

Inquiry Into Life, 16e, Mader
Chapter 1 The Study of Life

1) Organs are composed of tissues, which are composed of cells. This is an example of which characteristic of life?

- A) Living things grow and develop.
- B) Living things respond to stimuli.
- C) Living things maintain themselves by homeostasis.
- D) Living things have levels of hierarchical organization.
- E) Living things are adapted to the environment.

Answer: D

Explanation: Organs represent one level in the hierarchy of biological organization but they are a higher level of organization than either tissues or cells. The other answer choices are also characteristics of life; however, the example is concerned specifically with levels of organization.

Section: 01.01

Topic: Levels of Biological Organization

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.01 Identify the basic characteristics of life.

2) The smallest structural and functional unit in a multicellular organism is a(n)

- A) cell.
- B) tissue.
- C) organ.
- D) organ system.
- E) organism.

Answer: A

Explanation: The cell is the smallest structural and functional unit in a multicellular organism.

Section: 01.01

Topic: Levels of Biological Organization

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.02 Distinguish between the levels of biological organization.

3) Which level of biological organization is composed of several tissues?

- A) organism
- B) organ system
- C) organ
- D) cell
- E) molecules

Answer: C

Explanation: Organs are composed of tissues. Tissues are collections of cells, and cells are made up of various molecules. Organs make up organ systems, which comprise the organism.

Section: 01.01

Topic: Levels of Biological Organization

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.02 Distinguish between the levels of biological organization.

4) Which sequence correctly lists the different levels of biological organization, from the smallest and simplest to the largest and most complex?

- A) cells-organs-tissues-organ systems-organism
- B) cells-tissues-organ systems-organs-organism
- C) tissues-cells-organs-organ systems-organism
- D) tissues-organs-organ systems-organism-cells
- E) cells-tissues-organs-organ systems-organism

Answer: E

Explanation: The cell is the smallest unit of life. Cells are organized into tissues, which make up organs. A group of organs working together comprises an organ system. An individual organism contains multiple organ systems.

Section: 01.01

Topic: Levels of Biological Organization

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.02 Distinguish between the levels of biological organization.

5) Organs are composed of tissues, which are composed of cells. This is an example of which characteristic of life?

- A) Living things grow and develop.
- B) Living things respond to stimuli.
- C) Living things maintain themselves by homeostasis.
- D) Living things have levels of hierarchical organization.
- E) Living things are adapted to the environment.

Answer: D

Explanation: Organs represent one level in the hierarchy of biological organization but they are a higher level of organization than either tissues or cells. The other answer choices are also characteristics of life; however, the example is concerned specifically with levels of organization.

Section: 01.01

Topic: Levels of Biological Organization

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.01 Identify the basic characteristics of life.

6) Which sequence of classification categories is in the proper order from least to most inclusive?

- A) genus, class, kingdom, domain, order, phylum, species, family
- B) domain, class, genus, family, species, order, phylum, kingdom
- C) species, genus, family, order, class, phylum, kingdom, domain
- D) genus, species, order, class, family, kingdom, domain, phylum
- E) species, genus, family, class, order, phylum, kingdom, domain

Answer: C

Explanation: The correct sequence is species, genus, family, order, class, phylum, kingdom, domain. Species is the least inclusive category in the taxonomic hierarchy; domain is the most inclusive.

Section: 01.02

Topic: Levels of Biological Organization

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.01 Describe how living organisms are classified.

7) What is the correct format for the binomial name of a manatee?

- A) *Trichechus Manatus*
- B) *trichechus manatus*
- C) TRICHECHUS manatus
- D) *Trichechus manatus*
- E) *trichechus Manatus*

Answer: D

Explanation: When using binomial naming, the genus name should come first, and its first letter is always capitalized. The species name follows in all lowercase letters. Additionally, the name is always italicized. Thus, the correct answer is *Trichechus manatus*.

Section: 01.02

Topic: Levels of Biological Organization

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.01 Describe how living organisms are classified.

8) Corn belongs to the kingdom

- A) Plantae.
- B) Animalia.
- C) Fungi.
- D) Protista.
- E) Archaea.

Answer: A

Explanation: Corn is an example of a multicellular, photosynthetic organism belonging to kingdom Plantae.

Section: 01.02

Topic: Levels of Biological Organization

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.01 Describe how living organisms are classified.

- 9) The three major domains of life are
- A) plantae, animalia, and archaea.
 - B) bacteria, fungi, and eukaryotes.
 - C) eukarya, prokarya, and animalia.
 - D) archaea, bacteria, and eukarya.
 - E) eukarya, prokarya, and fungi.

Answer: D

Explanation: The three major domains of life include bacteria, archaea, and eukarya. The rest of the living organisms listed are not classified at the domain level.

Section: 01.02

Topic: Levels of Biological Organization

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.02 Distinguish between the three domains of life.

- 10) A multicellular, photosynthetic organism with complex, specialized cells and tissues would most likely be assigned to
- A) kingdom Animalia.
 - B) kingdom Fungi.
 - C) domain Archaea.
 - D) kingdom Protista.
 - E) kingdom Plantae.

