

WOTW-Restoration 2A

Resource Title: Human Impact on the Food Web of Santa Cruz Island

Resource Summary: This is a group assignment that helps students understand the cause and effect of humans' impact on the Santa Cruz Island Environment and Ecosystem. It has students creating food webs for both the Bald Eagle and the Gold Eagle along with a brainstorm of the effects different species have had on the environment.

Subject Areas: General Science/Earth Science, Biology, AP Biology, Environmental Science, AP Environmental Science

Grade Level Range: 9-12

Standards:

ESS3: Earth and Human Activity--Humans Impact in Environment—Earth Science 9-12

AP Environmental Science—Ecosystems, Ecology, Restoration, Keystone Species

High School Life Science NGSS Standards:

HS-LS2-3: Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.

HS-LS2-6: Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

HS-LS2-7: Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

HS-LS2-8: Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

High School Earth Science NGSS Standards:

HS-ESS3-3: Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.

HS-ESS3-4: Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

AP Environmental Science: This assignment covers ecosystems, ecology restoration, endangered species, food webs, biodiversity and keystone species concepts which are to be covered within this curriculum.

Resource Provided By: Laura Branch, Ernest Righetti High School; Santa Maria Joint Union High School District

Details:

Educational Uses:

- Discussion/Debate
- Activity
- Problem Solving
- Research
- Model/Simulation
- Classifying
- Collaborative endeavor
- Project Based

Lesson Procedure:

1. Watch the “Restoration” section of the movie, “West of the West”.
 - a. Have a conversation about the “characters” that come into play for the species of the film. For example: Are there native species? Are there non-native species? Are there invasive species?
 - b. Have students split up into groups of 2-3. Students will do the assignments listed below, one each on an 11 x 17 paper. (This assignment can also be done on either white boards or using an application on a tablet or computer for concept maps.)

Guiding Questions: (Create a concept/brainstorming map for these)

- What is the difference between an invasive species, native species and a nonnative species?
- What is a keystone species?
- What are the keystone species on the Santa Cruz Island? (Which ones keep the equilibrium of the island?)

- What is DDT? What was it used for? How did it adversely affect the Bald Eagle? A niche was opened for what type of animal? How did this negatively affect the Channel Island Fox?
- Who brought the pigs to the island? Are the pigs considered to be an invasive species? What types of damages have they caused?
- How did the killing of the pigs affect the islands?
- How did the pigs affect the Channel Island Fox?
- Where did the rats come from? How did the rat species turn into a subspecies? Does this mean it is now considered to be a native species? Why? Why not?
- What is the predator/prey relationship between the bald eagle and the Channel Island Fox?
- What is the predatory/prey relationship between the gold eagle and the Channel Island Fox?
- What gave way to the gold eagle ending up on the island, causing a population decrease on the Channel Island Fox?

Create:

- A food web using 15 different species found on Santa Cruz Island using the Bald Eagle as the top predator.
- A food web using 15 different species found on Santa Cruz Island using the Gold Eagle as the top predator.
- A flow chart showing humans environmental impact of the Santa Cruz Islands. Include:
 - Introduction of DDT pesticide in 1940s on the Bald Eagle
 - Opening of the niche for the Gold Eagle in the area
 - The effect Gold Eagle had on the Channel Island Fox
 - Effect Rooting pigs had on the Channel Island Fox
 - Effect sheep had on Santa Cruz Island
 - Effect cattle had on Santa Cruz Island
 - Breeding program of the Bald Eagle & what impact has it had on the restoration of the island.