

“Rotation”

Resource Summary:

Students will be tasked with comparing closely related species from the islands and the mainland, including extinct organisms. To come to a conclusion about common ancestry and the mechanisms of speciation, students will explain and draw how geographic and reproductive isolation occurred with the formation of the islands in the Channel.

Subject Areas: Science

Grade Level Range: 9th-12th

Standards:

Common Core English Language Arts – Science

WHST.9-10.6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dramatically.

WHST.11-12.6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

Next Generation Science Standards

HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.

Resource Provided By: Cody Foster, Biology/Marine Biology/Earth Science, Buena High School, Ventura Unified School District

Resource Details:

1. Students watch the “Island Rotation” Tale from *West of the West*.
2. While the clip is going, students pay close attention to how the islands formed over deep time.
3. Using a textbook or Internet resource, students define *speciation, geographic isolation, and reproductive isolation*.
4. Using the National Park Service website, students will conduct research comparing closely related species on the islands and the mainland (Island fox with gray fox, island scrub jay with western scrub jay, etc.).
5. Using fossil evidence, students compare pygmy and woolly mammoth and explain how they exemplify the evolutionary term “Foster’s Rule.”
6. Using one of the four pairs of organisms that students compared, students will storyboard the process of dispersal, geographic isolation, reproductive isolation, and speciation.

7. Students share out either in small groups or in a gallery-walk format.

Island Rotation—Allopatric Speciation on the Channel Islands

- Watch the video clip “Island Rotation”

1. Define the following terms:

a. **Speciation**

b. **Geographic Isolation**

c. **Reproductive Isolation**

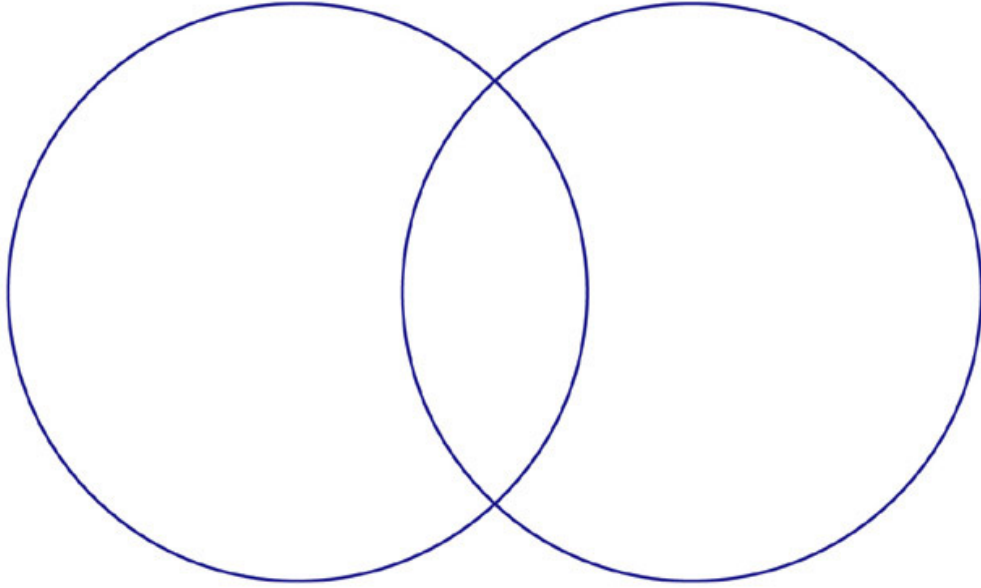
2. How does geographic and reproductive isolation affect speciation? Explain using a specific example.

3. For the next section, use the following National Park Service website to do some research on current endemic species on the Channel Islands. Then, conducting your own Internet research, compare the endemic species on the Channel Islands with their closely related species on the mainland.