Answer: E

Explanation: Members of kingdom Plantae are multicellular, with specialized cells and tissues, and can form their own food by photosynthesis. Organisms in kingdom Animalia are also multicellular with specialized cells and tissues, but unlike plants, they must ingest their food. Kingdom Fungi is comprised of unicellular and multicellular organisms that consume food by absorption. Kingdom Protista contains mostly unicellular organisms with a few multicellular forms, some of which consume food while others are photosynthetic. They lack the high degree of cellular and tissue specialization seen in plants. Domain Archaea contains only single-celled prokaryotic organisms.

Section: 01.02

Topic: Levels of Biological Organization

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.01 Describe how living organisms are classified.

- 11) Regions of the earth inhabited by living organisms are known collectively as
- A) the biosphere.
 - B) an ecosystem.
 - C) a population.
 - D) an organism.
 - E) a community.

Answer: A

Explanation: The biosphere is the zone of air, land, and water on the earth where living organisms are found. An ecosystem is a single community of organisms plus the non-living components of their environment. A community is a collection of populations of different species living in the same area. A population is a collection of members of the same species living in the same area. An organism is one living entity.

Section: 01.01

Topic: Levels of Biological Organization

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.02 Distinguish between the levels of biological organization.

- 12) All of the populations of various species living within a given area constitute a(n)
- A) biosphere.
 - B) ecosystem.
 - C) population.
 - D) domain.
 - E) community.

Answer: E

Explanation: A community is a collection of populations of different species living in the same area. All the members of a particular species living within a given area are known as a population. The biosphere consists of all of the regions on Earth where living organisms are found. An ecosystem is a community of organisms plus the non-living components of their environment. Domain is the highest, most inclusive category for the classification of organisms.

Section: 01.01

Topic: Levels of Biological Organization

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.02 Distinguish between the levels of biological organization.

- 13) A community of organisms along with the surrounding physical environment constitutes a(n)
- A) biosphere.
 - B) ecosystem.
 - C) population.
 - D) habitat.
 - E) community.

Answer: B

Explanation: An ecosystem includes not only all the living organisms in a given area, but also the non-living physical environment. The biosphere is the zone of air, land, and water on the earth where living organisms are found. A population is a collection of members of the same species living in the same area. A habitat is where an organism lives. A community is a collection of populations of different species living in the same area.

Section: 01.01

Topic: Levels of Biological Organization

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.02 Distinguish between the levels of biological organization.

- 14) The most important factor that determines where major ecosystems are located on the globe is
- A) soil type.
 - B) available vegetation.
 - C) climate.
 - D) oxygen levels.
 - E) political boundaries.

Answer: C

Explanation: The main determinant of where the major ecosystems are located is climate. Climate (temperature and precipitation) exerts the most important influence over what vegetation is available, and vegetation contributes to soil formation in addition to determining which kinds of animals can live in that ecosystem. Oxygen levels are a concern only at the highest altitudes, and political boundaries have no inherent influence on ecosystem locations.

Section: 01.01

Topic: Characteristics of Life

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.01 Identify the basic characteristics of life.

- 15) The term "biodiversity" refers to
- A) a study of the physical, non-living components of an ecosystem.
 - B) the similarities between species.
 - C) the rate of extinction of species due to human activities.
 - D) the total number of species, variation of species, and the ecosystems in which they live.
 - E) the study of food chains within an ecosystem.

Answer: D

Explanation: The term "biodiversity" is quite broad, encompassing the total number of species, variation of species, and the ecosystems in which they live. All of the other answer choices are too narrow to fit the definition of biodiversity.

Section: 01.04

Topic: Biodiversity

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.04.02 Summarize some of the major challenges facing science.

- 16) An informed statement that can be tested in a manner suited to the processes of science is known as a
- A) hypothesis.
 - B) phenomenon.
 - C) control.
 - D) variable.
 - E) theory.

Answer: A

Explanation: A hypothesis is defined as an informed statement that can be tested in a manner suited to the processes of science. When a hypothesis has withstood repeated testing over time, it may be elevated to a theory. In a controlled experiment, the control is the subject or group not subjected to the factor, or variable, being tested.

Section: 01.03

Topic: Scientific Method

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.01 Identify the components of the scientific method.

17) Which answer choice lists the steps of the scientific method in the correct order?

- A) hypothesis, observation, experiment, conclusion, data collection
- B) conclusion, hypothesis, observation, experiment, data collection
- C) observation, hypothesis, experiment, data collection, conclusion
- D) observation, experiment, hypothesis, conclusion, data collection
- E) data collection, conclusion, hypothesis, experiment, observation

Answer: C

Explanation: In a typical application of the scientific method, observations are used to formulate a hypothesis. The hypothesis may then be tested, as in an experiment. Data is collected as part of the experimental process. Based on the results of the hypothesis testing, a conclusion is made.

Section: 01.03

Topic: Scientific Method

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.01 Identify the components of the scientific method.

