

Adaptations: How do plant and animal adaptations from the tropics compare to organisms from here in Montana?

Target Grade Level: 5th

Created and Adapted by:
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1. CONTRIBUTOR'S NAME: LAUREN PRIESTMAN
2. NAME OF INQUIRY: ADAPTATION: HOW DO PLANT AND ANIMAL ADAPTATIONS FROM THE TROPICS COMPARE TO ORGANISMS FOUND HERE IN MONTANA?
3. GOALS AND OBJECTIVES:
 - a. Inquiry Questions: What is an adaptation? How do adaptations benefit an organism?
 - b. Ecological Theme(s): Natural Selection, Adaptation
 - c. General Goal: To get students to think about how different traits allow organisms to survive in specific habitats, and why these qualities promote greater fitness for that species.
 - d. Specific Objectives: Observe adaptations in different seeds, leaves, and birds.
 - e. Grade Level: 5th
 - f. Duration/Time Required:
 - Prep time depends on the time it takes to gather examples
 - Implementing Exercise During Class: 30 minutes to 1 hour
 - Assessment: 15-20 minutes
4. ECOLOGICAL AND SCIENCE CONTEXT:
 - a. Background (for Teachers): Adaptation, natural selection, fitness, and heritability.
 - b. Background (to present to Students): Define an adaptation. Discuss qualities that may be considered adaptations and those that may not.
5. MOTIVATION AND INCENTIVE FOR LEARNING: High-quality examples and stories are interesting and exciting for the students.
6. VOCABULARY: Adaptation, heritability, fitness.
7. SAFETY INFORMATION: NONE
8. MATERIALS LIST:

*NOTE: USE EXAMPLES FROM MANY DIFFERENT HABITATS

Seeds and fruit: Suggested examples include wind-dispersed seeds: cheatgrass, barley, dandelion, etc; sea-dispersed: coconut; bird dispersed: raspberries, mountain ash, etc.

Leaves: Suggested examples include cactus, conifer needles, large shade-tolerant leaves, alpine plant leaves, etc.

Birds: Suggested species include crossbill, hawk, sea bird species, hummingbird, duck, etc. (Stuffed birds may be borrowed from the teaching collection at the University of Montana Museum and Herbarium. Contact Dave Dyer 243-4743).

Eagle transparencies (attached) *Note: Eagle pictures may not be posted in a web format, as permission has not been granted.

9. METHODS/PROCEDURE FOR STUDENTS:

a. Pre-investigation work: Student should have a basic understanding of plant and animal anatomy and some exposure to habitat variation.

b. Investigation work:

1) For each example, students should list the qualities of the organism that they believe are adaptations.

2) Students should be able to answer the following questions about each adaptation:

How do these adaptations increase the organism's ability to survive in a specific habitat?

Does this adaptation create a greater chance for this organism to produce more offspring?

Will the offspring share this quality? (Is the adaptation heritable?)

3) Students may present their data in a discussion forum or written on a data sheet (see attachment: Adaptation Data Sheet)

10. ASSESSMENT: Students should follow-up this activity with an exercise called "Super Organism". In this activity, students will:

a) Define the qualities of an environment of their choice.

b) Create an organism that has at least 5 adaptations that help it survive in this environment.

c) List the adaptations and describe why they are necessary for survival.

13. REFERENCES:

<http://evolution.berkeley.edu/evosite/Lessons/IFundamentals.php#>

<http://evolution.berkeley.edu/evosite/evo101/IIIIE5Adaptation.shtml>

14. LIST OF EXPERTS AND CONSULTANT

Smithsonian Tropical Institute, Panama

Dave Dyer, University of Montana Herbarium and Museum Curator, Missoula, MT

15. EVALUATION/REFLECTION BY FELLOWS AND TEACHERS OF HOW IT WENT:

We used a discussion format to implement this exercise. Students were full of questions and observations! The discussion lasted for one hour, and the follow-up activity was given as homework.