<https://www.nps.gov/chis/learn/nature/index.htm>

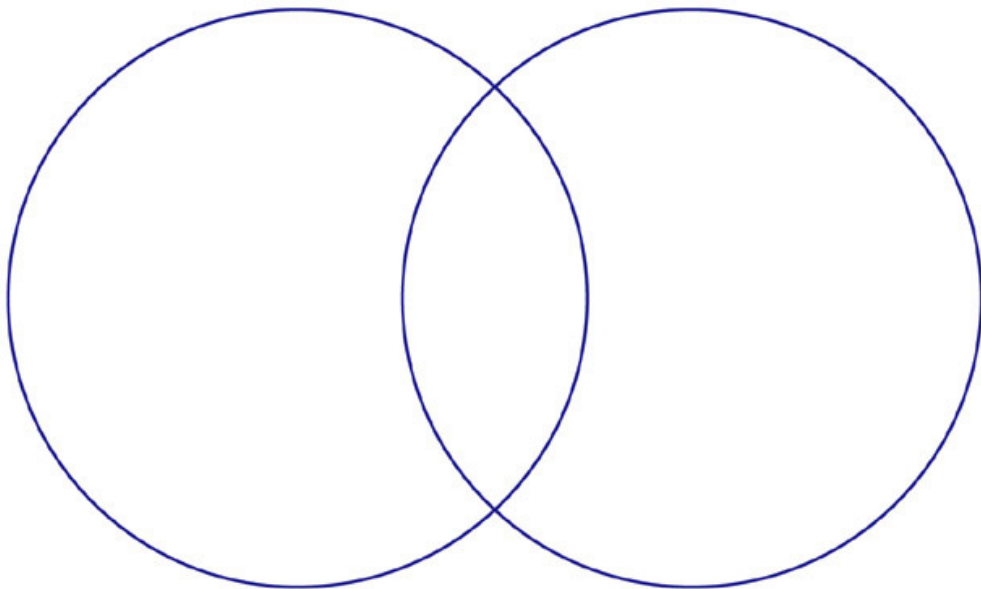
Channel Island Fox

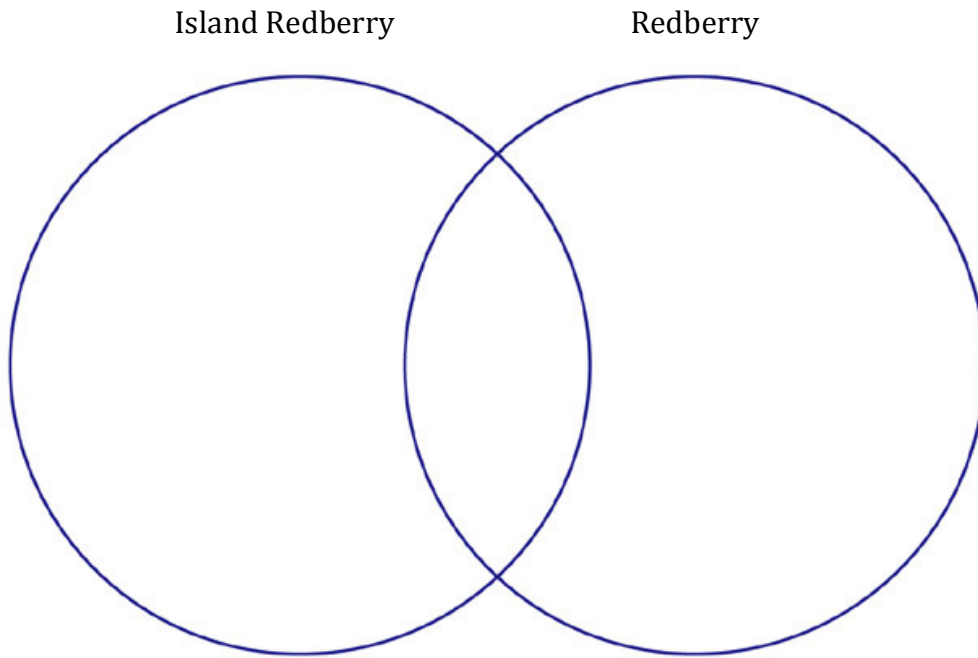
Gray Fox



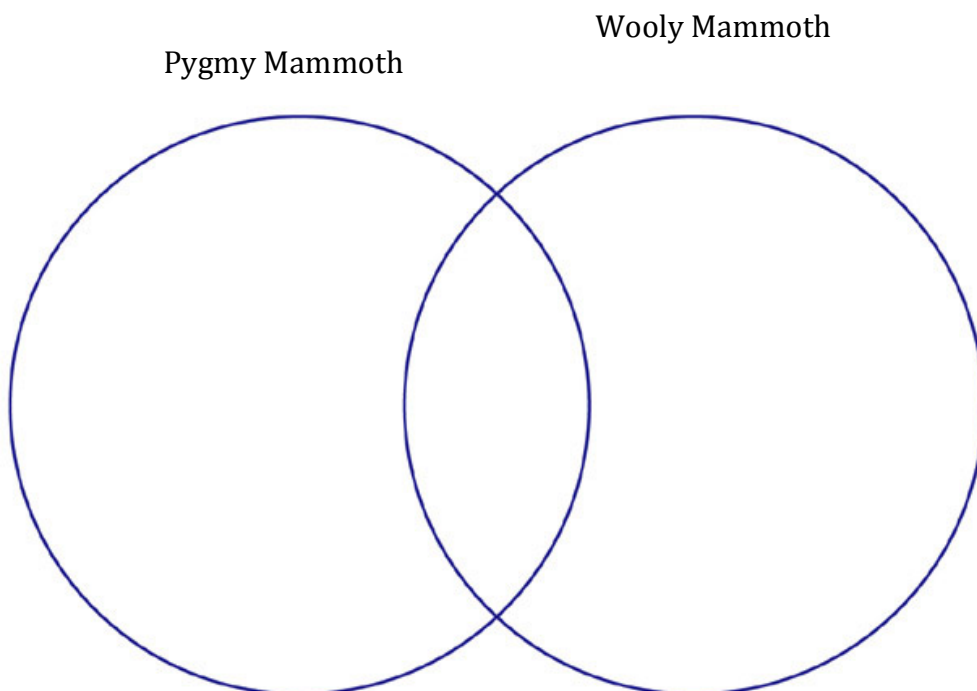
Island Scrub Jay

Western Scrub Jay





4. The previous three examples are all currently extant (living) organisms. A classic example of speciation and geographic isolation involves the woolly and pygmy mammoths. From the information you can find on the two fossils, complete the Venn diagram below.



5. Define the evolutionary term **Foster's Rule**:

6. Explain how one of the four previous examples exemplifies Foster's Rule. Be sure to also use evolutionary terms such as natural selection, allopatric speciation, selective advantage, etc.

7. Storyboard (either in words or pictures) how the speciation event occurred for one of the four examples.

Additional Resources:

- <http://www.ucmp.berkeley.edu/quatarnary/pleistocene.php>
- <https://www.sbnature.org/research/anthro/chumash/timel.htm>
- <http://www.pbs.org/wgbh/evolution/>
- <https://phet.colorado.edu/en/simulation/natural-selection>