

Galápagos Tortises: A Study in Adpatation

Lesson Plan

Grade
9-12

NGSS Standards
HS-LS4-1, HS-LS4-2

21st Century Skills
Critical thinking, problem
solving

Materials
Access to D&D Virtual
Reality Exhibit, student
worksheets

Estimated time
1 hour

Difficulty
Low

Vocabulary
Adaptation, carapace,
natural selection,
scutes, traits

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Objective

To examine how tortoises vary from one island to another and understand how such adaptations emerge in response to local conditions and increase an organism's chance of survival.

Activity

Students visit the museum exhibit or the 3D Virtual Exhibit individually or with a partner, engaging primarily with the Galápagos Islands Exploration Table and surrounding exhibit components.

After answering the questions in the quiz, students engage in a class discussion about **how** tortoises develop slightly different shell shapes under slightly different circumstances.

The tortoises do not "see the need for" a different shell shape or even the "need to reach higher." Mutations create new shell shapes (in small incremental steps) and advantageous shapes are preserved by natural selection through higher rates of survivability and reproduction.

Natural selection is statistical and blind and takes place over many generations.

Assessment

There are ten (10) questions worth a total of 35 points. Answers can be found in the exhibit, the Galápagos Table in particular. The student quiz is printed, the two pages staples and handed in for scoring. An answer key is provided in the teacher section of this lesson plan.

Key questions (which require deduction) are worth the most points (the second part of question 5 and questions 7 and 8).

Lesson plan based on Darwin & Dinosaurs Exhibit
More lesson plans at darwindinosaurs.com

Galápagos Tortoises: A Study in Adpatation

Teacher Worksheet Key

1. What was Darwin's first clue that the tortoises differed from island to island?

The local governor told Darwin he could tell from what island any tortoise came from by looking at its shell.

1

2. Looking at the two tortoises in the museum exhibit, list 3-5 features for the tortoises and how they differ between the two main types.

Dome-shaped	Saddle-shaped
• short neck	• longer neck
• short front legs	• long front legs
• dome-shaped shell	• saddle-shaped shell
• shell is smoother	• bumpier shell
• neck sticks out flat	• neck rises up
• more defined scutes along edge of shell	• edge of carapace not well defined

3

3. What can the saddle-shaped tortoise do that the dome-shaped can't do?

Raise its head high.

1

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Teacher Worksheet Key

4. On the map below, mark the six islands inhabited today by tortoises, indicating whether the island is lush (L), intermediate (I), or dry and sparse (S).

6



5. Now indicate which type of tortoise lives on each one of the islands: dome (D), intermediate (I), or saddle (S). **What do you notice about the results?**

6 + 5

The dome-shaped tortoise is found on lush islands, whereas the saddle-shaped is found on dry and sparse islands, and intermediate shell shapes are found on islands with intermediate climates. This indicates shell shape corresponds to local environments.

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Teacher Worksheet Key

6. What do tortoises eat?

Vegetation such as grass, leaves and cactus.

1

7. If the saddle-shaped tortoise can reach higher and it is found on dry and sparse islands, what does this suggest?

That on dry and sparse islands, there is some advantage to reaching higher, such as reaching to get at vegetation higher off the ground.

3

8. Define adaptation based on what you've learned about the Galápagos tortoises.

Adaptation is the emergence of traits that help an organism survive.

5

9. Name two phenomenon that have decimated the tortoise population.

**Early sailing ships taking tortoises for food.
Invasive species like rats that eat tortoise eggs.**

2

10. How many tortoises were there before humans began visiting the islands and how many are left in the Galápagos today?

250,000. Today, there about 25,000.

2

Further Research

The Galápagos tortoise is a critically endangered species.
Learn more at the Galápagos Conservancy.

35

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NAME

CLASS

URL my.matterport.com/show/?m=fv3NZ9XP6Zd

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