18) Which of the following is one of the domains of life?

- A) Animalia
- B) Eukarya
- C) Plantae
- D) Protista
- E) Fungi

Answer: B

Explanation: Eukarya is a domain of life. Animalia, Protista, Plantae, and Fungi are all kingdoms of life.

Section: 01.02

Topic: Levels of Biological Organization

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.01 Describe how living organisms are classified.

19) Technology is the

- A) application of scientific knowledge to the interests of humans.
- B) study of living organisms.
- C) study of the interactions between living organisms and their environment.
- D) application of common knowledge for a practical purpose.
- E) application of laws to benefit society.

Answer: A

Explanation: Technology is the application of scientific knowledge to the interests of humans.

Section: 01.04

Topic: Challenges Facing Science

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.04.01 Distinguish between science and technology.

20) Using technology in the field of agriculture which has enabled farmers to feed a growing human population is an example of a beneficial use of technology.

Answer: TRUE

Explanation: Advances in technology have enabled farmers to grow more food in order to feed a growing human population. This is definitely a benefit of technology.

Section: 01.04

Topic: Challenges Facing Science

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.04.01 Distinguish between science and technology.

21) A physician specializes in surgery involving the following group of organs: mouth, esophagus, stomach, and intestines. Overall, what is the highest level of organization that this physician is specialized in?

- A) cell
- B) tissue
- C) organ
- D) organ system
- E) organism

Answer: D

Explanation: The mouth, esophagus, stomach, and intestines are all organs belonging to the digestive system. An organism is made up of multiple organ systems. The individual organs are made up of tissues, which are collections of cells.

Section: 01.01

Topic: Levels of Biological Organization

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.02 Distinguish between the levels of biological organization.

22) Which statement about living organisms is false?

- A) Living organisms create energy.
- B) Living organisms maintain homeostasis.
- C) Living organisms reproduce.
- D) Living organisms have adaptations.
- E) Living organisms grow and develop.

Answer: A

Explanation: Living organisms cannot create energy. Instead, they convert it from one form to another. It will then be used to maintain homeostasis, reproduce, and adapt, as well as grow and develop.

Section: 01.01

Topic: Characteristics of Life

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.01 Identify the basic characteristics of life.

23) When you are overheated, you perspire, and when you are too cold, you shiver to generate heat. Which property of life is best represented by this example?

- A) homeostasis
- B) development
- C) behavior
- D) organization
- E) adaptation

Answer: A

Explanation: Homeostasis is the body's ability to maintain a stable internal environment.

Section: 01.01

Topic: Characteristics of Life

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.01 Identify the basic characteristics of life.

24) The body temperature in humans is maintained around 37°C. Which characteristic of life does this information represent?

- A) Living organisms acquire materials and energy from the environment.
- B) Living organisms maintain homeostasis.
- C) Living organisms adapt.
- D) Living organisms grow and develop.
- E) Living organisms respond to stimuli.

Answer: B

Explanation: Keeping the internal body temperature within a constant range is an important part of homeostasis. Living things acquire materials and energy from the environment and respond to stimuli in order to maintain homeostasis. Adaptations that organisms have for surviving in their environment enable them to maintain homeostasis. The maintenance of homeostasis allows organisms to grow and develop.

Section: 01.01

Topic: Characteristics of Life

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.01 Identify the basic characteristics of life.

25) The bones in a bird are hollow, reducing its weight for flight. This is an example of which characteristic of life?

- A) Living organisms grow and develop.
- B) Living organisms acquire materials and energy from the environment.
- C) Living organisms reproduce.
- D) Living organisms adapt to their environment.
- E) Living organisms are homeostatic.

Answer: D

Explanation: Adaptations, such as the hollow bones of birds, are features that make organisms better suited to their environment. All the other answer choices are also characteristics of living things, but the example of the bird skeleton has to do specifically with adaptation.

Section: 01.01

Topic: Characteristics of Life

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.03 Recognize the importance of adaptation and evolution to life.

26) Which classification category includes the most species?

- A) family
- B) genus
- C) class
- D) phylum
- E) kingdom

Answer: E

Explanation: Placed in order from most inclusive (containing the greatest number of species) to least inclusive (containing the smallest number of species), the categories would be listed: kingdom, phylum, class, family, genus.

Section: 01.02

Topic: Levels of Biological Organization

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.01 Describe how living organisms are classified.

27) Which of these classification categories contains the most closely related group of organisms?

- A) domain
- B) genus
- C) family
- D) phylum
- E) kingdom

Answer: B

Explanation: Members of closely related species are grouped into the same genus. The categories listed, from the greatest to least degree of relatedness of organisms, are: genus, family, phylum, kingdom, and domain.

Section: 01.02

Topic: Levels of Biological Organization

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.01 Describe how living organisms are classified.

28) The common name for "cat" in Spanish is "gato" and in Chinese is "mao." Which of the following statements pertaining to the use of scientific names instead of common names is false?

