# B

Biology Standard
B.8.d.

## Teacher's Masters

California Education and the Environment Initiative

# The Isolation of Species

**California Education and the Environment Initiative**

Approved by the California State Board of Education, 2010

**The Education and the Environment Curriculum is a cooperative endeavor of the following entities:**

California Environmental Protection Agency
California Natural Resources Agency
Office of the Secretary of Education
California State Board of Education
California Department of Education
California Integrated Waste Management Board

**Key Leadership for the Education and Environment Initiative:**

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**Key Partners:**

Special thanks to **Heal the Bay,** sponsor of the EEI law, for their partnership and participation in reviewing portions of the EEI curriculum.

Valuable assistance with maps, photos, videos and design was provided by the **National Geographic Society** under a contract with the State of California.

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# Contents


## Lesson 1 Geographic Isolation

None required for this lesson.

## Lesson 2 Mechanisms of Isolation

None required for this lesson.

## Lesson 3 The Influence of Human Activities on Animal Species' Population Structure

None required for this lesson.

## Lesson 4 Effects of Introduced Species

None required for this lesson.

## Lesson 5 Island Species' Vulnerability

None required for this lesson.

## Assessments

Isolation and Species—Traditional Unit Assessment Master . . . . . 2

The Isolation of Native Species—Alternative Unit Assessment Master . . . . . 5

Name: _____

**Instructions:** Select the best answer and circle the correct letter. (1 point each)

1. Which of the following is the most probable dispersal mechanism for a reptile to arrive on a geographically isolated island?
   a. rafting on floating mats of vegetation
   b. swimming
   c. hitchhiking on another animal
   d. reptiles are not found on islands

2. Which of the following processes supports the occurrence of allopatric speciation?
   a. gene flow
   b. geographic isolation
   c. migration between regions
   d. interbreeding between populations

3. How do reproductive isolating mechanisms (RIMs) contribute to speciation?
   a. RIMs prevent interbreeding between two species or populations.
   b. RIMs prevent breeding between less fit individuals.
   c. RIMs allow two populations to interbreed.
   d. RIMs allow populations to converge into one species.

4. Which of the following is not an example of a reproductive isolating mechanism (RIM) that occurs between species?
   a. Members of each species look different from each other.
   b. Individuals have different odors.
   c. Individuals have some genes that are different.
   d. Members of the species live in different locations.

5. How does habitat fragmentation reduce genetic diversity in species?
   a. Habitat fragmentation makes nonnative species introduction possible.
   b. Habitat fragmentation opens migration routes.
   c. Habitat fragmentation isolates a large population into smaller groups.
   d. Habitat fragmentation encourages open gene flow.

6. All of the following human activities increase the isolation of species except _____.
   a. agricultural land use
   b. introduction of nonnative species
   c. hunting a population to low numbers
   d. breeding programs

Name: _____

7. Many species in the Galápagos are sensitive to environmental changes induced by the events of El Niño because of their inability to _____.
   a. migrate to new regions to find new food resources
   b. survive temperature changes
   c. avoid new predators
   d. change coloration

**Instructions:** Complete the following tasks in the spaces provided.

8. Provide three examples of how a species may become separated from an origin population. (3 points)

_____

_____

_____

9. For each of the following, circle whether it will cause an increase or a decrease in the isolation of species and explain how it may cause this change. (1 point for increase or decrease, 2 points for explanation)

   a. Captive breeding programs (increase or decrease)

   _____

   _____

   _____

   b. Habitat fragmentation (increase or decrease)

   _____

   _____

   _____

   c. Introduction of nonnative species (increase or decrease)

   _____

   _____

   _____

Name: _____

d. Hunting (increase or decrease)

_____

_____

e. Protection in a reserve (increase or decrease)

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10. Describe three ways nonnative species influence the geographic or reproductive isolation of native species. (2 points each)

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11. Explain why species on islands are usually more sensitive to rapid environmental changes (either natural [for example, El Niño] or caused by humans). (5 points total)

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Name: _____

**Instructions:** Read **Island Case Study** (Student Edition, pages 10–11) and answer the following questions in the spaces provided.

1. Describe how the Hawaiian Islands' geographic isolation influences the speciation of the native island goose, the nene. (2 points: one point for describing the isolation, one point for including genetic divergence)

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2. Describe three human activities that contribute to the geographic isolation of the nene. First list the activity, then explain how it contributes to isolation. (2 points each, 6 points total)

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3. Explain three factors related to island environments that make native island species vulnerable to rapid environmental changes. (1 point each, 3 points total)

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4. Identify and describe three ways that nonnative species can influence the populations of native species (the Hawaiian nene). (2 points each, 6 points total)

5. Describe two ways that the introduction of nonnative species influences the isolation of native species and how this isolation may influence the speciation of the native species' populations. (2 points each, 4 points total)

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