Missouri

End-of-Course Assessment

Biology

Session I

Missouri Department of Elementary and Secondary Education
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Directions to the Student

Today you will be taking Session I of the Missouri Biology Test. This is a test of how well you understand the course level expectations for Biology.

There are several important things to remember:

1. Read each question carefully and think about the answer. Then choose the one answer that you think is best.
2. Make sure you completely fill in the bubble for the answer on your answer sheet with a number 2 pencil.
3. If you do not know the answer to a question, skip it and go on. You may return to it later if you have time.
4. If you finish the test early, you may check over your work.
5. Do NOT write in your test booklet. Mark your answers directly on your answer sheet with a number 2 pencil.

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1. **The gopher snake uses its glottis to produce a hiss that sounds similar to a rattlesnake's rattle. What is the most likely reason a gopher snake would do this?**

   A. to attract prey

   B. to attract a mate

   C. to confuse predators

   D. to increase adrenaline flow

2. **A population of salamanders that live in a river require clear, fresh water to survive. A flood causes tons of sediment to be suspended in the river. Which of these most likely will happen to the salamander population?**

   A. The salamanders will adapt to life on land.

   B. The salamanders will move to another river.

   C. The salamanders will adapt to living in the muddy water.

   D. The salamanders will decrease in number because of the water quality.

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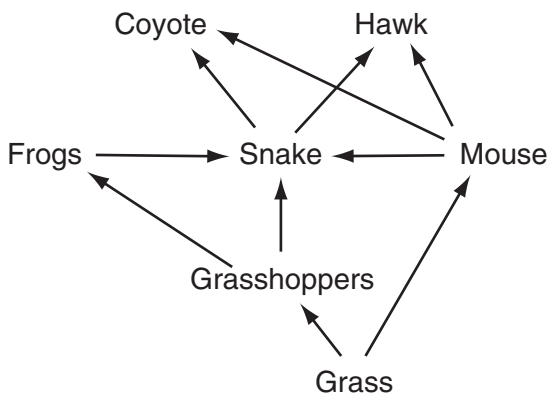
3. The diagram below shows a food web.



A reduction in which of these would lead to a decrease in all the other populations in the web?

A. coyote

B. grass

C. grasshoppers

D. snake

4. Which of these best explains the difference between the way animals and plants exchange gases with their environments?

A. Animals use only photosynthesis, while plants use both photosynthesis and respiration.

B. Animals use only respiration, while plants use both photosynthesis and respiration.

C. Animals use both photosynthesis and respiration, while plants use only respiration.

D. Animals use both photosynthesis and respiration, while plants use only photosynthesis.

Go On ▶

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5. What is the main function of a selectively permeable cell membrane?

A. storage of water

B. storage of chemicals

C. breaks down molecules within the cell

D. regulates what enters and leaves the cell

6. The papaya mealybug is a pest that poses a threat to many tropical plants. Which fate of the mealybug would result from the inability of the species to reproduce?

A. The species would mutate.

B. The species would increase.

C. The species would become extinct.

D. The species would continue to thrive.

7. In a certain insect, round wings (R) are dominant to pointed wings (r). Which cross will produce the greatest number of genotypic and phenotypic variations?

A. rr × rr

B. Rr × Rr

C. Rr × RR

D. RR × RR

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8. Polar bears swim across large expanses of ocean while hunting for seals, their main source of food. The bears use sea ice as resting spots during their long swims. However, the sea ice is rapidly melting as a result of global warming. Which statement describes what most likely will happen if global warming continues at its present rate?

A. Polar bear and seal populations will both increase.

B. Polar bear populations will decrease, and seal populations will increase.

C. Polar bear populations will increase, and seal populations will decrease.

D. Polar bear populations will decrease, and seal populations will remain the same.

9. A strand of DNA is exposed to intense heat. Which of these best describes what will happen to the strand of DNA?

A. The chemical bonds of the DNA molecule will be broken.

B. More nitrogen base pairs will add on to the DNA molecule.

C. The chemical bonds of the DNA molecule will be strengthened.

D. The nitrogen base pairs in the DNA molecule will switch places.

10. Which structure is primarily responsible for directing all processes of a plant cell?

A. chloroplast

B. lysosome

C. mitochondria

D. nucleus

Go On ▶

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11. The loss of habitat in a forest region has caused some plant species to become extinct, while others survive. The process by which some plant species survive and others do not in a changing environment is <u>best</u> explained by

A. natural selection

B. law of segregation

C. biological magnification

D. alternation of generations

12. What is the role of hydrogen bonds in the structure of DNA?

A. to code for proteins

B. to synthesize proteins

C. to separate the strands

D. to connect the base pairs

13. Which process allows for an organism to increase the number of body cells during development?

A. budding

B. conjugation

C. meiosis

D. mitosis

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14. A forest fire destroys the majority of the trees in a state park. Which effect will this most likely have on secondary consumers in that ecosystem?

A. The amount of available energy will increase because there will be fewer predators in the forest.

B. The amount of available energy will increase because there will be less competition from producers.

C. The amount of available energy will decrease because fewer primary consumers will survive the lack of vegetation.

D. The amount of available energy will remain constant because secondary consumers are not reliant on primary consumers.

15. The loulu tree in Hawaii reproduces by a seed encased in a fruit. Non-native species, such as pigs and rats, eat the fruit as a regular part of their diet, drastically reducing the regeneration rate of the loulu. What most likely would be the outcome for loulu trees in the next century without intervention?