- A) Common names may refer to more than one kind of organism.
- B) Scientific names can be known and recognized by all scientists throughout the world.
- C) The scientific name is related to the classification of that organism.
- D) The common name more clearly identifies an organism as unique than does the scientific name.

Answer: D

Explanation: The only false statement about the use of scientific names is that common names more clearly identify organisms as unique than does the scientific name. In fact, different organisms are often called by the same common name.

Section: 01.02

Topic: Levels of Biological Organization

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.01 Describe how living organisms are classified.

29) All the banded sunfish (*Enneacanthus obesus*) in a pond would comprise a(n)

- A) population.
- B) ecosystem.
- C) community.
- D) biosphere.
- E) species.

Answer: A

Explanation: A species is a category of organisms within the same genus that share very similar characteristics. Banded sunfish (*Enneacanthus obesus*) are a species. A population is all the members of a given species within a particular area, as in the example of all the banded sunfish in one pond. All the different populations in the same area make up a community. A community together with its physical environment makes up an ecosystem. The biosphere is the zone of air, land, and water on the earth where living organisms are found.

Section: 01.01

Topic: Levels of Biological Organization

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.02 Distinguish between the levels of biological organization.

- 30) When comparing energy and chemicals in an ecosystem
- A) both chemicals and energy cycle over and over again.
 - B) chemicals cycle over and over again but energy does not cycle.
 - C) neither chemicals nor energy cycle.
 - D) energy cycles over and over again but chemicals do not cycle.

Answer: B

Explanation: Chemicals can be recycled in an ecosystem as they pass from one organism to the next. The same is not true for energy, because every time energy changes form, some energy is "lost" in the form of heat.

Section: 01.01

Topic: Energy and Chemical Cycling

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.01 Identify the basic characteristics of life.

- 31) When researchers test a new human cancer drug using mice, the mice constitute the
- A) hypothesis.
 - B) data.
 - C) experimental design.
 - D) model.
 - E) control.

Answer: D

Explanation: An experimental model is a representation of an actual subject; in this case, the mice represent humans. The manner in which a scientist intends to conduct an experiment is called the experimental design. A hypothesis is a tentative explanation for a natural event. The results of an experiment are referred to as the data. A control is a subject or group of subjects that goes through all the steps of an experiment but lacks the factor, or is not exposed to the factor, being tested.

Section: 01.03

Topic: Experimental Design

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.03 Analyze a scientific experiment and identify the hypothesis, experiment, control groups, and conclusions.

32) Which of the following domains contains organisms that are adapted to life in extreme environments?

- A) domain Archaea
- B) domain Bacteria
- C) domain Eukarya
- D) domain Animalia
- E) domain Plantae

Answer: A

Explanation: Domain Archaea contains organisms that can survive in the most extreme environments. While domain Bacteria contains organisms that can be found almost everywhere, they are generally absent from the most extreme environments. Domain Eukarya contains the plants, animals, fungi, and protists which are not adapted to the most extreme environments. Animalia and Plantae are not domains.

Section: 01.02

Topic: Biodiversity

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.02 Distinguish between the three domains of life.

33) Which domains contain organisms that lack a membrane-bound nucleus?

- A) Archaea and Bacteria
- B) Archaea and Eukarya
- C) Bacteria and Eukarya
- D) Eukarya and Animalia
- E) Archaea and Animalia

Answer: A

Explanation: The domains Archaea and Bacteria both contain prokaryotic organisms that by definition lack a membrane-bound nucleus. Domain Eukarya contains organisms that have a membrane-bound nucleus. Animalia is not a domain.

Section: 01.02

Topic: Levels of Biological Organization

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.02 Distinguish between the three domains of life.

34) It is estimated that as much as 10% of all species may be in danger of extinction before the end of the century.

Answer: FALSE

Explanation: It is estimated that as much as 38% of all species may be in danger of extinction before the end of the century.

Section: 01.04

Topic: Challenges Facing Science

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Learning Outcome: 01.04.02 Summarize some of the major challenges facing science.

35) Wood becomes petrified when its tissues are replaced by minerals. Although petrified wood is no longer part of a living organism, which property of life will still be present in the wood?

A) organization

B) homeostasis

C) growth and reproduction

D) response to stimuli

E) metabolism

Answer: A

Explanation: A piece of petrified wood is a fossil, a preserved remnant of a once-living organism. Although it lacks metabolism, can no longer maintain homeostasis, and does not grow, reproduce, or respond to stimuli, the original pattern of organization is still evident.

Section: 01.01

Topic: Characteristics of Life

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.01 Identify the basic characteristics of life.

36) An unmanned spacecraft has been sent to another planet to detect new life forms. If the probe could only send back one image, which property or properties of life would be observable in the picture?

A) organization

B) homeostasis and metabolism

C) growth

D) response to stimuli

E) evolution

Answer: A

Explanation: A still image would not be likely to show dynamic processes such as homeostasis, metabolism, evolution, growth, or reproduction. However, organization would be evident.

Section: 01.01

Topic: Characteristics of Life

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.01 Identify the basic characteristics of life.

