

- 9) Which of the following correctly describes the forms by which energy flows through an ecosystem from entry to exit?
- A) heat → chemical → heat
 - B) chemical → heat → light
 - C) light → heat → chemical
 - D) light → chemical → heat

Answer: D

- 10) Approximately what proportion of the carbon dioxide (CO₂) released by burning fossil fuels remains in the atmosphere, contributing to the trapping of heat close to Earth's surface?
- A) 90%
 - B) 50%
 - C) less than 1%
 - D) 5%

Answer: B

- 11) Which of the following terms describes membrane-enclosed components of cells that carry out specialized functions?
- A) organelles
 - B) cells
 - C) organs
 - D) tissues

Answer: A

- 12) Which of the following represents the correct hierarchy of biological organization from large scale to smaller scale?
- A) biosphere → communities → populations → ecosystems → organisms
 - B) biosphere → ecosystems → populations → communities → organisms
 - C) communities → populations → organisms → ecosystems → biosphere
 - D) biosphere → ecosystems → communities → populations → organisms
 - E) ecosystems → biosphere → communities → populations → organisms

Answer: D

- 13) Living things are divided into three different domains. Which of these domains are classified as prokaryotes?
- A) Bacteria and Fungi
 - B) Bacteria and Archaea
 - C) Archaea and Eukarya
 - D) Bacteria and Eukarya

Answer: B

- 14) 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) Animalia
 - C) Plantae
 - D) Fungi
 - E) Archaea

Answer: E

- 15) Strong evidence in support of the common ancestry of all life comes from which of the following observations about living things?
- A) the ability of plants to convert light energy to chemical energy
 - B) the fact that decomposers include both bacteria and fungi
 - C) the existence of a nearly universal genetic code
 - D) the universal use of protein catalysts by all cells

Answer: C

- 16) Charles Darwin proposed that "descent with modification" resulted when organisms of a particular species become adapted to their environment because they possess which of the following characteristics?
- A) nonheritable traits that enhance their survival and reproductive success in the local environment
 - B) nonheritable traits that enhance survival and decrease their 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

- 17) Which of the following statements describes an individual that is likely to be the most successful in an evolutionary sense?
- A) a male who mates with 20 females and fathers one offspring
 - B) a reproductively sterile individual who never falls ill
 - C) an organism that dies after five days of life but leaves 10 offspring, all of whom survive to reproduce
 - 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: C

- 18) 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 which of the following concepts or processes?
- A) an emergent property
 - B) natural selection
 - C) reductionism
 - D) the hierarchy of the biological organization of life

Answer: B

- 19) Which of the following statements describes Charles Darwin's most significant original contribution to understanding both the unity and the diversity of life?
- A) He proposed a mechanism to explain the process of evolution.
 - B) He explained the relationship between genes and evolution.
 - C) He observed that individuals in a population generally displayed variation for a number of traits.
 - D) He suggested that survival depends upon competition.
 - E) He documented examples of organisms that had evolved over time.

Answer: A

- 20) Which of the following statements is a distinguishing characteristic of fungi?
- A) living in extreme environments like boiling hot springs
 - B) obtaining nutrients by absorbing them from the environment
 - C) converting light energy to chemical energy in the form of sugars
 - D) obtaining nutrients by ingesting other organisms

Answer: B

- 21) The variation observed among the finches Darwin collected from the Galápagos Islands illustrate which of the following principles associated with the evolution of species?
- A) production of more offspring than can survive
 - B) the accuracy of the fossil record
 - C) mutation frequency
 - D) descent with modification

Answer: D

- 22) 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, how would you predict that the average length of the adult fish population might be affected?
- A) Length would rapidly decrease.
 - B) Length would remain unchanged.
 - C) Length would gradually decrease.
 - D) Length would gradually increase.
 - E) Length would rapidly increase.

Answer: C

- 23) 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) Mothers and their infants typically nap for two to three hours each afternoon.
 - D) Young chimpanzees play games in the trees and on the ground.

Answer: C

- 24) The process of science involves testing which of the following?
- A) a hypothesis
 - B) a control group
 - C) an observation
 - D) a conclusion
 - E) a data set

Answer: A

- 25) Which of the following statements describes a controlled experiment?
- A) an experiment that proceeds at a slow pace to guarantee that the scientist can carefully observe all reactions and process all experimental data
 - B) an experiment with at least two groups, one differing from the other by two or more variables
 - C) an experiment that is repeated many times to ensure that the results are accurate
 - D) an experiment with at least two groups, one of which does not receive the experimental treatment

Answer: D

- 26) Which of the following is a requirement for a good scientific hypothesis?
- A) It must explain a large body of specific observations.
 - B) It must generate quantitative data.
 - C) It must be able to be proven true.
 - D) It must lead to testable predictions.

Answer: D

- 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 group is exposed to only one variable rather than several.
 - C) The control group is matched with the experimental group except for the one experimental variable.
 - D) The control group is left alone by the experimenters.

Answer: C

- 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) 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).
 - C) 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.
 - D) Numerous different species live in sunny parts of an ecosystem; therefore, they are all photosynthetic.

Answer: B

- 29) Why is it important that scientific discoveries and ideas be discussed by people with various points of view, from a variety of subdisciplines, and with diverse cultural backgrounds?
- A) Scientists need to exchange their ideas with other disciplines and cultures so that all groups are in agreement regarding the course of future research.
 - B) They can correct each other's approach to make it truly scientific.
 - C) This is another way of ensuring that everyone gets the same results.
 - D) Robust and critical discussion between diverse groups improves scientific thinking.

Answer: D

- 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) A control group assures that an experiment will be repeatable.
 - C) The control group provides a reserve of experimental subjects.
 - D) A control group is required for the development of an "If . . . then" statement.

Answer: A

- 31) Which of the following descriptions constitutes a controlled experiment?
- A) growing one set of 10 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
 - B) growing one set of 10 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
 - C) 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
 - D) using a microscope to observe organisms present in a sample of pond water and recording the number of each type of organism observed

Answer: B

- 32) All the organisms on your campus make up
- A) a population.
 - B) a taxonomic domain.
 - C) an ecosystem.
 - D) a community.

Answer: D

- 33) Which of the following best demonstrates the unity among all organisms?
- A) emergent properties
 - B) DNA structure and function
 - C) descent with modification
 - D) natural selection

Answer: B

- 34) A controlled experiment is one that
- A) tests experimental and control groups in parallel.
 - B) keeps all variables constant.
 - C) proceeds slowly enough that a scientist can make careful records of the results.
 - D) is repeated many times to make sure the results are accurate.

Answer: A

- 35) Which of the following statements best distinguishes hypotheses from theories in science?
- A) Hypotheses usually are relatively narrow in scope; theories have broad explanatory power.
 - B) Theories are proved true; hypotheses are often contradicted by experimental results.
 - C) Hypotheses are guesses; theories are correct answers.
 - D) Theories are hypotheses that have been proved.

Answer: A

- 36) 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 observations are accurate, they will support my hypothesis.
 - C) If my hypothesis is correct, I can expect certain test results.
 - D) If my prediction is correct, it will lead to a testable hypothesis.

Answer: C