**2000 #3**

Species such as the dusky seaside sparrow, the passenger pigeon, and the woolly mammoth are extinct. Populations of other species have declined to the point where they are designated as threatened or endangered.

1. Identify one threatened or endangered species and explain why its population has declined.
2. Describe three characteristics of organisms that would make them particularly vulnerable to extinction.
3. Present three arguments in favor of the maintenance of biodiversity.
4. Name and describe one United States federal law or one international treaty that is intended to prevent the extinction of species.

**2001 #2**

After reading the following excerpt from an article about the interrelationships among organisms in an oak forest, answer parts (a), (b), and (c), which follow.

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| **Chain Reactions Linking Acorns to Gypsy Moth Outbreaks and Lyme Disease Risk** Oak trees (*Quercus* ssp.) produce large autumnal acorn crops every two to five years, and produce few or no acorns during intervening years. Acorns are a critical food for white-footed mice (*Peromyscus leucopus*). Mice are important predators of the pupal stage of the gypsy moth (*Lymantria dispar*). This introduced insect periodically undergoes outbreaks that defoliate millions of hectares of oak forests, decreasing tree growth, survival, and acorn crop production. An abundance of acorns provides food for white-tailed deer (*Odocoileus virginianus*). Mice and deer are the primary hosts of the black-legged tick (*Ixodes scapularis*), which carries Lyme disease. |

1. In the space provided below, diagram a food web based on the interrelationships of the organisms identified in the excerpt.
2. Design a controlled experiment that tests the relationship between acorn production and gypsy moth population. Include the hypothesis that the experiment tests.
3. Briefly describe a strategy that uses integrated pest management for the control for the black-legged tick population.

**2003 #1**

Read the following article from the *Fremont* *Examiner*.

A researcher studying the ecology of the deciduous forest outside of Freemont has made an alarming discovery. While taking an inventory of the species present on the forest floor, Professor Peter Tate discovered many earthworms of an Asian species not previously known to live in this area. The Asian worms, unlike native worms, have voracious appetites.

The forest floor is home to a myriad of species that live in the leaf litter, which is composed of several years’ accumulation

of slowly decomposing leaves. Dr. Tate explained that “the leaf litter is critical to the survival of local species of forest plants.” Dr. Tate has found the Asian worms, unlike their indigenous cousins, consume the entire layer of leaf litter in a single season. He said, “This sets the stage for the takeover by invasive exotics such as Japanese silt grass.” Dr. Tate and other scientists are exploring strategies for the control for the Asian worms.

**Worm Invasion**

FREEMONT EXAMINER

1. Support Dr. Tate’s assertion that “the leaf litter is critical to the survival of local species of forest plants.” Include in your discussion the roles of leaf litter in a deciduous forest ecosystem.
2. Describe THREE abiotic changes that would be likely to result if the exotic worms consumed all the leaf litter in a single year.
3. For one of the changes you identified in part (b), explain how the change could set the stage for takeover of Japanese silt grass or other exotic species.
4. Design a controlled experiment to determine whether the worms, in fact, do change the forest ecosystem. Identify the environmental factor you will measure, and include the specific hypothesis you will test and the data you will collect.

**2003 #4**

The American whooping crane and the California condor are two of North America’s largest birds. Although both are rare and endangered, they are protected, and large preserves are available for them. The two species, however, seem to be responding differently to these conservation efforts.

In 1937, the whooping crane population was reduced to 14 individuals. It has since recovered; currently more than 200 birds live and breed in the wild. In the preservation of endangered species, the whooping crane is a success story. On the other hand, the California condor population declined rapidly so that no birds remained in the wild between 1987 and 1992. Condors were reintroduced into the wild after 1992 and approximately 50 condors currently live in the wild in California and Arizona. However, the recovery program cannot yet be considered a success.

1. Identify and describe TWO major causes for the original decline of the species. (You may describe one cause for each species or two causes for one species.)
2. Describe TWO measures that have been taken to protect these species. (Specify which of the species benefited from each measure.)
3. Describe TWO important characteristics of an endangered species that would cause it to be slow to recover.
4. Make one economic or ecological argument for protecting the condor, the whooping crane, or another endangered species that you identify and make one economic or ecological argument against protecting it.

**2010 #5**



The zebra mussel, a mollusk native to Eurasia, was first discovered in the Great Lakes of North America in 1988. Zebra mussels attach to solid substrates and are filter feeders. Adult zebra mussels can survive for several days or even weeks out of water if the temperature and humidity are favorable. An adult female zebra mussel can produce as many as one million eggs per year. The recent range of occurrence of zebra mussels in the United States is indicated by shading in the map above.

1. Why are zebra mussels located primarily in areas in the eastern United States rather than in the western United States?
2. How are zebra mussels introduced into isolated lakes? Describe one viable method for preventing the spread of zebra mussels into isolated lakes.
3. Identify and explain one impact that zebra mussels can have on aquatic ecosystems.
4. Identify another invasive species, either terrestrial or aquatic, and describe one negative impact it has had.
5. One strategy for controlling an invasive species has been to introduce another nonnative species to control it; this strategy can often have unintended results. Give a specific example of the use of this strategy and discuss a negative impact of introducing a nonnative species to control and invasive species.
6. Discuss TWO specific characteristics of invasive species that enable them to thrive in new environments.