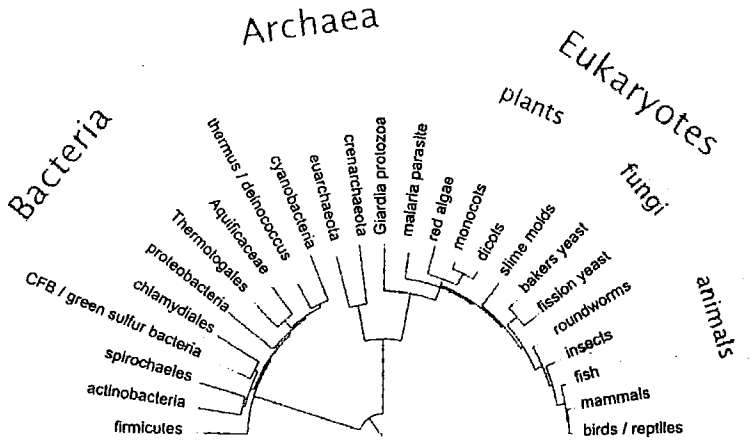
30. All organisms can be classified as either prokaryotic or eukaryotic. Which of the following kingdoms contain ONLY eukaryotes?

a. Bacteria and Protista
b. Bacteria and Archaea
c. Protista and Fungi
d. Fungi and Archaea

31. Many organisms have some of the same characteristics. Which of the following terms is used to describe shared characteristics that are due to a common ancestor?

a. homogenous
b. heterogeneous
c. heterologous
d. homologous

32. The diagram below is a modern form of the tree of life based on genetic analyses.



According to this diagram, which of the following groups of organisms have the MOST SIMILAR evolutionary history?

a. red algae and baker's yeast
b. insects and slime molds
c. monocots and dicots
d. firmicutes and euryarchaeota

33. Photosynthesis is a complex process that produces glucose for plants. Which of the following is the source of the carbon found in these glucose molecules?

a. carbon monoxide in the air
b. carbon dioxide in the air
c. carbon atoms from organic material in the soil
d. carbon atoms from minerals in ground water

34. Enzymes play an important role in the processes that help organisms stay healthy and survive. Which of the following BEST describes enzymes?

a. Enzymes are protein molecules that act as biological catalysts.
b. Enzymes are fat-soluble organic compounds with specific physiological functions.
c. Enzymes are strong acids that break down large biomolecules.
d. Enzymes are lipids that store energy.

35. All animal cells need nutrients to survive. Which of the following BEST explains what happens to nutrients once they cross the cell membrane?

a. Nutrients are transported by proteins to the nucleus for storage.
b. Nutrients are transported by proteins to a Golgi complex for packaging and shipping.
c. Nutrients are transported by proteins to mitochondria to be processed into glucose and ATP.
d. Nutrients are transported to the ribosomes to build proteins.

36. Biomass pyramids, energy pyramids, and number pyramids are visual representations of information about ecosystems. Which of the following statements is true of biomass pyramids?

a. Biomass pyramids show the total energy flow in an ecosystem.
b. Biomass pyramids are never inverted.
c. Biomass pyramids are inverted for aquatic ecosystems.
d. Biomass pyramids indicate the number of each type of organism in an ecosystem.

37. Camels have many adaptations that enable them to survive in their harsh desert environment.

Which of the following adaptations would MOST LIKELY protect camels from blowing sand?

a. two rows of long eyelashes
b. fat stored in the hump
c. thick, leathery patches on the knees
d. thick fur and under wool

38. Plants and animals have several levels of organization. Which of the following is a correct statement about these levels of organization?

a. Tissues make up cells, which make up organs.
b. Cells make up organs, which make up tissues.
c. Organs make up tissues, which make up cells.
d. Cells make up tissues, which make up organs.

39. During a laboratory investigation, students examined the effect of carbon dioxide concentration on the rate of photosynthesis in an aquatic plant. Students took 20 stems from an aquatic plant and submerged them in separate test tubes of pond water. Sodium bicarbonate was added to 10 of the test tubes to increase the level of carbon dioxide in the tubes. All test tubes were placed 10 cm away from the light source. The rate of photosynthesis was determined by counting the number of bubbles produced in one minute. The number of bubbles counted by both groups was averaged, and the results were recorded in the table below.

Average number of bubbles produced in one minute (no sodium bicarbonate added to test tube)	Average number of bubbles produced in one minute (sodium bicarbonate added to test tube)
190	252

Which of the following inferences can be made based on the information provided above?

a. The rate of photosynthesis increases exponentially as carbon dioxide levels increase.
b. The rate of photosynthesis is unaffected by increases in carbon dioxide levels.
c. The rate of photosynthesis increases as the concentration of carbon dioxide increases.
d. The rate of photosynthesis decreases as the concentration of carbon dioxide increases.

40. Which of the following is NOT true of photosynthesis?

a. Every step of photosynthesis requires light.
b. Carbon dioxide enters the plant through stomata in the leaves and stems.
c. Water enters the plant through the root hairs in the soil.
d. Water may be produced during photosynthesis.

