



Life and Environmental Sciences
How Living Things Interact With Their Environment

Additional FCAT Practice Questions

Directions: Select the best answer for each of the following questions

1. The dronefly mimics the honeybee in the sense that it has the same yellow stripes and body shape, but unlike a honeybee, it has no stinger. What is the main principle behind mimicry?
 - A. Developing a similar color, shape or behavior that has provided another organism a survival advantage.
 - B. It provides the prey an advantage in a predator-prey relationship.
 - C. Mimicry results in the similarity between organisms that are in direct competition with each other.
 - D. The principle of mimicry is to copy the genetic makeup of another organism.

2. A predator sometimes expends considerable effort in catching prey. Which of the following represent the most important two benefits that a predator gains from consuming prey animals?
 - A. The predator gains nutrition in the form of needed nutrients, and genetic material from the prey's DNA.
 - B. The predator gains nutrition in the form of needed nutrients, and energy extracted from the molecules of prey's body.
 - C. The predator gains energy and water extracted from the molecules of the prey's body.
 - D. The predator gains nutrition in the form of needed nutrients, and enzymes that it can use from the prey's blood.

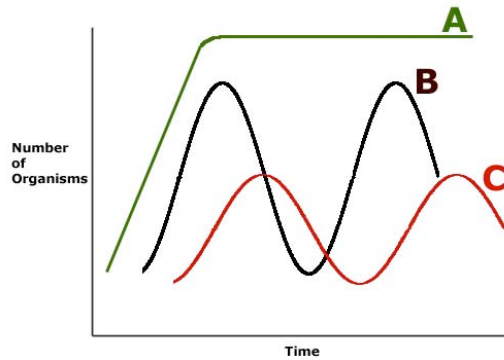
3. The lupin is a popular garden plant that produces pretty flowers, and is part of the legume family of plants. Many legumes have nodules on their roots that contain bacteria (lower part of photo).



These bacteria have the ability to separate the atoms of free nitrogen. What is the important ecological role of these bacteria?

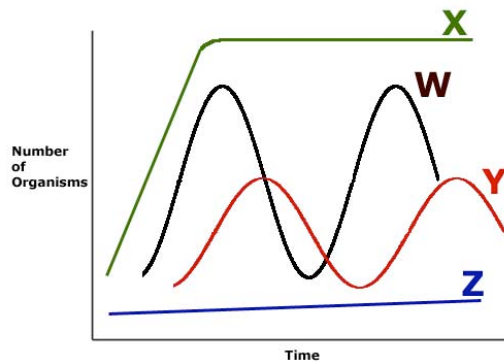
- A. The bacteria absorb nitrogen from the soil that it can be added back into the air.
- B. The bacteria are decomposers that break down dead material.
- C. The bacteria fix atmospheric nitrogen, turning it into a form that is useable by other organisms.
- D. The bacteria increase the effectiveness of roots absorbing water.

4. A biologist keeps track of the numbers of three different organisms, represented on the following graph by letters A, B and C.



Which of the following statements best describes the two organisms in the graph that represent a predator-prey relationship?

- A. A and C, where C is the predator
 - B. B and C, where B is the predator
 - C. A and B, where A is the predator
 - D. B and C, where C is the predator
5. A biologist keeps track of the numbers of three different organisms, represented on the following graph by letters W, X, Y, Z.



Which of the organisms is most likely the predator?

- A. W
- B. X
- C. Y
- D. Z

6. In many parts of the United States that require home heating, homeowners have switched from oil to natural gas as a heating fuel because of convenience and it burns cleaner. Which of the following is a by-product of burning both natural gas and oil?
- A. Methane
 - B. Hydrogen
 - C. Carbon dioxide
 - D. Oxygen
7. One idea that oil companies have begun using is called carbon dioxide sequestering. The idea works by pumping carbon dioxide emissions back into the ground to help force up underground oil reserves. Once the oil is obtained, the well is sealed, trapping the carbon dioxide gas underground. Which of the following best describes an environmental advantage of carbon dioxide sequestering?
- A. Carbon dioxide is removed from the atmosphere, which reduces pollution.
 - B. Carbon dioxide is added to the ground, where it can act as a natural fertilizer.
 - C. Carbon dioxide is added to the ground, where it can stabilize rock formations that would otherwise collapse.
 - D. Carbon dioxide is removed from the atmosphere, which may reduce the potential effects of global warming.
8. Coal is a fossil fuel. It can be extracted from the ground by open pit mines, or by underground mines. Once extracted, it can be burned to provide heat and energy. Why is coal referred to as a "fossil" fuel?
- A. Coal forms from energy-rich organic materials that were deposited millions of years ago. The source of these organic materials was plants and animals, therefore the term "fossils".
 - B. Coal deposits are from depressions in certain types of rock.
 - C. Chunks of mined coal often have the appearance of bones.
 - D. When volcanoes erupt, the magma sometimes flows over organic materials, burning it to form coal.

