

7

Science Standard
7.3.a.



Shaping Natural Systems through Evolution

California Education and the Environment Initiative

Approved by the California State Board of Education, 2010

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

California Environmental Protection Agency
California Natural Resources Agency
California State Board of Education
California Department of Education
Department of Resources Recycling and Recovery (CalRecycle)

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.

Office of Education and the Environment

1001 I Street • Sacramento, California 95814 • (916) 341-6769

<http://www.CaliforniaEEI.org>

© Copyright 2011 by the California Environmental Protection Agency

© 2013 Second Edition

All rights reserved.

This publication, or parts thereof, may not be used or reproduced without permission from the Office of Education and the Environment.

These materials may be reproduced by teachers for educational purposes.



Contents

Lesson 1 Natural Selection and Evolution

- 1 Pupfish 2
- 2 California Lakes: Then and Now..... 3

Lesson 2 Evidence of Evolution

- 3 *Tegula* Snail Research..... 4
- 4 Evolution Notes 1 5
- 5 Evolution Notes 2 6
- 6 Evolution Notes 3 7

Lesson 3 Simulating Variation and Natural Selection

- 7 Darwin's Finches 8

Lesson 4 California's Diversity: Environmental Factors and Evolution

- 8 California's Climate Zones..... 9

Lesson 5 From Bananas to Prairie Chickens: How Humans Influence Evolution

- 9 Wild Bananas..... 10

Lesson 6 Revisiting the Pupfish: Human Activities and Evolution

- 10 Human Influence on Evolution..... 11

VA #1 Pupfish



VA #2 California Lakes: Then and Now

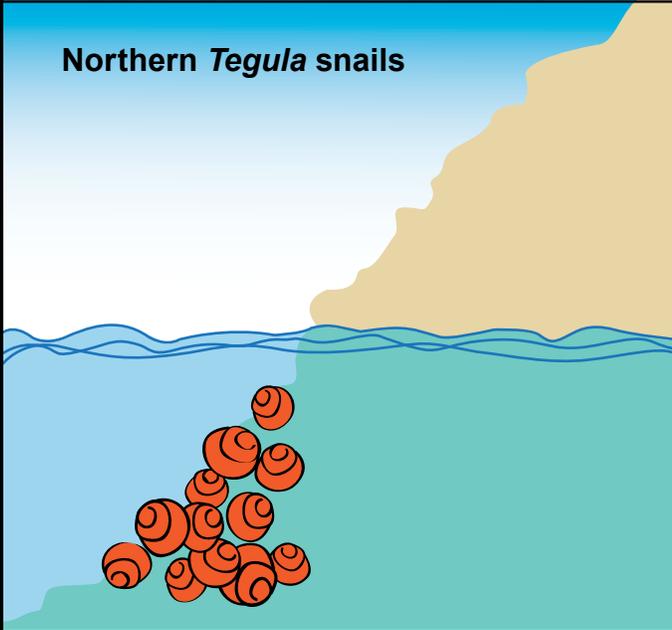


VA #3 *Tegula* Snail Research

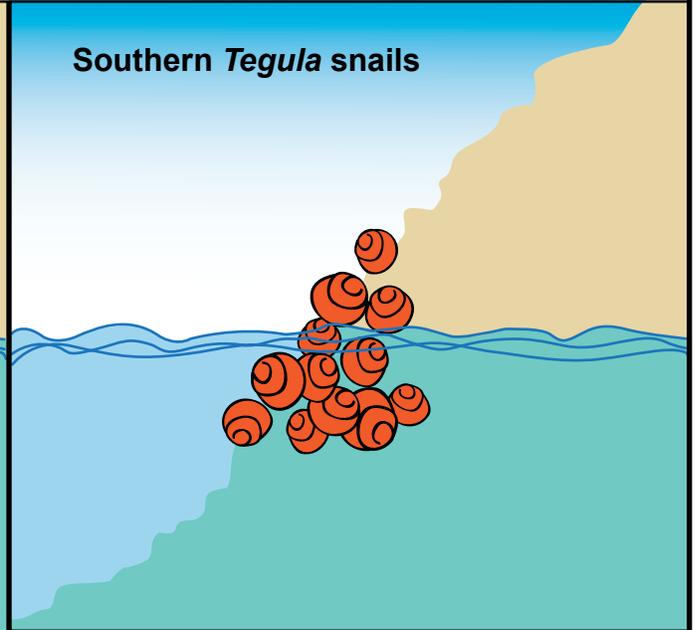
Tegula funebris (black turban snail)



Northern *Tegula* snails



Southern *Tegula* snails



VA #4 Evolution Notes 1

Variation...

