Campbell Biology in Focus, 2e **(Urry)**
Chapter 1 Introduction: Evolution and the Foundations of Biology

1.1 Multiple-Choice Questions

1) All of the individuals of the same species living within a specified area is known as a
A) community.
B) ecosystem.
C) family.
D) population.
Answer: D
Topic: Concept 1.1
Skill: Knowledge/Comprehension
Learning Outcome: 1.1

2) Organisms interact with their environments, exchanging matter and energy. For example, plant chloroplasts convert the energy of sunlight to
A) the energy of motion.
B) carbon dioxide and water.
C) chemical energy.
D) oxygen.
E) kinetic energy.
Answer: C
Topic: Concept 1.1
Skill: Knowledge/Comprehension
Learning Outcome: 1.1

3) The primary source of energy for producers in an ecosystem is
A) light energy.
B) kinetic energy.
C) thermal energy.
D) chemical energy.
E) ATP.
Answer: A
Topic: Concept 1.1
Skill: Knowledge/Comprehension
Learning Outcome: 1.1

4) All of the living things on Earth along with all of the places where life exists is known as
A) an ecosystem.
B) the biosphere.
C) a biological community.
D) a population.
Answer: B
Topic: Concept 1.1
Skill: Knowledge/Comprehension
Learning Outcome: 1.1

5) All of the living things in a particular area along with all of the nonliving aspects of the environment with which organisms interact is known as
A) an ecosystem.
B) the biosphere.
C) a biological community.
D) a population.
Answer: A
Topic: Concept 1.1
Skill: Knowledge/Comprehension
Learning Outcome: 1.1

6) All of the organisms inhabiting a particular ecosystem are known as
A) a biological system.
B) a biosphere.
C) a biological community.
D) a population.
Answer: C
Topic: Concept 1.1
Skill: Knowledge/Comprehension
Learning Outcome: 1.1

7) Which of the following types of cells lack a nucleus?
A) animal
B) plant
C) archaea
D) fungi
E) protists
Answer: C
Topic: Concept 1.1
Skill: Application/Analysis
Learning Outcome: 1.1

8) Investigating the molecular structure of DNA in order to understand the chemical basis of inheritance is an example of which approach utilized in the study of biology?
A) systems biology
B) emergent properties
C) reductionism
D) mutualism
Answer: C
Topic: Concept 1.1
Skill: Application/Analysis
Learning Outcome: 1.1

9) Living things are divided into three different domains. Which of these domains are classified as prokaryotes?
A) Bacteria and Eukarya
B) Archaea and Monera
C) Eukarya and Monera
D) Bacteria and Protista
E) Bacteria and Archaea
Answer: E
Topic: Concept 1.2
Skill: Knowledge/Comprehension
Learning Outcome: 1.2

10) In her studies of chimpanzee behavior, Jane Goodall collected both qualitative and quantitative data. Which of the following is an example of quantitative data?
A) Chimpanzees typically travel together in small groups.
B) Pairs of animals take turns grooming each other.
C) Young chimpanzees play games in the trees and on the ground.
D) Mothers and their infants typically nap for two to three hours each afternoon.
Answer: D
Topic: Concept 1.3
Skill: Application/Analysis
Learning Outcome: 1.3

11) A single-celled organism isolated from a deep-sea, hot thermal vent was found to have a cell wall but lacked a nucleus. This organism is most likely a member of which of the following domains?
A) Eukarya
B) Archaea
C) Animalia
D) Protista
E) Fungi
Answer: B
Topic: Concept 1.2
Skill: Application/Analysis
Learning Outcome: 1.2

12) Strong evidence in support of the common ancestry of all life comes from
A) the fact that decomposers include both bacteria and fungi.
B) the ability of plants to convert light energy to chemical energy.
C) the existence of a nearly universal genetic code.
D) the universal use of protein catalysts by all cells.
Answer: C
Topic: Concept 1.2
Skill: Application/Analysis
Learning Outcome: 1.2
Global L.O.: G2

13) Charles Darwin proposed that "descent with modification" resulted when organisms of a particular species become adapted to their environment because they possess
A) nonheritable traits that enhance survival and decrease their reproductive success in the local environment.
B) nonheritable traits that enhance their survival and reproductive success in the local environment.
C) heritable traits that enhance their survival and reproductive success in the local environment.
D) heritable traits that enhance their survival and decrease their reproductive success in the local environment.
Answer: C
Topic: Concept 1.2
Skill: Knowledge/Comprehension
Learning Outcome: 1.2

