

Part A Questions

_____ 1. If the ribosomes of a cell were destroyed, what effect would this most likely have on the cell?

- (1) It would stimulate mitotic cell division.
- (2) The cell would be unable to synthesize proteins.
- (3) Development of abnormal hereditary features would occur in the cell.
- (4) Increased protein absorption would occur through the cell membrane.

_____ 2. The shape of a protein is most directly determined by the

- (1) amount of energy available for synthesis of the protein
- (2) kind and sequence of amino acids in the protein
- (3) type and number of DNA molecules in a cell
- (4) mistakes made when the DNA is copied

_____ 3. Which reproductive pattern would be associated with a species that is most likely to undergo rapid evolutionary change?

- (1) asexual reproduction with a short reproductive cycle
- (2) sexual reproduction with a short reproductive cycle
- (3) asexual reproduction with a long reproductive cycle
- (4) sexual reproduction with a long reproductive cycle

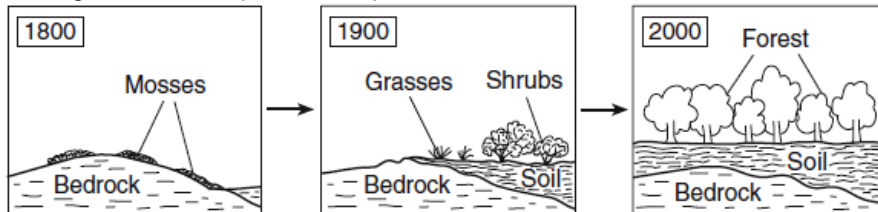
_____ 4. A dogfish shark contains 24 chromosomes in each of its muscle cells. How many chromosomes are normally found in each of its gametes?

- (1) 6
- (2) 12
- (3) 24
- (4) 48

_____ 5. In 1960, an invasive species of fish was introduced into the ecosystem of a river. Since then, the population of a native fish species has declined. This situation is an example of an

- (1) ecosystem that has recovered
- (2) ecosystem altered through the activities of an organism
- (3) environmental impact caused by physical factors
- (4) ecological niche without competition

_____ 6. The diagram below represents a process that occurs in nature.



This diagram can be used to illustrate the

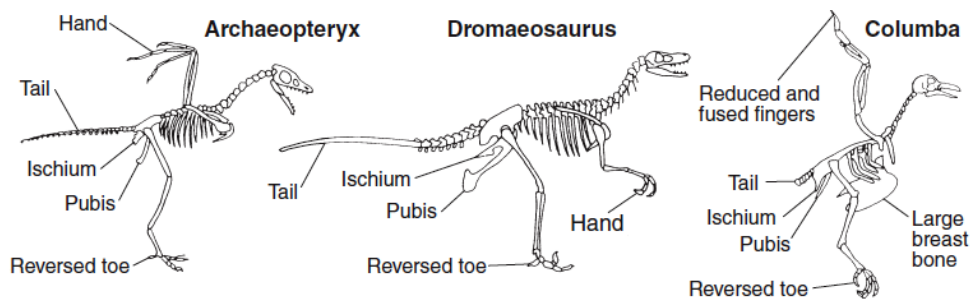
- (1) effects of reduced competition between different types of plant life
- (2) effect of human intervention on a stable ecosystem
- (3) ecological succession from bare rock to stable ecosystem
- (4) evolution of mosses to trees over 200 years

_____ 7. The Audubon Society recently released a study that showed that the populations of some bird species have decreased in number by as much as 50% since 1966. The study eliminated food and water shortages and natural cycles as causes for the decrease. Which factor might have contributed to this decline?

- (1) overproduction of bird offspring
- (2) destruction of natural habitats
- (3) fewer predators
- (4) an energy-rich diet

Part B-1 Questions

- _____ 8. Conclusions based on an experiment are most likely to be accepted when
- (1) they are consistent with experimental data and observations
 - (2) they are derived from investigations having many experimental variables
 - (3) scientists agree that only one hypothesis has been tested
 - (4) hypotheses are based on one experimental design
- _____ 9. Maple trees and tulips are classified as autotrophs because they both
- (1) produce gametes by the process of mitosis
 - (2) produce carbon dioxide and water as metabolic wastes
 - (3) are able to obtain complex organic materials from the environment
 - (4) are able to synthesize organic molecules from inorganic raw materials
- _____ 10. The remains of three organisms are shown below.