41. The transportation system in angiosperms consists of the vascular tissues xylem and phloem. Which of the following is true of xylem and phloem?

a. Xylem transports water and carbon dioxide up from the roots, and phloem transports oxygen down to the rest of the plant.
b. Xylem transports water and minerals up from the roots, and phloem transports glucose down to the rest of the plant.
c. Phloem transports water and carbon dioxide up from the roots, and xylem transports oxygen down to the rest of the plant.
d. Phloem transports water and minerals up from the roots, and xylem transports glucose down to the rest of the plant.

42. During a botany project, a student placed a clear plastic bag over a green potted plant for three days. Which of the following hypotheses might the student be trying to test?

a. Plants produce glucose during photosynthesis.
b. The color of light affects photosynthesis.
c. The amount of water a plant receives affects photosynthesis.
d. Plants lose water via transpiration through their leaves.

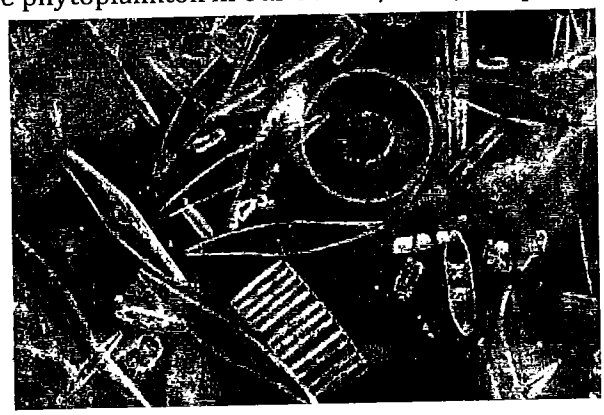
43. A group of biology students is investigating tropisms in plants. They are instructed to cut the tips off of nine radish seedlings and place them in petri dishes. Three of the seedlings have tips that are pointing down, three have tips that are pointing horizontally, and three have tips that are pointing up. Which of the following tropisms might the students be trying to investigate?

a. thigmotropism
b. phototropism
c. hydrotropism
d. gravitropism

44. Ecosystems are dynamic, and various factors—both biotic and abiotic—can have serious effects on their stability. Which of the following lists ONLY abiotic factors that can affect ecosystems?

a. temperature, soil pH, and types of producers
b. oxygen availability, amount of light, and amount of available water
c. floods, types of decomposers, and droughts
d. fires, types of autotrophs, and water salinity

45. Microorganisms play a vital role in Earth's ecosystems. Diatoms, as shown in the figure below, make up a large part of the phytoplankton in our oceans, lakes, and ponds.



Which of the following describes the typical role of phytoplankton in marine ecosystems?

a. Phytoplankton are primary consumers in nearly all marine food chains.
b. Phytoplankton are secondary consumers in nearly all marine food chains.
c. Phytoplankton are producers in nearly all marine food chains.
d. Phytoplankton are decomposers in nearly all marine food chains.

46. Ecological succession typically begins with a pioneer stage and ends with a climax stage. Which of the following BEST describes organisms in the climax stage?

a. Organisms in the climax stage are typically smaller than organisms in the pioneer stage.
b. Organisms in the climax stage typically have shorter life spans than organisms in the pioneer stage.
c. Organisms in the climax stage typically have simpler life cycles than organisms in the pioneer stage.
d. Organisms in the climax stage typically have lower metabolic rates than organisms in the pioneer stage.

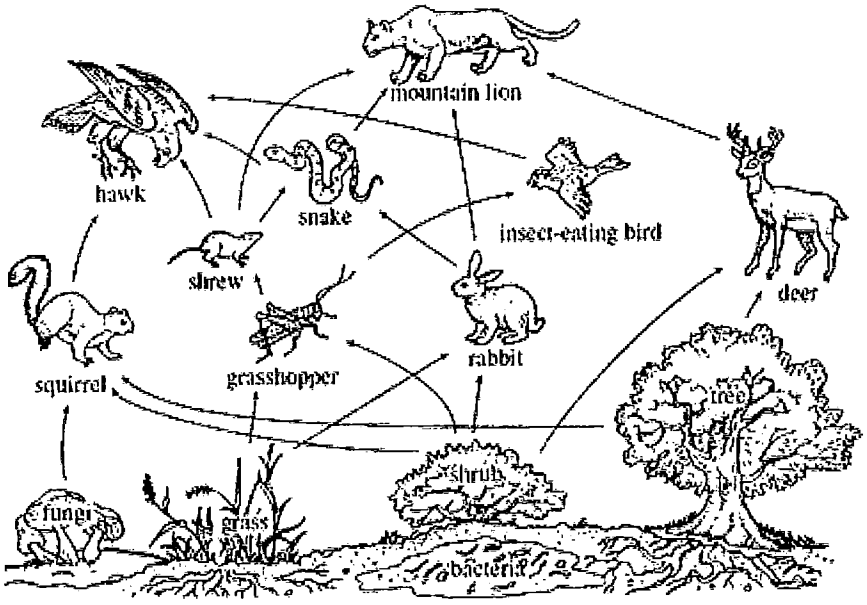
47. Organisms can interact with each other in many different ways in an ecosystem. For example, protozoans that live in the digestive tracts of termites help termites digest the cellulose in the wood that the termites consume. The termites and the protozoa could not survive without each other. Which of the following terms BEST describes this relationship?