A species of organisms displays variety in inherited traits.

If the genes for a trait do not exist in a population, that trait cannot be selected.

Genetic mutations result in different new traits (some beneficial, some detrimental, some with no effect).

Mutations are random, but selection of their traits expressed in a population is not random.



... allows for Natural Selection.

VA #5 Evolution Notes 2

Environment...

In certain environments, some traits are more useful than others.

Those traits that are favorable in that environment are adaptations.

Adaptations allow an organism to survive and reproduce in a particular environment. When an environment changes (due to human activities, natural disasters, and more), the traits that are adaptive and get “selected” may change.



... results in Natural Selection.

VA #6 Evolution Notes 3



A trait is more likely to be passed on to the next generation when it helps the organism to:

- Survive (avoid predators; find food)
- Find a mate
- Reproduce

Traits that help an organism to do these three things (survive, find a mate, and reproduce) are more likely to be found in more offspring in subsequent populations.

VA #7 Darwin's Finches

Large Ground Finch



Small Ground Finch



Vegetarian Finch



Large Cactus Finch



Cactus Finch



Medium Ground Finch



Small Tree Finch



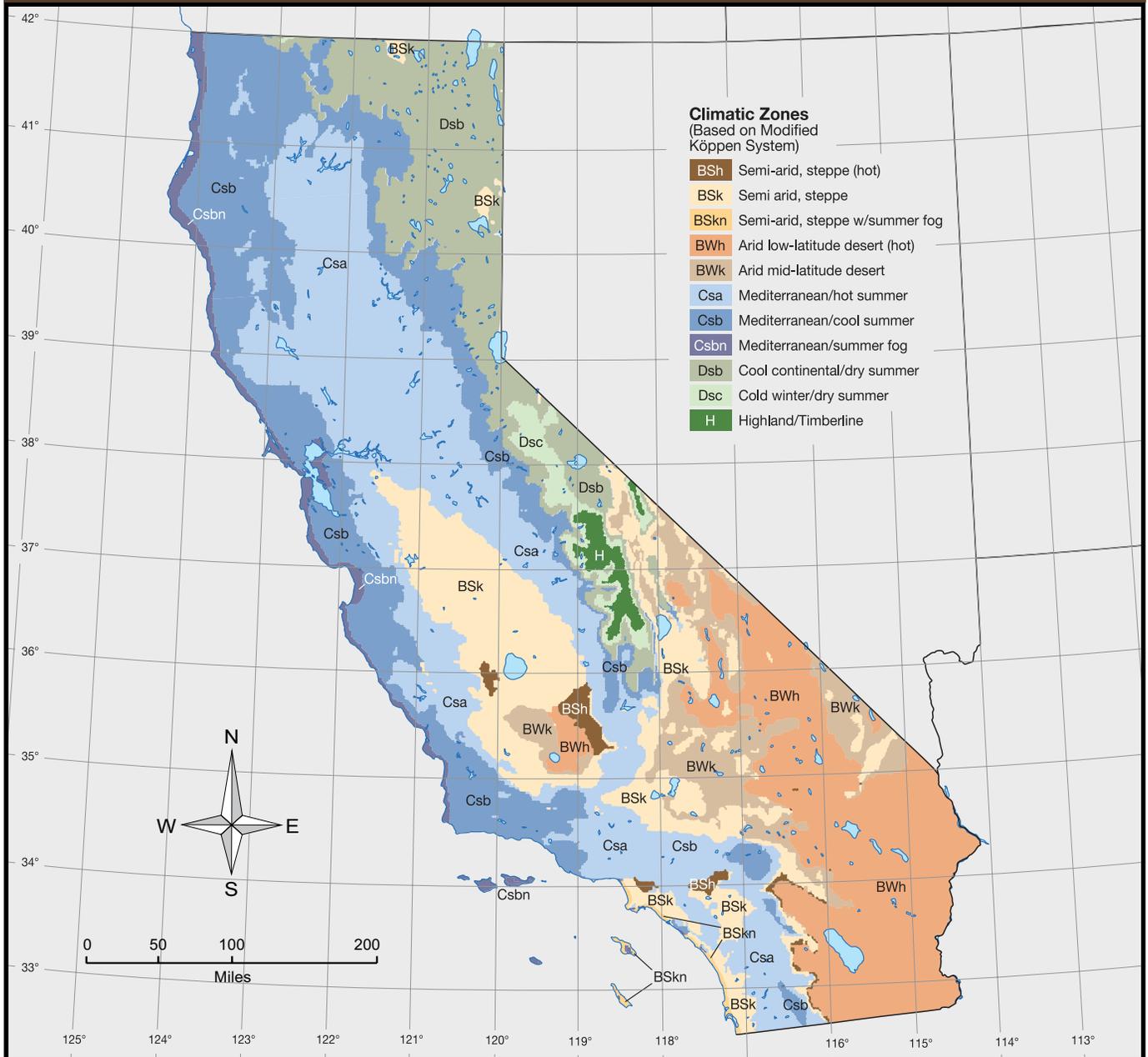
Warbler Finch



Wood Finch



VA #8 California's Climate Zones

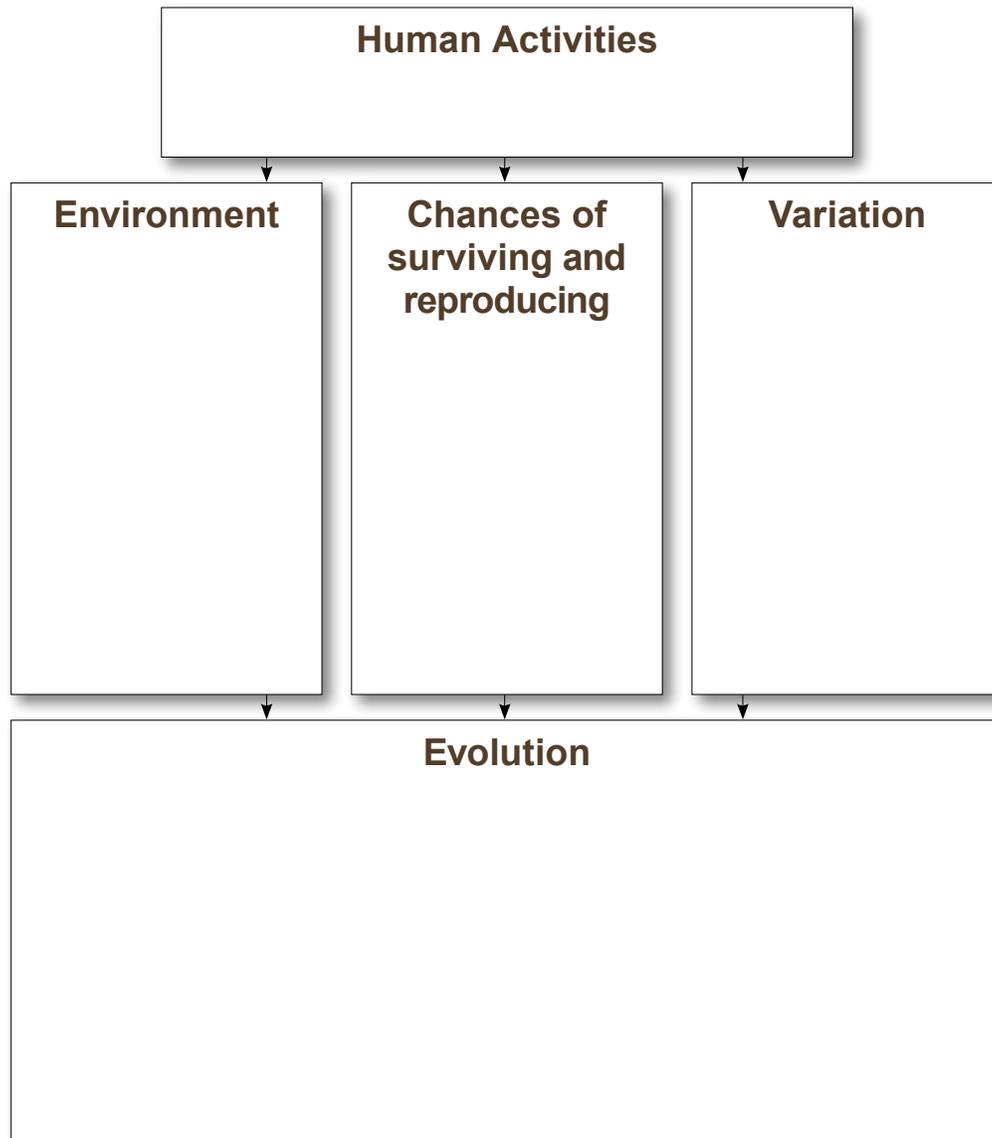


VA #9 Wild Bananas



VA #10 Human Influence on Evolution

Species: _____





California STATE BOARD OF
EDUCATION

California Education and the Environment Initiative