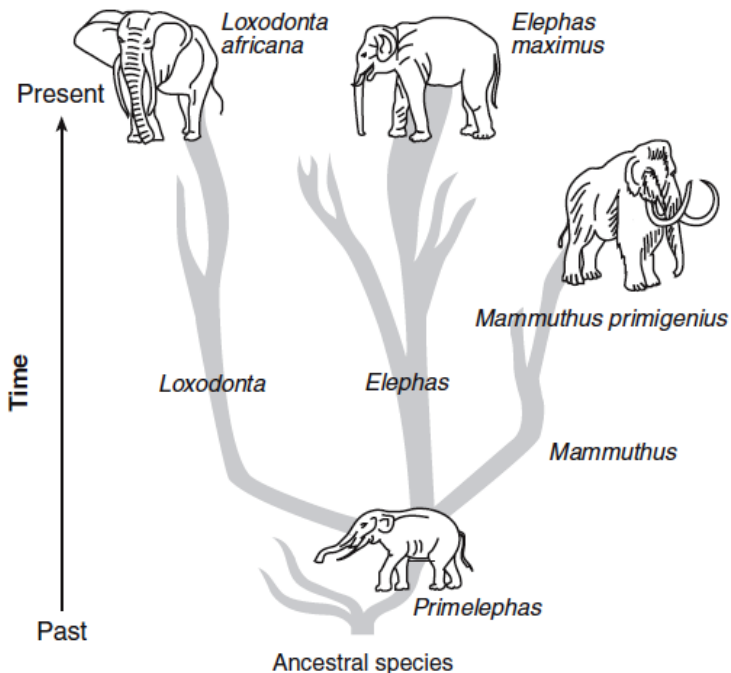


A study of these remains would indicate that these organisms have

- (1) identical food preferences
 - (2) identical body sizes
 - (3) structural similarities
 - (4) habitat similarities
- _____ 11. One possible pathway for the evolution of elephants is represented in the diagram below.

Which statement concerning this pattern of evolution is correct?

- (1) Evolution always results in favorable traits.
- (2) Evolution does not always result in a species that will survive to present time.
- (3) Evolution leads to less complex organisms.
- (4) Evolution results in the same changes in all species.



Name _____

Date Due _____

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Part B-2 Questions

Base your answers to questions 12 through 14 on the passage below and on your knowledge of biology.

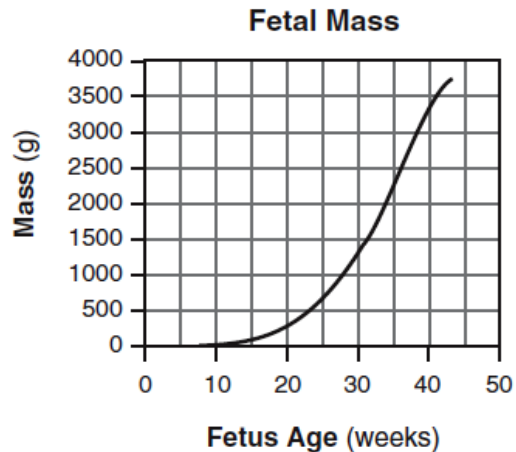
“A normally healthy 35-year-old woman was found to have a severe intestinal infection usually seen in much older and sicker patients in hospitals. Because of so many cases like hers, some doctors became alarmed that the organism responsible could spread rapidly and cause unusually severe illnesses and some deaths. Scientists suspect that the cause is a mutated form of an organism that has a resistance to some of the most common treatments.”

12. Since it is difficult to cure an infection caused by this organism, it might be easier to prevent these infections by using a vaccine. Identify the specific material a vaccine would have to contain to prevent future infections. [1]

13. Explain how this vaccine would prevent future infections. [1]

14. The mutated form of this type of organism could result from a change in a molecule within one member of the original population. Identify the molecule. [1]

Base your answers to questions 15 and 16 on the graph below and on your knowledge of biology. The graph represents changes in the mass of a fetus from week 8 to its birth at week 43.