A. They would become extinct.

B. They would rebound and thrive.

C. They would remain at their current levels.

D. They would evolve a new way to reproduce.

16. Which of these would lead to a lower rate of photosynthesis in a plant?

A. an increase in the amount of oxygen in the air

B. a decrease in the amount of oxygen in the air

C. an increase in the amount of carbon dioxide in the air

D. a decrease in the amount of carbon dioxide in the air

Go On ▶

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17. What is the result of the fertilization of an egg?

A. It restores the diploid number of chromosomes.

B. It deletes polypeptide chains in the chromosomes.

C. It gives offspring more chromosomes than the parents.

D. It gives offspring fewer chromosomes than the parents.

18. Which of these <u>best</u> describes the initial change caused by a DNA mutation?

A. a change in the sequence of base pairs

B. a change in the production of enzymes

C. a change in the number of nucleosomes within a cell

D. a change in the number of hydrogen bonds between the bases

19. A new species of snake was introduced to a tropical region. Scientists then noticed a steady decline in the presence of field mice and an increase in the number of snakes. Which of these is the <u>most likely</u> explanation about why the population size of each animal changed?

A. The snakes introduced to the region dominated the habitat, forcing the mice to find another place to live.

B. The mice became prey to the introduced snakes, allowing the snake population to increase but decreasing the mice population.

C. The snakes introduced to the region competed with the mice for food, allowing the snake population to increase but decreasing the mice population.

D. The people in the surrounding area set traps that killed the mice, allowing the snakes to live without any predators and therefore to increase in number.

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20. Which statement best describes an advantage of asexual reproduction for a population of organisms?

A. The population can increase in number more rapidly.

B. The population can develop greater genetic diversity.

C. The population can maintain the same number of organisms.

D. The population can adapt more quickly to a changing environment.

21. The following cell structures are located within cells that make proteins. Which description best explains the relationship among these cell structures in making a protein?

- **nucleus**
- **ribosome**
- **endoplasmic reticulum (ER)**

A. nucleus makes protein → protein winds through the ER → protein folds into its active shape

B. nucleus directs ER to assemble the protein → ribosomes surround protein → protein folds into its active shape

C. ER creates protein → DNA in the nucleus codes for ribosomes to surround protein → protein folds into its active shape

D. DNA in nucleus codes for protein → protein assembled in ribosomes and moves to ER → protein folds into its active shape

Go On ▶

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22. Which of these best describes mutualism?

A. a relationship between two species where both species benefit

B. a relationship between two species where neither species benefits

C. a relationship between two species where one species benefits and the other is not affected

D. a relationship between two species where one species benefits and the other species is harmed

23. Which of these would be least likely to diffuse across the phospholipid bilayer of a cell membrane?

A. water

B. oxygen

C. sodium ions

D. carbon dioxide

24. How would a drop in temperature most likely affect the processes of cellular respiration and photosynthesis?

A. The rates of both cellular respiration and photosynthesis would decrease.

B. The rates of both cellular respiration and photosynthesis would remain constant.

C. The rate of photosynthesis would increase, and the rate of cellular respiration would decrease.

D. The rate of photosynthesis would decrease, and the rate of cellular respiration would increase.

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25. Which abiotic factor limits the altitude at which plants can grow?

A. the presence of a parasite

B. the temperature of the area

C. the presence of herbivorous animals

D. the concentration of microbes in the soil

26. How many daughter cells are formed in meiosis?

A. 0

B. 1

C. 2

D. 4

27. Which of these shows the steps by which proteins are coded and synthesized?

A. RNA → DNA → protein

B. DNA → RNA → protein

C. protein → RNA → DNA

D. protein → DNA → RNA

28. Two gametes containing 20 chromosomes fuse during fertilization. How many chromosomes will the zygote cell contain?

A. 10

B. 20

C. 40

D. 80

Go On ▶

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29. A molecule can easily pass through the selectively permeable membrane of an animal cell. Which of these <u>most likely</u> describes the molecule?

A. The molecule is very small and charged.

B. The molecule is very large and charged.

C. The molecule is very small and not charged.

D. The molecule is very large and not charged.

30. Which of these <u>directly</u> allows blood cells to transport oxygen to various parts of the body?

A. carbon dioxide

B. hemoglobin

C. antibodies

D. platelets

31. One species of Galapagos finches, the cactus finch, eats insects off cactus plants. A disease kills off most of the cacti in the Galapagos Islands. Which of these <u>most likely</u> would happen to the carrying capacity of the island?

A. It would increase a small amount since the insect population would decrease.

B. It would remain about the same since the finches would change to a different diet.

C. It would increase exponentially since the insects would have limited places to hide.

D. It would decrease considerably since the finches are specifically adapted to their niche.

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32. The chromosome structure in a cell accounts for genetic variation based on the order of its

A. sugar groups

B. nitrogen bases

C. hydrogen bonds

D. phosphate groups

33. What will happen if an animal cell that has a solute concentration of 1% is placed in a 5% saltwater solution?

A. It will shrink because there is less water outside of the cell than there is on the inside.

B. It will burst because there is more water on the outside of the cell than there is on the inside.

C. It will burst because there is more water on the inside of the cell than there is on the outside.

D. It will remain the same size because there is an equal amount of water on the inside and outside of the cell.

34. Which statement describes a way in which cellular respiration <u>differs</u> from photosynthesis?

A. Cellular respiration consists of two phases.

B. Cellular respiration releases carbon dioxide.

C. Cellular respiration provides energy for the cell.

D. Cellular respiration is carried out in one specific organelle.

Go On ▶

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35. A cell with 24 chromosomes undergoes mitosis twice. How many chromosomes will each daughter cell have?

A. 6

B. 12

C. 24

D. 48

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