37) Ever since the antibiotic drug penicillin was discovered in 1928, the incidence of resistant bacteria has steadily increased as a direct result of

- A) biodiversity.
- B) natural selection.
- C) homeostasis.
- D) development.
- E) reproduction.

Answer: B

Explanation: In natural selection, members of a species that are best adapted to survive and reproduce in their environment have more offspring than those that are not. Thus, more members of the population will come to have the successful adaptation. In this example, when people started using penicillin to fight bacterial infections, only susceptible bacteria were killed; resistant ones were able to survive and reproduce. Now there are many more resistant bacteria. Biodiversity is the total number of species, the variability of their genes, and the ecosystems they inhabit. Although genetic variability is the raw material for natural selection, it is not equivalent. Homeostasis is an organism's ability to maintain a stable internal environment. Development is the series of changes that occur throughout the lifespan of an organism. Reproduction is the ability of an organism to make more like itself; it is related to natural selection in that more successful organisms can pass their adaptations on to their offspring, but the terms are not equivalent.

Section: 01.01

Topic: Characteristics of Life

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.03 Recognize the importance of adaptation and evolution to life.

38) Nutrient molecules obtained from the food we eat are used to build cellular structures or for energy. This best represents which characteristic of life?

- A) Living things acquire materials and energy from the environment.
- B) Living things are homeostatic.
- C) Living things are adapted.
- D) Living things grow and develop.
- E) Living things respond to stimuli.

Answer: A

Explanation: The ability to acquire materials and energy from the environment is crucial to all the other activities of living organisms, including homeostasis, adaptation, growth and development, and responses to stimuli.

Section: 01.01

Topic: Characteristics of Life

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.01.01 Identify the basic characteristics of life.

39) You have discovered a previously unknown organism. It is multicellular with a filamentous form, and it absorbs food from its environment. Upon microscopic examination, you see that the cells have nuclei. How would you classify this organism?

- A) domain Bacteria
- B) kingdom Animalia
- C) kingdom Protista
- D) kingdom Fungi
- E) kingdom Plantae

Answer: D

Explanation: Kingdom Fungi is comprised of unicellular and multicellular organisms, all heterotrophic by absorption. The multicellular forms are generally filamentous. Members of kingdom Plantae are multicellular, with specialized cells and tissues, and can form their own "food" by photosynthesis. Organisms in kingdom Animalia are also multicellular with specialized cells and tissues, but they are heterotrophs that ingest their food. Kingdom Protista contains mostly unicellular organisms with a few multicellular forms, some of which are heterotrophic by ingestion while others are photosynthetic. Domain Bacteria contains only unicellular, prokaryotic organisms. All four of the kingdoms listed as answer choices belong to domain Eukarya.

Section: 01.02

Topic: Levels of Biological Organization

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.01 Describe how living organisms are classified.

40) Which of these is an example of inductive reasoning used to form a hypothesis?

- A) Every fungus that has ever been studied absorbs its food; therefore, food absorption is characteristic of fungi.
- B) All fungi absorb their food; if mushrooms are fungi, then the mushroom absorbs its food.
- C) A mushroom is classified in the kingdom Fungi of the domain Eukarya.
- D) The cell from a mushroom has a nucleus.
- E) Fungi are not capable of photosynthesis.

Answer: A

Explanation: In order to formulate a hypothesis, a scientist generally uses inductive reasoning, in which a collection of facts or observations are woven together to support a statement. Inductive reasoning is exemplified by, "Every fungus that has ever been studied absorbs its food; therefore, food absorption is characteristic of fungi." To test a hypothesis, a scientist could use deductive reasoning, which is based on "if, then" statements such as, "If a mushroom is a fungus, then the mushroom absorbs its food." The other answer choices are accurate observations or statements, but not representative of either type of reasoning.

Section: 01.03

Topic: Scientific Method

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.01 Identify the components of the scientific method.

41) You are conducting an experiment to determine which brand of fertilizer results in the greatest amount of fruit production by tomato plants. In this example, the response variable would be the

- A) brand of fertilizer.
- B) unfertilized tomato plants.
- C) fertilized tomato plants.
- D) amount of fruit produced by the tomato plants.
- E) variety of tomato plants.

Answer: D

Explanation: The response (dependent) variable would be the amount of fruit produced, because this is the response to the different fertilizer varieties used. The fertilizer varieties would constitute the experimental (independent) variable, because this is the factor that the researcher is manipulating. It would be a good experimental design to have two groups of plants: a test group (fertilized plants) and a control group (unfertilized plants). To minimize the number of variables in the experiment, only one variety of plant should be used.

Section: 01.03

Topic: Experimental Design

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.03 Analyze a scientific experiment and identify the hypothesis, experiment, control groups, and conclusions.

42) Which of the following might plausibly be said by a scientist?

- A) Although no one else gets the same results as I do, since I get the results in my experiments, it is still science.
- B) Since all the accumulated body of data support it, my hypothesis is undoubtedly "true."
- C) Test methods are unimportant since anyone can run another test; it is the results that make the substance of science.
- D) The test's results and conclusion finish the scientist's job; it is enough that a scientist alone knows the results.
- E) There is always a possibility that a more advanced experiment might falsify my hypothesis.

