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.

    (a) Identify one threatened or endangered species and explain why its population has declined.

    (b) Describe three characteristics of organisms that would make them particularly vulnerable to extinction.

    (c) Present three arguments in favor of the maintenance of biodiversity.

    (d) Name and describe one United States federal law or one international treaty that is intended to prevent the extinction of species.

Question 3 Scoring Guide

(a)   2 POINTS MAXIMUM

1 point earned for identification of a specific species. General names are not accepted (e.g., whale, owl), unless <u>all</u> members of the group are endangered (e.g., elephant).

<u>Examples of Species Accepted</u>
Giant panda, elephant, whooping crane, manatee, rhinoceros, California condor, bald eagle, western lily, wooly spider monkey, Florida panther, blue whale, Galapagos tortoise

1 point earned for explanation linked to species above

<u>Examples of Explanations Accepted</u>
● habitat alteration for a specific reason, such as:
  - human encroachment (urban sprawl)
  - fragmentation (building highways)
  - conversion (building a marina)
  - simplification (agriculture)
  OR
  - identification of the specific habitat altered (e.g., "The bamboo forest needed by the giant panda has been destroyed.")
● hunting or poaching for a specific reason (e.g., food, sport, commercial, cultural beliefs)
● inability to compete with non-native or invasive species (must be specific, e.g., "Arrowroot is outcompeted by the non-native purple loosestrife.")
● pollution (must be specific, e.g., "Lead poisoning of bottom-feeding waterfowl."
● pest control (must be specific, e.g., "DDT causes thin egg shells in bald eagles.")

(b)   3 POINTS MAXIMUM

Each characteristic must be clearly described, explained, **or** a specific example must be provided (only first three are graded)

<u>Acceptable characteristics (need description)</u>
- specialized feeding behavior/food source
- requires large territory
- preys on livestock/people
- competition with humans (for space/food)
- no natural defense (against introduced species)
- fixed migratory patterns
- specialized reproductive behavior, breeding
- low reproductive rate
- limited geographic range, habitat
- specific behavior patterns
- exploited for economic value (specific)
- k-strategist
- feed at high trophic level, biomagnification
- large size
- slow speed
- limited range of tolerance
- small population linked to lack of genetic diversity

(c) 3 POINTS MAXIMUM

1 point earned for each argument (only first three are graded)

- ecosystem function and/or stability based on a specific reason such as
  - organism's role in food web (e.g., keystone species, predator-prey relationships)
  - organism's role as a pollinator
  - organism's role in nutrient cycles (e.g., decomposer, nitrogen-fixer)
- future medical resources
- future food resources
- economic potential (ecotourism, future products with market value)
- genetic bank (species diversity to allow continued evolution)
- recreation (hiking, camping, hunting, fishing, etc.)
- scientific value for research/natural lab
- scenic/aesthetic value
- symbolic/religious value
- intrinsic value/ethical reasons (organism have inherent right to live, ecological wealth)
- provides resources for indigenous human population
- minimizes spread of infectious diseases

(d) 2 POINTS MAXIMUM

1 point earned for naming the law or treaty
1 point earned for describing the law

Federal Laws (1 point)	Components (1 point; need ONE of the following)
Endangered Species Act (ESA)	- identify species that are endangered/threatened <u>or</u>
	- protect endangered species from one of the following: import/export, taking, harassing, harming, hunting, shooting, wounding, trapping, killing, capturing, collecting, possessing, selling, delivering, transporting, shipping, receiving <u>or</u>
	- penalize violators <u>or</u>
	- design protection plans <u>or</u>
	- reintroduce species <u>or</u>
	- protect habitat

Lacey Act - prohibits transport of protected species between states

The following are also acceptable with a correct description:

Wild Bird Conservation Act	Eagle Protection Act
Migratory Bird Treaty Act	African Elephant Conservation Act
Whaling Conservation and Protection Study/Act	Fur Seal Act
Marine Mammal Protection Act	Whaling Convention Act
Migratory Bird Conservation Act	Fish and Wildlife Conservation Act
Fish and Wildlife Coordination Act	Fish and Game Sanctuary Act
Marine Protection, Research and Sanctuary Act	Fish and Wildlife Act
Wildlife Restoration Act of 1937 (Pittman-Robertson Act)	
National Wildlife Refuge System Administration Act	

International Treaties:
- CITES (Convention on International Trade in Endangered Species) – regulates international trade of protected species and their products
- Convention on Biological Diversity – treaty signatories are expected to adopt biodiversity plans, establish protected ecosystems, promote sustainable use of biological resources, restore degraded habitats, protect threatened species
- International Whaling Commission Ban on Whaling – imposed moratorium on whaling

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.

(a) Identify one threatened or endangered species and explain why its population has declined.

(b) Describe three characteristics of organisms that would make them particularly vulnerable to extinction.

(c) Present three arguments in favor of the maintenance of biodiversity.

(d) Name and describe one United States federal law or one international treaty that is intended to prevent the extinction of species.

a) Giant Panda is a species known by the masses as endangered. Only few hundred remain in the mountenous forests of China. This animal suffers from problems with habitat loss as Chinese settlement push further into the forests. Panda also faces problem with its food source, bamboo, which grows incycles causing a famine for pandas. Also since so few of them are left that they have a problem with mating and genetic diversty. Most human attempts at mating the species fail

b) Specialized feeding. Becomes a problem when the area is disturbed. The only source of food decreases causing die off of individuals

Complex mating — some animals require a large number of individuals to participate in the "rituals" when a number is

diminished, reproduction will not occur

~~Susceptible~~ Interfering with livestock. Coyotes and birds are often killed because they frequently attack foodcrops on which farmers' quality of life is based.

c) Biodiversity provides genetic material for future evolutionary processes. Without it future population will be susceptible to changing conditions without an ability to perform adaptive selection.

Biodiversity preserves genetic ~~information~~ useful to humans. Many medicines that are produced come from tropical areas. Many ~~are~~ species with potential cures are still undiscovered. Loss of diversity means loss of these species, means loss of potential knowledge

Biodiversity keeps the environment in check. One species prevents another species from destroying the entire system. Wolves keep rabbits from destroying grasslands and spiders prevent insects from destroying the plants. Didn't work on humans though, ~~but~~ we can control our actions, but only biodiversity can control the entire biosphere

d) The endangered species Act was designed to help threatened or endangered species to recover. It does so by placing limitations on hunting, fishing and encroaching on the habitat where these species prosper.

Question 3

Sample Q – Score 10
This student gave a thorough answer that was typical of students who scored highly on the question. An endangered species (giant panda) was identified and a reason for its declining population given. Three characteristics that would make a species vulnerable to extinction were cited and clearly explained. The student presented three sound arguments for maintaining biodiversity, before going on to name and describe the Endangered Species Act.

Sample R – Score 8
This student did not correctly identify an endangered species, but scored the maximum number of points in the other sections. Well-explained examples were given in part (b), and concise arguments made in part (c). The Endangered Species Act was named and described in part (d).

Sample S – Score 6
The manatee was named as the endangered species and a reason for its decline stated. The student scored full points in part (b), did not any receive credit for part (c), and was awarded one point for naming the Endangered Species Act.