15. Identify *one* factor that could cause a fetus to grow at a slower rate than that shown in the graph. [1]

_____ 16. During which five-week period did the fetal mass increase at the greatest rate?

- (1) weeks 10–15
- (2) weeks 15–20
- (3) weeks 25–30
- (4) weeks 30–35

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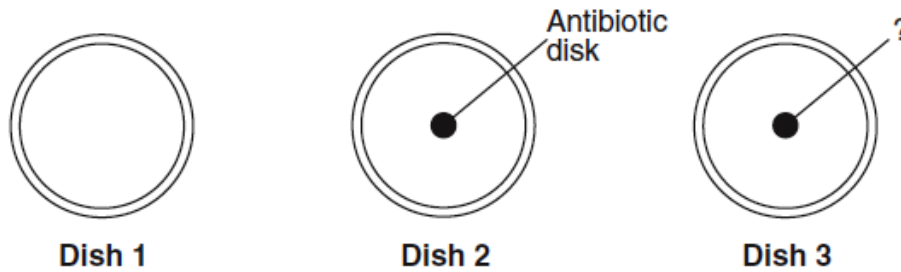
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Part C Questions

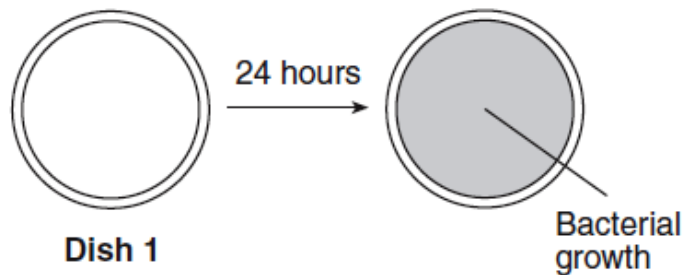
Base your answers to questions 17 through 19 on the information below and on your knowledge of biology.

“A researcher wanted to test the effectiveness of a new antibiotic on *Streptococcus pyrogenes*, the species of bacteria that causes strep throat. Bacteria were added to dish 1, dish 2, and dish 3. A disk soaked in the new antibiotic was then placed in dish 2. Dish 3 was set up as the control. The dishes are shown in the diagram below.”

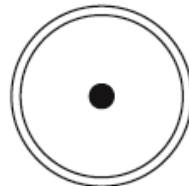


17. State *one* appropriate hypothesis for this experiment. [1]

18. All three dishes were placed in an incubator at 37°C for 24 hours. The results for dish 1 are shown below.



Complete the diagram of dish 2 below to represent an example of experimental results that would support your hypothesis. Explain how your diagram supports your hypothesis. [1]



Dish 2 after 24 hours

19. Describe how the disk in dish 3 should be prepared so it can serve as the control for this experiment. [1]

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Part D Questions

Base your answers to questions 20 and 21 on the information below and on your knowledge of biology.

“A plant known as caltrop is found on one of the Galapagos Islands. The caltrop plant produces seeds with tough, spiny coats. There is a bird species, *Geospiza fortis*, that can crack the tough seed coat and eat the contents inside. On one part of the island where there are many of these birds, the caltrop plants produce fewer seeds and the coats of the seeds have longer and more numerous spines. On another part of the island where there are few of these birds, the plants produce more seeds and the seed coats have fewer, shorter spines.”

20. Identify *one* variation the caltrop seeds have for survival. [1]

21. Identify *one* process that can result in adaptations. [1]

Base your answers to questions 22 and 23 on the information below and on your knowledge of biology.

“Two students each design their own investigations to determine whether resting or exercising beforehand allows a person to squeeze a clothespin more times over a certain period of time. Student *A* squeezes the clothespin as many times as he can after sitting quietly for two minutes. In the second trial he runs in place for two minutes and then squeezes the clothespin as many times as he can. He records the results of each trial in his data table. Student *B* uses the same procedure as student *A*. She also asks that the other 25 boys and girls in her class carry out the same procedure and she records their data. She then calculates the average number of times that the clothespins had been squeezed without exercise and with exercise before the trials.”

22. Based on the description given of the investigations, state *one* reason why student *B*'s investigation will give more reliable results than student *A*'s. [1]

23. Student *B* states that exercising before the second trial will always have the same effect on this type of muscular activity. Explain why the statement made by student *B* could be questioned. [1]

_____ 24. A laboratory technique is illustrated in the diagram to the right. The technique of lowering the coverslip at an angle is used to

- (1) make organelles more visible
- (2) reduce the formation of air bubbles
- (3) make the specimen transparent
- (4) reduce the size of the specimen