Answer: E

Explanation: Hypotheses are always subject to additional testing; they are only conditionally accepted or rejected. If two individuals performing the same experiment obtain different results, this would fail to support the hypothesis. Test methods are important because they may influence the results obtained. Scientific endeavors do not end with obtaining results and a conclusion; researchers share their results via publications and meetings.

Section: 01.03

Topic: Scientific Method

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.01 Identify the components of the scientific method.

43) Which of the following is a potential consequence if the agricultural industry produced food without the use of technology?

- A) There could be a significant decrease in the amount of food produced.
- B) There would be a collapse of many of the terrestrial ecosystems on Earth.
- C) The extinction of the top level species that reside in the communities around the agricultural land.
- D) The amount of food produced would increase.
- E) None of these consequences will occur if people stop using technology in the agriculture industry.

Answer: A

Explanation: If the agriculture industry stops using technology the most likely consequence will be a significant decrease in the amount of food produced. Ecosystems will flourish with a decrease in technology which will then make it easier for the top level species to survive. Unfortunately, the amount of food produced would decrease.

Section: 01.04

Topic: Challenges Facing Science

Bloom's: 5. Evaluate

Accessibility: Keyboard Navigation

Learning Outcome: 01.04.02 Summarize some of the major challenges facing science.

44) Which of the following represents a potential threat to biodiversity?

- A) People construct artificial reefs to support marine life.
- B) Humans clear land for agriculture and housing.
- C) Energy flows through an ecosystem, with much lost as heat.
- D) Tropical rain forests and coral reefs are found where solar energy is the most abundant.
- E) In a food chain, one organism feeds on another.

Answer: B

Explanation: When humans clear land, biodiversity is lost because we replace the former inhabitants with a much smaller number of species. The construction of artificial reefs can actually help maintain or restore biodiversity as species that have been forced to move from destroyed coral reefs find new homes. The feeding order of a food chain is an integral part of a community and does not generally have a negative impact on biodiversity. Tropical rain forests and coral reefs are the most diverse ecosystems on our planet. Energy flow is a normal aspect of ecosystems, and does not adversely affect biodiversity.

Section: 01.04

Topic: Biodiversity; Challenges Facing Science

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.04.02 Summarize some of the major challenges facing science.

45) Which statement regarding science and technology is true?

- A) Science, without the assistance of technology, has brought about life-improving discoveries, such as antibiotics.
- B) Technology, without the assistance of science, helps us to understand the causes of cancer.
- C) Science is defined as the application of technological knowledge.
- D) Combining both science and technology may ease the feeding of the world population by producing new plant strains.

Answer: D

Explanation: Technology is the application of scientific knowledge to the interests of humans. Scientific investigations are the basis for the majority of our technological advances. When science is combined with technology, advancements can be made to improve the quality of life for people in many ways including the production of new plant strains that produce greater quantities of food and/or are resistance to pests.

Section: 01.04

Topic: Challenges Facing Science

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.04.01 Distinguish between science and technology.

46) If a new anti-cancer drug is found to be effective in initial tests with mice, what might researchers conclude?

- A) If the drug was effective in a large number of mice, it will therefore be effective in humans.
- B) If the drug was effective in a small proportion of mice, it will be effective in a small proportion of humans.
- C) The mice have provided a positive control in this experiment that proves the drug is effective in humans.
- D) The drug is effective in the mouse model; it must still be tested in humans.
- E) The effect of the drug on mice has no bearing on the effect of the drug on humans.

Answer: D

Explanation: Results obtained using models are considered a hypothesis until the experiment can be performed using the actual subject. In this case, the mice are the experimental model, and humans would be the actual subjects. The mice cannot be described as a control; a control would be a group of mice that go through all the steps of the experiment but are not exposed to the drug being tested.

Section: 01.03

Topic: Scientific Method; Experimental Design

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.03 Analyze a scientific experiment and identify the hypothesis, experiment, control groups, and conclusions.

47) Some students consume large amounts of coffee and so-called energy drinks to help them stay alert when studying. You notice that many who engage in this practice seem to do poorly on exams. Suppose you want to investigate the relationship between caffeine consumption and exam performance. Which of the following statements would be an appropriate hypothesis?

- A) Students who consume large amounts of caffeine while studying will have lower exam scores than those who consume less caffeine.
- B) One should avoid consuming too much caffeine while studying.
- C) Too much caffeine is harmful to your health.
- D) Many students consume large amounts of caffeine while studying.
- E) Caffeine increases alertness but also increases anxiety.

