

CHAPTER 19	Thought Lab 19.2: Maintaining Genetic Diversity in the Whooping Crane Answer Key	BLM 19.2.5A
ANSWER KEY		

Answers to Analysis Questions

1. Genetic diversity would be low compared to the genetic diversity in the crane population in the 1700s or 1800s. The cranes have undergone a bottleneck, probably accompanied by genetic drift, both of which lower genetic diversity.
2. Pair bonding would increase the effort needed to establish a captive breeding program because you could not catch just any two cranes to start the program. You would have to capture both members of a bonded pair, which would be a bit difficult without seeing them at the nest. Likewise, if one member of a pair dies in captivity, the other adult is no longer of use in the program. Effectively, its genetic makeup is removed from the gene pool.
3. Conservationists could not identify which cranes are more likely to be successful unless the environmental tolerances of the genetic information are identified. However, low genetic diversity would lead conservation officers to be concerned about the crane population's ability to survive in the wild should the environment change.
4. Whooping cranes raised as sandhill cranes probably think they are sandhill cranes. They would learn the sandhill crane's mating rituals, for example, but might only be able to respond to the rituals of whooping cranes. Alternatively, they may choose sandhill cranes as prospective mates.
5. Effective techniques include protecting the wild breeding sites, removing predators from the wild breeding sites, banning interference with crane migrations, banning hunting of whooping cranes, and storing eggs and sperm of whooping cranes for future programs. You should explain your chosen method. The explanation should indicate how the method works and the impact of the action on the population of the cranes.

Answers to Extension Questions

6. A gene bank is a term used to describe the storage of biological tissue for later use in reconstructing a species that is currently on the brink of extinction, or for storage of genetic diversity in agriculturally important species where the farming practices have reduced the varieties currently in production. Gene banks are a last resort for the preservation of a species. For many animals, we lack the technology to use the tissues to create individuals. We store the tissue in the hope that some time in the future we will learn how to successfully use it. For agricultural purposes, gene banks are an important and successful way of retaining genetic diversity that is in the process of being lost by farming and production practices.
7. The question is plural, so you should list at least two methods. Eggs are collected from wild nests. Breeders can take the first and second eggs laid, and the pair will lay a third. Eggs are incubated in separate locations to reduce the impact of disease on the hatchlings. Hatchlings are imprinted with hand puppets so they grow up thinking they are whooping cranes. Technologies should be identified and described.