14) Which of these individuals is likely to be most successful in an evolutionary sense?
A) a reproductively sterile individual who never falls ill
B) an organism that dies after five days of life but leaves ten offspring, all of whom survive to reproduce
C) a male who mates with 20 females and fathers one offspring
D) an organism that lives 100 years and leaves two offspring, both of whom survive to reproduce
E) a female who mates with 20 males and produces two offspring who live to reproduce
Answer: B
Topic: Concept 1.2
Skill: Application/Analysis
Learning Outcome: 1.2
Global L.O.: G2

15) Over time, the lineage that led to modern whales shows a change from four-limbed land animals to aquatic animals with two limbs that function as flippers. This change is best explained by
A) an emergent property.
B) reductionism.
C) the hierarchy of the biological organization of life.
D) natural selection.
Answer: D
Topic: Concept 1.2
Skill: Application/Analysis
Learning Outcome: 1.2

16) Which of the following was Charles Darwin's most significant original contribution to understanding both the unity and diversity of life?
A) He documented examples of organisms that had evolved over time.
B) He proposed a mechanism to explain the process of evolution.
C) He explained the relationship between genes and evolution.
D) He observed that individuals in a population generally displayed variation for a number of traits.
E) He suggested that survival depends upon competition.
Answer: B
Topic: Concept 1.2
Skill: Knowledge/Comprehension
Learning Outcome: 1.2

17) Which of the following is a distinguishing characteristic of fungi?
A) obtaining nutrients by absorbing them from the environment
B) obtaining nutrients by ingesting other organisms
C) producing sugars by photosynthesis
D) living in extreme environments like boiling hot springs
Answer: A
Topic: Concept 1.2
Skill: Knowledge/Comprehension
Learning Outcome: 1.2

18) Which of the following correctly describes the forms by which energy flows through an ecosystem from entry to exit?
A) heat → chemical → heat
B) light → heat → chemical
C) light → chemical → heat
D) chemical → heat → light
Answer: C
Topic: Concept 1.1
Skill: Knowledge/Comprehension
Learning Outcome: 1.1

19) Burning of fossil fuels releases large amounts of carbon dioxide (CO_2) into the atmosphere. Approximately what proportion of this CO_2 remains in the atmosphere, contributing to the trapping of heat close to the Earth's surface?
A) less than 1%
B) 5%
C) 50%
D) 90%
Answer: C
Topic: Concept 1.1
Skill: Knowledge/Comprehension
Learning Outcome: 1.1

20) Membrane-enclosed components of cells that carry out specialized functions are
A) tissues.
B) organs.
C) organelles.
D) molecules.
Answer: C
Topic: Concept 1.1
Skill: Knowledge/Comprehension
Learning Outcome: 1.1

21) Which of the following represents the correct hierarchy of biological organization from large-scale to smaller scale?
A) ecosystems → biosphere → communities → populations → organisms
B) communities → populations → organisms → ecosystems → biosphere
C) biosphere → communities → populations → ecosystems → organisms
D) biosphere → ecosystems → communities → populations → organisms
E) biosphere → ecosystems → populations→ communities → organisms
Answer: D
Topic: Concept 1.1
Skill: Knowledge/Comprehension
Learning Outcome: 1.1

22) Darwin's finches, collected from the Galápagos Islands, illustrate which of the following?
A) mutation frequency
B) ancestors from different regions
C) descent with modification
D) the accuracy of the fossil record
Answer: C
Topic: Concept 1.2
Skill: Knowledge/Comprehension
Learning Outcome: 1.2

23) Imagine there is a species-specific fishing regulation that mandates that only adult fish of this species that are 75 cm or longer may be kept; shorter fish must be released. Based on your knowledge of natural selection, you would predict that the average length of the adult fish population will
A) remain unchanged.
B) gradually decline.
C) rapidly decline.
D) gradually increase.
E) rapidly increase.
Answer: B
Topic: Concept 1.2
Skill: Application/Analysis
Learning Outcome: 1.2
Global L.O.: G2

24) The process of science involves testing which of the following?
A) a data set
B) a hypothesis
C) an observation
D) a conclusion
E) a control group
Answer: B
Topic: Concept 1.3
Skill: Knowledge/Comprehension
Learning Outcome: 1.3

25) A controlled experiment is one in which
A) the experiment is repeated many times to ensure that the results are accurate.
B) the experiment proceeds at a slow pace to guarantee that the scientist can carefully observe all reactions and process all experimental data.
C) there are at least two groups, one of which does not receive the experimental treatment.
D) there are at least two groups, one differing from the other by two or more variables.
Answer: C
Topic: Concept 1.3
Skill: Application/Analysis
Learning Outcome: 1.3