Answer: A

Explanation: A hypothesis is a tentative explanation for a phenomenon that can be tested and then supported or falsified based upon the results. To test the hypothesis, you would compare the exam scores of students who drink large amounts of caffeine to those who do not. If the students who consume more caffeine have significantly lower scores, then your hypothesis is supported. Otherwise, the hypothesis is falsified. The statement that one should avoid consuming too much caffeine while studying is a recommendation, not a hypothesis. The statements that caffeine increases alertness and many students consume large amounts of caffeine are observations, which may be used in formulating a hypothesis. Too much caffeine is harmful to your health is a conclusion that has been reached by some scientific studies; it is not, however, a hypothesis that is appropriate to this experimental design.

Section: 01.03

Topic: Scientific Method; Experimental Design

Bloom's: 5. Evaluate

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.03 Analyze a scientific experiment and identify the hypothesis, experiment, control groups, and conclusions.

48) You are conducting an experiment to determine what concentration of disinfectant is most effective in killing bacteria. In this example, the concentration of disinfectant would represent the

- A) control.
- B) experimental variable.
- C) response variable.
- D) data.
- E) hypothesis.

Answer: B

Explanation: The experimental (independent) variable is the factor being tested—in this case, the concentration of disinfectant. The response (dependent) variable is the result or change seen in response to the experimental variable—in this case, the quantity of bacteria killed. A control is not subjected to the experimental variable; an example would be an object or surface contaminated with bacteria that is not treated with disinfectant. Data are experimental results. A hypothesis is a tentative, testable explanation for a natural phenomenon.

Section: 01.03

Topic: Scientific Method; Experimental Design

Bloom's: 5. Evaluate

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.03 Analyze a scientific experiment and identify the hypothesis, experiment, control groups, and conclusions.

49) In the late 1800s, Louis Pasteur was searching for a vaccine for anthrax in livestock. One French veterinarian had a local reputation for being able to cure anthrax by applying oils and wrapping the animal in cloth to induce a fever. Pasteur also knew that some animals recovered well on their own when left untreated. Pasteur tested the effectiveness of the local veterinarian's methods by injecting four cattle with anthrax bacteria. He then directed the veterinarian to perform his procedures on two cattle. The other two cattle were left alone. What is the rationale for Pasteur's experimental design?

- A) Two cattle represent a test of the veterinarian's hypothesis; two represent a test of Pasteur's hypothesis.
- B) Two cattle represent a test of the treatment; two serve as a control to determine the likelihood of survival without treatment.
- C) Two cattle represent a test based on inductive reasoning; two serve to test deductive reasoning.
- D) The two cattle that are treated are the only test being conducted; the other two cattle serve no purpose beyond representing all the untreated cattle in France.
- E) The two cattle not being treated were just a whim on Pasteur's part.

Answer: B

Explanation: The two cattle left alone constitute a control group, since they were injected with anthrax but not subjected to the veterinarian's treatment; they are not intended to represent all the cattle in France. The other two cattle represent the test group, since they received both the anthrax injection and the veterinarian's treatment. The entire experimental design is based on deductive reasoning: If the veterinarian's treatment is more effective than lack of treatment, then the treated cattle should recover and the untreated ones should not.

Section: 01.03

Topic: Scientific Method; Experimental Design

Bloom's: 5. Evaluate

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.03 Analyze a scientific experiment and identify the hypothesis, experiment, control groups, and conclusions.

50) As the human population size increases

- A) ecosystems remain unaffected.
- B) fewer fossil fuels are burned and carbon dioxide levels remain constant.
- C) it becomes evident that preserving the biosphere has no benefit to humans.
- D) fewer ecosystems are destroyed, resulting in an abundance of biodiversity.
- E) biodiversity is adversely affected as humans have destructive effects on ecosystems.

Answer: E

Explanation: Human activities continue to disrupt and destroy ecosystems, reducing biodiversity. The more our population increases, the more fossil fuels are burned, causing a rise in carbon dioxide levels which can lead to a decrease in biodiversity.

Section: 01.04

Topic: Ecosystem Ecology; Challenges Facing Science

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.04.02 Summarize some of the major challenges facing science.

51) Which statement about ecosystems is true?

- A) Chemicals flow through ecosystems in a one-way direction and are not recycled.
- B) Energy continually cycles through an ecosystem.
- C) Some organisms can produce their own food and these organisms form the base of the food chain.
- D) Within an ecosystem there is a community of organisms, but non-living components are absent.
- E) The location of ecosystems around the world appears to be random. There is no relationship between ecosystem location and factors like climate.

Answer: C

Explanation: Some organisms are capable of producing their own food through photosynthesis. The food these organisms produce becomes the basis for the rest of the food chain within an ecosystem. All the other statements are incorrect. Energy flows through an ecosystem in a one-way direction, while chemicals cycle continuously. An ecosystem is comprised of both living organisms and non-living components like water and sunlight.

Section: 01.04

Topic: Ecosystem Ecology; Challenges Facing Science

Bloom's: 5. Evaluate

Accessibility: Keyboard Navigation

Learning Outcome: 01.04.02 Summarize some of the major challenges facing science.