a. mutualism
b. neutralism
c. competition
d. amensalism

48. Dolphins can survive because of their many adaptations. Which of the following adaptations helps dolphins conserve the oxygen they need to make long dives?

a. Dolphins work together to herd the fish they consume.
b. A dolphin's tail moves up and down to help propel the dolphin through the water.
c. A dolphin's heart beat slows during long dives, and blood is diverted to vital internal organs.
d. Dolphins have a layer of blubber, which provides insulation.

49. A forest food web is illustrated below.



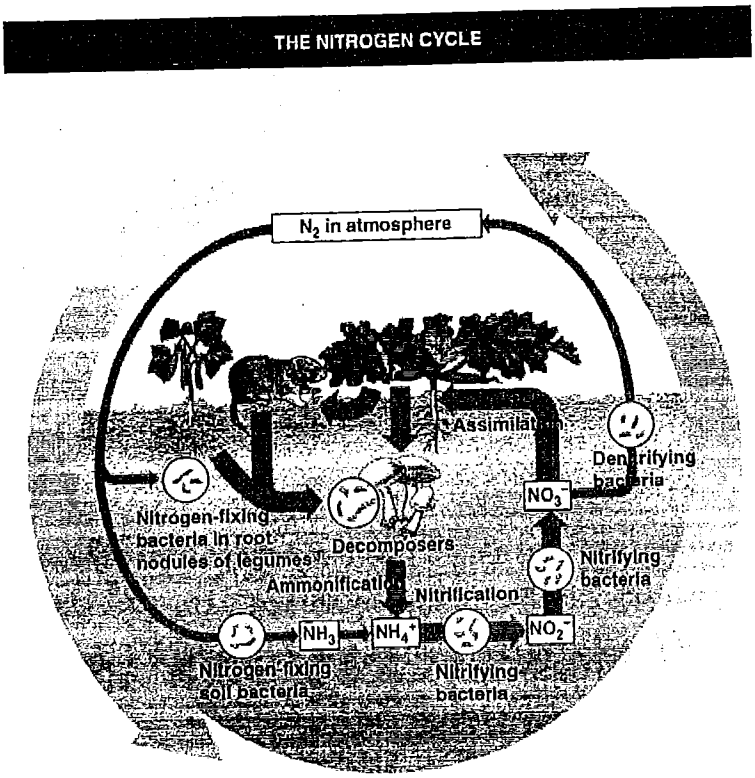
Which of the following describes how energy might flow through this food web?

a. mountain lion → snake → rabbit → shrub
b. squirrel → hawk → shrew → grasshopper
c. shrub → deer → mountain lion → hawk
d. grass → rabbit → snake → mountain lion

50. Ecosystems include herbivores, omnivores, and carnivores. Which of the following identifies the correct trophic level for carnivores?

a. primary consumers
b. secondary consumers
c. producers
d. decomposers

51. In an ecosystem, matter such as oxygen, carbon, and nitrogen is cyclic. Nitrogen is the most abundant of the gases that make up our atmosphere, and undergoes the processes shown in the figure below.



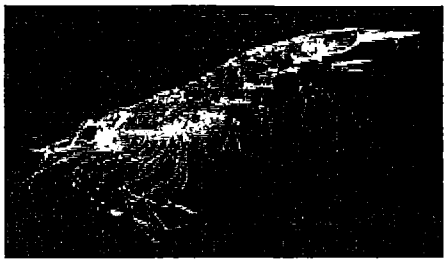
Which of the following is true of the nitrogen cycle?

a. Decomposers convert nitrogen into a form that organisms can use.
b. Nitrogen-fixing bacteria convert nitrogen into a form that organisms can use.
c. Denitrifying bacteria convert nitrogen into a form that organisms can use.
d. Atmospheric nitrogen exists in a form that organisms can use.

52. All organisms on Earth can be arranged into five levels of organization. Which of the following levels includes all of the other levels?

a. ecosystem
b. biosphere
c. population
d. community

53. Krill are small crustaceans that are found in all of the world's oceans. Krill feed on phytoplankton, and are an important food source for many carnivores.



According to the above description, which of the following terms BEST describes krill?

a. tertiary consumers
b. secondary consumers
c. producers
d. primary consumers

54. Ecosystems require energy at every level. Which of the following is NOT true of the energy in an ecosystem?

a. Energy in an ecosystem decreases with each trophic level.
b. Energy in an ecosystem is initially provided by the sun.
c. Energy in an ecosystem may be stored as fats, sugars, and starches.
d. Energy in an ecosystem increases as it moves through each step of a food chain.