

## The Science of Biology

1. A hypothesis can be tested with
  - A. an observation
  - B. an experiment
  - C. inductive reasoning
  - D. deductive reasoning
  - E. a question
2. The area of science that studies life and its processes is called
  - A. biology
  - B. astronomy
  - C. geology
  - D. archeology
  - E. anthropology
3. After making careful observations, scientists construct
  - A. an experiment
  - B. a hypothesis
  - C. a conclusion
  - D. a theory
  - E. a data set
4. After Darwin concluded his voyage on the *Beagle*, he proposed that the process of natural selection was the mechanism for
  - A. artificial selection
  - B. evolution
  - C. sexual selection
  - D. speciation
  - E. overpopulation of finches on the Galapagos Islands
5. Which of the following is a term used in conjunction with how the traits of organisms that leave more offspring become more common in succeeding generations?
  - A. natural selection
  - B. artificial selection
  - C. fitness
  - D. reproduction
  - E. creativity
6. Science is not based on
  - A. reasoning
  - B. observations
  - C. biased opinions
  - D. experimental testing
  - E. using results to rule out alternate hypothesis

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7. Which of the following characteristics are necessary to being “alive”?
  - A. order
  - B. sensitivity
  - C. growth, development, and reproduction
  - D. regulation
  - E. all of the above
  
8. In science when general principles are arrived at from the examination of specific hypotheses (cases), it is called
  - A. inductive reasoning
  - B. deductive reasoning
  - C. theory
  - D. controlled testing
  - E. scientific method
  
9. Which of the following statements is not true about a hypothesis?
  - A. It is an explanation that accounts for careful observations.
  - B. It is a proposition that might be true.
  - C. It fits the known facts.
  - D. It always withstands the test of experiments.
  - E. It might be rejected in future in light of new information.
  
10. A suggested explanation that might be true and is subject to testing by further observations is
  - A. an experiment
  - B. a generality
  - C. a hypothesis
  - D. a scientific principle
  - E. a theory
  
11. Hypotheses that are consistent with the results of experimental testing are
  - A. accepted as scientific principles
  - B. accepted without further question
  - C. conditionally accepted
  - D. modified and reworked until true
  - E. rejected

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12. The scientific process involves
  - A. the acceptance of all hypotheses
  - B. rejection of hypotheses that are inconsistent with experimental results
  - C. the acceptance of only data consistent with the hypothesis
  - D. the acceptance of hypothesis as a fact even after subsequent non-confirmation with experimental results
  - E. the formulation of theories without experimentation or obtaining proof
13. A valid experiment must include
  - A. a variable that is altered in a specific way
  - B. a control in which the variable is left unaltered
  - C. both the control and the variable, which are treated in parallel
  - D. only one variable to be tested
  - E. all of the above
14. The theory that provides a conceptual framework that unifies biology as a science is
  - A. the theory of evolution
  - B. the endosymbiotic theory of mitochondria and chloroplasts
  - C. the cell theory
  - D. the chromosomal theory of inheritance
  - E. none of the above
15. The proposal that one type of organism can change gradually into another type over a long period of time is known as
  - A. creativity
  - B. evolution
  - C. natural history
  - D. preconception
  - E. preservation
16. Which of the following was not one of the beliefs of Darwin's time?
  - A. Various organisms and their structures resulted from creator's actions.
  - B. Species were unchangeable over the course of time.
  - C. The world is fixed and constant.
  - D. Operation of natural laws produces constant change and improvement.
  - E. A divine creator exists.

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17. Darwin described which of the following as “those individuals that possess superior physical, behavioral, or other attributes are more likely to survive than those that are not so well endowed,” and thus more likely to pass their traits to the next generation?
- A. biological diversity
  - B. geometric progression
  - C. natural selection
  - D. superior beings
  - E. survival of modifications
18. A critical requirement of Darwin’s theory is
- A. an uncontrolled growth in all species
  - B. that the earth is relatively young
  - C. all individuals of any given species be identical
  - D. genetic variation is possible in nature
  - E. all species are made at the same time
19. One morning on your way to work (you leave early to beat the rush hour traffic) your vehicle will not start. You curse at the car, but nothing happens. After recognizing that those types of words will not cause the car to start, you ask yourself, “I wonder if I left the lights on last night when I came home from work?” What you said to yourself could be called a(n)
- A. observation
  - B. hypothesis
  - C. experiment
  - D. data
  - E. question
20. Using the same situation described in the previous question, your vehicle not starting when you tried to leave for work is best described as
- A. an observation
  - B. a hypothesis
  - C. an experiment
  - D. data
  - E. a question