52) In the late 1800s, Louis Pasteur was searching for a vaccine for anthrax in livestock. One French veterinarian had a local reputation for being able to cure anthrax by applying oils and wrapping the animal in cloth to induce a fever. Pasteur also knew that some animals got well on their own when left untreated. Pasteur tested the effectiveness of the local veterinarian's methods by injecting four cattle with anthrax bacteria. He then directed the veterinarian to perform his procedures on two cattle. The other two cattle were left alone. One cow from each group died and the other one in each group survived. Pasteur dismissed the veterinarian's procedure as ineffective, but he also considered this to be a poor test. Why would he consider this to be a poor test?

- A) The difference in survival between the two groups was not dependent on the treatment.
- B) In a small group with 50% survival, the treated cows would have survived anyway.
- C) The number of cows that survived was the same as the number of cows that died.
- D) With such a small group you cannot determine if survival was dependent on the treatment or random chance.
- E) The production of a fever in the treated cattle interfered with the outcome.

Answer: D

Explanation: This was a poor test because of the small sample size. The larger the sample size (in this case, the number of cattle studied), the less likely that the result is due to chance alone. There was no difference in survival between the two groups—one of each survived and one died—but due to the small number of subjects it was not possible to determine if the veterinarian's treatment (inducing a fever) had any real effect.

Section: 01.03

Topic: Scientific Method; Experimental Design

Bloom's: 5. Evaluate

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.03 Analyze a scientific experiment and identify the hypothesis, experiment, control groups, and conclusions.

53) Give examples of the costs and benefits of using technology.

Answer: Answers will vary. Some of the potential costs will include: an increase in pollution, the accidental destruction of ecosystems or species that were not supposed to be destroyed. Some potential benefits include: an increase in the amount of food that can be produced, the ability to eliminate a pest species.

Section: 01.04

Topic: Scientific Method

Bloom's: 6. Create

Accessibility: Keyboard Navigation

Learning Outcome: 01.04.01 Distinguish between science and technology.

54) Which of the following statements regarding the scientific method are true? Check all that apply.

- A) Deductive reasoning is used to form a hypothesis.
- B) Observations are used to form a hypothesis.
- C) Experiments need to be repeatable.
- D) The control and experimental groups are identical except for one variable.
- E) The response variable is also known as the independent variable.

Answer: B, C, D

Explanation: When forming a hypothesis, scientists use inductive reasoning and the response variable is also known as the dependent variable. All the other choices are true statements.

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Section: 01.03

Topic: Scientific Method

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.01 Identify the components of the scientific method.

55) Which of the following statements regarding the scientific method are true? Check all that apply.

- A) Scientific studies are reported in scientific journals.
- B) At the end of an experiment, a hypothesis is determined to be absolutely true or absolutely false.
- C) The control is not subjected to the experimental variable.
- D) Data is analyzed using statistical tests.
- E) When analyzing data, a higher the p value means results are not likely due to chance.

Answer: A, C, D

Explanation: Hypotheses are never considered to be absolutely true or false. When analyzing data, the lower the p value, the more confidence the researcher has that the results are not due chance. All the other statements are true.

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Section: 01.03

Topic: Scientific Method

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.01 Identify the components of the scientific method.

56) The statement "plants grown from cross-pollinated seeds will grow taller and produce more fruit than plants grown from self-pollinated seeds" is an example of a scientific theory.

Answer: FALSE

Explanation: The statement "plants grown from cross-pollinated seeds will grow taller and produce more fruit than plants grown from self-pollinated seeds" is a hypothesis. It is an informed statement that can be tested in a manner suited to the processes of science.

Section: 01.03

Topic: Scientific Method

Bloom's: 5. Evaluate

Accessibility: Keyboard Navigation

Learning Outcome: 01.03.02 Distinguish between a theory and a hypothesis.

57) Historically, the protists were classified in "kingdom Protista." Recently, however, the protists were reclassified into "supergroups." What was the reason for this reclassification?

A) There were too many protist species to fit into a single kingdom.

B) Scientists decided to reclassify protists based on their nutritional mode. For example, all the photosynthesizers were placed together into one supergroup.

C) Scientists reclassified protists based on how many cells the organism contains. For example, there is a supergroup for one-celled organisms, a supergroup for two-celled organisms, etc.

D) New DNA evidence suggests that not all protists share a common ancestor and therefore their classification needed to be reorganized.

Answer: D

Explanation: DNA analyses of protists have revealed that not all protists share a common evolutionary lineage. Protists have been reclassified into supergroups to reflect the unique evolutionary heritage of each group.

Section: 01.02

Topic: Levels of Biological Organization

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.03 Explain the role of supergroups in the classification of life.

58) While exploring a river deep in the Amazon, you discover a new protists. The protist is green and photosynthesizes. In which supergroup will your new protist be classified?

- A) SAR
- B) Archaeplastida
- C) Excavata
- D) Amoebozoa
- E) Opisthokonta

Answer: B

Explanation: A green photosynthetic protist would also be called a green algae. Green algae are the distant relatives of plants and would be classified in supergroup Archaeplastida.

Section: 01.02

Topic: Biodiversity

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

Learning Outcome: 01.02.03 Explain the role of supergroups in the classification of life.