26) Which of the following is a requirement for a good scientific hypothesis?
A) It must generate quantitative data.
B) It must explain a large body of specific observations.
C) It must lead to testable predictions.
D) It must be proven to be true.
Answer: C
Topic: Concept 1.3
Skill: Knowledge/Comprehension
Learning Outcome: 1.3

27) Which of the following is the best description of a control for an experiment?
A) The control group is kept in an unchanging environment.
B) The control is left alone by the experimenters.
C) The control group is matched with the experimental group except for the one experimental variable.
D) The control group is exposed to only one variable rather than several.
Answer: C
Topic: Concept 1.3
Skill: Knowledge/Comprehension
Learning Outcome: 1.3

28) Which of the following is an example of inductive reasoning?
A) If a banana is not ripe, then an ape will not eat it.
B) Numerous different species live in sunny parts of an ecosystem; therefore, they are all photosynthetic.
C) Hundreds of cultures of a unicellular alga are incubated in the presence of light, and in all of the samples the cells congregate on the side of the culture toward the light. Therefore, the alga is phototactic (attracted to light).
D) If two species are members of the same genus, then they are more similar to each other than they are to members of a different genus.
Answer: C
Topic: Concept 1.3
Skill: Application/Analysis
Learning Outcome: 1.3
Global L.O.: G2

29) Why is a scientific topic best discussed by people of varying points of view, a variety of subdisciplines, and diverse cultures?
A) They can rectify each other's approach to make it truly scientific.
B) Robust and critical discussion between diverse groups improves scientific thinking.
C) Scientists can explain to others that they need to work in isolation to utilize the scientific method more productively.
D) This is another way of ensuring that everyone gets the same results.
E) Scientists need to exchange their ideas with other disciplines and cultures so that all groups are in consensus with the course of future research.
Answer: B
Topic: Concept 1.3
Skill: Evaluation/Synthesis
Learning Outcome: 1.3
Global L.O.: G2

30) Why is it important that an experiment include a control group?
A) A control group provides a reference by which to determine if a particular outcome may reasonably result from the variable being tested.
B) The control group provides a reserve of experimental subjects.
C) A control group is required for the development of an "If . . . then" statement.
D) A control group assures that an experiment will be repeatable.
Answer: A
Topic: Concept 1.3
Skill: Application/Analysis
Learning Outcome: 1.3
Global L.O.: G2

31) Which of the following constitutes a controlled experiment?
A) using a microscope to observe organisms present in a sample of pond water and recording the number of each type of organism observed
B) setting up a bird feeder and compiling a list of all of the bird species seen at the feeder over a period of several weeks
C) growing one set of ten seedlings under white light and one set of the same type of seedlings under red light and measuring their growth over a period of two weeks
D) growing one set of ten seedlings under white light at 30°C and one set of a different type of seedlings under red light at 25°C and measuring their growth over a period of two weeks
Answer: C
Topic: Concept 1.3
Skill: Application/Analysis
Learning Outcome: 1.3
Global L.O.: G2

1.2 End-of-Chapter Questions

1) All the organisms on your campus make up
A) an ecosystem.
B) a community.
C) a population.
D) a taxonomic domain.
Answer: B
Topic: End-of-Chapter Questions
Skill: Knowledge/Comprehension

2) Which of the following best demonstrates the unity among all organisms?
A) emergent properties
B) descent with modification
C) DNA structure and function
D) natural selection
Answer: C
Topic: End-of-Chapter Questions
Skill: Knowledge/Comprehension

3) A controlled experiment is one that
A) proceeds slowly enough that a scientist can make careful records of the results.
B) tests experimental and control groups in parallel.
C) is repeated many times to make sure the results are accurate.
D) keeps all variables constant.
Answer: B
Topic: End-of-Chapter Questions
Skill: Knowledge/Comprehension

4) Which of the following statements best distinguishes hypotheses from theories in science?
A) Theories are hypotheses that have been proved.
B) Hypotheses are guesses; theories are correct answers.
C) Hypotheses usually are relatively narrow in scope; theories have broad explanatory power.
D) Theories are proved true; hypotheses are often contradicted by experimental results.
Answer: C
Topic: End-of-Chapter Questions
Skill: Knowledge/Comprehension

5) Which of the following best describes the logic of scientific inquiry?
A) If I generate a testable hypothesis, tests and observations will support it.
B) If my prediction is correct, it will lead to a testable hypothesis.
C) If my observations are accurate, they will support my hypothesis.
D) If my hypothesis is correct, I can expect certain test results.
Answer: D
Topic: End-of-Chapter Questions
Skill: Application/Analysis