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21. A medical scientist is designing an experiment to test the results of a new drug that she hypothesizes will greatly reduce and possibly eliminate the side effects of a new cancer treatment. If this experiment is to be set up correctly, she must
- A. Divide the patients into two groups and give each group the same amount of the new drug.
  - B. Divide the patients into two groups and give one group the new drug and give the other group nothing.
  - C. Divide the patients into two groups and give one group the new drug and the other group a drug that has no effect (for example, a tablet that only contains sugar).
  - D. Divide the patients into two groups and give one group the new drug for one week and the other group a different drug for one week.
  - E. Divide the patients into two groups and give one group one-half of the dosage of the new drug and the other group nothing.
22. The best explanation for the high number of spiders in plot 4 is
- A. There are too many insects.
  - B. There are no centipedes to eat the spiders and there are abundant insects upon which to feed.
  - C. The spiders ate the centipedes and ignored the insects.
  - D. The insects ate the centipedes and avoided the spiders.
23. The plots that were staked out on the island were part of the
- A. question
  - B. observation
  - C. hypothesis
  - D. experimental design
  - E. conclusion
24. The best explanation for the low numbers of spiders and insects in plot 5 is
- A. Centipedes are actively consuming insects and spiders.
  - B. There were not enough insects to support a large centipede population.
  - C. Centipedes prefer spiders to insects.
  - D. There were not enough spiders to catch and consume all the insects.
25. One testable hypothesis that the investigators could examine is
- A. Herbivorous insects prefer islands where spiders and centipedes live.
  - B. Herbivorous insects are not particular about where they live.
  - C. The number of centipedes feeding on them influences herbivorous insects and spider numbers.
  - D. Spiders are effective at avoiding herbivorous insects.

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26. The nature of science implies that
- A. New scientific findings never change current thinking in society.
  - B. Scientists are never sure of their findings and how to present these ideas to society.
  - C. New scientific findings may cause a change in current thinking in society.
  - D. Science has much improvement to make before it can be used to change current thinking in society.
27. If you were to design a long-term research study to determine why there are no human births in Lapland during the months of August, September, and October, you would need to also examine a comparison population of humans in which births took place every month. The primary reason for including a comparison population within the design of this experiment would be to
- A. accumulate more facts that could be reported to other scientists
  - B. test the effects of more than one variable at the same time
  - C. prove that there are no births in Lapland during August, September, and October
  - D. act as a control that would ensure that the results obtained are due to a difference in only one variable
28. The scientific method involves making careful observations, asking questions, formulating hypotheses, collecting data, testing, and making conclusions about the collected data. Of the following statements about toxic wastes, select the choice that science **cannot** address.
- A. Science can test for the presence of toxin in a river.
  - B. Science can determine the level of toxin that is lethal to fish in the river.
  - C. Science can say that a river should not be polluted.
  - D. Science can formulate hypotheses about how a river was polluted.
  - E. Science can determine the rate of mutations caused by toxins in a river.
29. Hierarchical organization in living organisms goes from lowest to highest in which of the following statements.
- A. molecule; cell; organ; population; community
  - B. organelle, organism; community; population
  - C. atoms; cell; organism; ecosystem; species
  - D. ecosystem; population; organism; cell
  - E. cell; organ; tissue; species

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No. on Test	Correct Answer
1	Ans: B
2	Ans: A
3	Ans: B
4	Ans: B
5	Ans: A
6	Ans: C
7	Ans: E
8	Ans: A
9	Ans: D
10	Ans: C
11	Ans: C
12	Ans: B
13	Ans: E
14	Ans: A
15	Ans: B
16	Ans: D
17	Ans: C
18	Ans: D
19	Ans: E
20	Ans: A
21	Ans: C
22	Ans: B
23	Ans: D
24	Ans: A
25	Ans: C
26	Ans: C
27	Ans: D
28	Ans: C
29	Ans: A