9. Any process carbon dioxide into the atmosphere is called a carbon source. Carbon sinks, such as forests, remove carbon dioxide from the atmosphere. In the last 100 years, the number of carbon sources has steadily increased, while carbon sinks have decreased. Which of the following represents the danger in the changing balance between carbon sources and carbon sinks?
- A. Higher levels of carbon dioxide in the atmosphere may contribute to climate change.
 - B. Less carbon sinks means less nutrients in the soil.
 - C. More carbon sources means that fossil fuels will run out sooner.
 - D. The lack of carbon sinks could endanger Earth's fresh water supplies.
10. Which of the following is not a fossil fuel?
- A. Oil
 - B. Wood
 - C. Coal
 - D. Natural Gas
11. Imagine that the number of Florida panthers occupying a particular area has recently dropped. If you did not know whether the panthers were being hunted, leaving the area, or dying of disease, which of the following would be the most effective way to investigate the cause of the decline?
- A. Observe the behavior of panthers in a local zoo
 - B. Trap and collar a number of panthers to follow their movements using radio and GPS technology
 - C. Follow a particular panther (at a safe distance) for a year
 - D. Collect panther fecal samples for analysis

12. Which of the following is most likely to represent a pioneer community that appears in an area after a forest fire?
- A. Small mammals and shrubs
 - B. Trees and birds
 - C. Flowering plants and insects
 - D. Small plants and grasses that tolerate high temperatures and direct sunshine
13. A forested area is devastated by fire. Which of the following best represents the plants that will be first to inhabit the area?
- A. Plants that can tolerate very cool temperatures
 - B. Plants that are slow growers
 - C. Plants that reproduce rapidly in high temperatures and direct sunlight
 - D. Plants that start as seeds carried to the area in bird droppings
14. Florida forest protection agencies have many initiatives to prevent forest fires. However they still can occur, and as devastating as they are, they are nowhere near as devastating as the destruction of Alaskan tundra ecosystems that can occur due to human activity such as road or pipeline building. What is the most reasonable explanation for why tundra destruction is worse than forest fires in Florida?
- A. Growing seasons in cold ecosystems are very short, so it may take hundreds of years for plant life to re-establish itself.
 - B. The Florida forest ecosystem is not as complex.
 - C. Florida forest ecosystems are not seriously damaged by fire.
 - D. It is easier for firefighters to stop a fire in Florida than it is to stop human activity in sensitive areas of the tundra.

15. The worst type of destruction of a habitat is when it completely removed right down to the bare rock. Recovery from this type of destruction is possible, but it takes a very long time. Which of the following is the reason why recovery from such destruction takes so long?
- A. Accumulation of areas of water
 - B. The growth of plants
 - C. The formation of new soil
 - D. Migration of animals to the area
16. One of the most powerful antibiotics at the disposal of doctors is vancomycin. However, in 1987 a vancomycin resistant enterococcus (VRE) bacteria was first reported. Doctors are fearful that careless use of vancomycin will lead to more resistant bacterial strains such as VRE. What process is responsible for the development of these resistant strains?
- A. Asexual reproduction
 - B. Gene therapy
 - C. Protein synthesis
 - D. Natural selection

17. Over time, the genetic variation in a population will increase over time as sexual reproduction yields new genetic combinations and mutations yield new genes. However some populations have very little variation, such as this farmer's crop of canola plants.



The plants in this crop are genetically very similar. What is the most likely reason why this is so?

- A. Artificial selection is occurring, only plants with desired traits are allowed to produce the seeds for the crop
- B. The environment that the crop is grown in is very stable
- C. Not all of the plants are reproducing sexually
- D. Gene therapy was used to insert the desired genes into the plants

18. The Kaibab and Abert squirrels live on opposite sides of the Grand Canyon. They are two distinct species that do not interbreed, but it is believed that at one time in the past, they were part of population.



What is most responsible for the formation of the these two new species from the original population?

- A. The formation of the Grand Canyon
 - B. Natural selection selecting for different traits on opposite sides of the canyon
 - C. Changing water levels in the Colorado river
 - D. The density of plant life on both sides of the canyon
19. Some large breeds of dogs are susceptible to a common genetic defect called hip dysplasia. With this defect, the ball and socket joint of the hip does not form properly, and as a result, the hips cannot support the full adult weight of the dog. This genetic defect almost exclusively affects purebred dogs, mixed breed dogs are rarely affected. Which of the following is the best explanation for why purebred dogs are more susceptible to hip dysplasia?
- A. Purebred dogs are forced to participate in rigorous dog shows that place extra stress on the hips.
 - B. Purebred dogs are often heavier, placing more stress on the hips.
 - C. Purebred dogs have smaller populations, and therefore, fewer genes than mixed breed dogs.
 - D. Humans control the breeding of the purebred dogs, therefore natural selection cannot "weed out" those dogs with the hip dysplasia defect.

20. A cold-blooded predator such as a gopher snake will require less prey animals than a warm-blooded predator, such as an owl. This is due to the lower metabolic requirements of the snake - it will only need to eat one gopher every few days, while an owl may have to eat several gophers every evening in order to get enough energy to survive. Which of the following best explains the selective pressure placed on gophers by these two predators?
- A. The selective pressure on the gopher population will be greater from the snake predation than from the owl predation.
 - B. The selective pressure on the gopher population will be greater from the owl predation than from the snake predation.
 - C. The selective pressure on the gopher population will be equal with respect to the predation by the owl and snake.
 - D. The predation by the owl and snake places no selective pressure on the gopher population.

Answers

1. A
2. B
3. C
4. D
5. C
6. C
7. D
8. A
9. A
10. B
11. B
12. D
13. C
14. A
15. C
16. D
17. A
18. B
19. D
20. B