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Lesson Plan for Ide@s

Lesson or Unit Title: Wisconsin's Connection to the Galapagos Islands

Subjects: □□ Science: Biology, Ecology, History, Natural History

Standards: Science B.8.1, F.8.8, B.12.5, H.12.6 (<http://dpi.state.wi.us/standards/>)

Grade Levels: 9-12

Suggested time: 3-50 minute periods, reading can also be assigned as homework

Costs: None

### Resource Description/Summary

The Galapagos Islands are an archipelago positioned near the equator in the Pacific Ocean. The islands are a province of Ecuador, and are located about 600 miles from the mainland. The natural environment of the Galapagos Islands has fascinated scientists for hundreds of years. Observations made by Charles Darwin during his voyage to the islands in the 19<sup>th</sup> century greatly influenced his theory of natural selection. The islands' contributions to the scientific community are countless, but in recent years, due to conservation efforts, the collection of materials and specimens from the islands has been heavily restricted.

Within the last thirty years, only three museums have been allowed by the government of Ecuador to collect and transport materials from the islands. One of these institutions is the University of Wisconsin-Madison's Zoological Museum (UWZM). The UWZM has collected a multitude of information from their scientific expeditions to the Galapagos Islands, and some of the images and papers from these expeditions have been digitized by the University of Wisconsin's Digital Collections Center. These resources provide a wonderful historical context to the study of natural history and the current concerns scientists are facing today. Applying the documents to the study of conservation and ecology is a great way to foster learning in the classroom. After the lessons are completed, consider a field trip to the UWZM to learn more.

### Objectives:

Throughout the course of this lesson students will:

1. Understand what a primary source is, and how to identify one
2. Analyze ecological changes in the Galapagos Islands through the use of primary source material
3. Think critically about scientific research
4. Explore the topic of conservation
5. Identify native species
6. Develop critical reading skills

### Resources:

UW-Madison Zoological Museum: Galapagos Collection

<http://digicoll.library.wisc.edu/Zoology/subcollections/GalapagosAbout.shtml>

Charles Darwin Foundation

[www.darwinfoundation.org](http://www.darwinfoundation.org)

The Complete Works of Charles Darwin Online (from the University of Cambridge)

<http://darwin-online.org.uk/>

Suggested Activity:

This activity will consist of finding excerpts within the collection for the students to compare and draw conclusions from. Several texts that are available within the Galapagos collection are recommended below. In most cases, assigning several pages from the introductory chapters will allow students to gain a broad understanding of the subject matter.

Suggested texts to use:

(All texts are available within the UW Digital Collection's Galapagos Collection, unless otherwise noted)

### Activity 1

*A Visit to the Galapagos Islands in 1880*

*New York Zoological Society Bulletin (1935)*

*Galapagos science: 1972 status and needs: report of Galapagos Science Conference, October 6-8, 1972, Washington D. C.*

- Take a look at excerpts from these three texts.
  - o What are the most apparent differences between the 1880s view of the Galapagos Islands and the picture we are presented with in 1972?
  - o How does the scientific collection and presentation of information change over time?
  - o Which depiction of the Galapagos Islands do you find to be the most accurate? How did you decide?
  - o Discuss what makes the sources accurate.

### Activity 2

*Ecology of giant tortoises (Geochelone elephantopus) in the Galapagos Islands*  
1987

*The Galápagos giant tortoises (Geochelone elephantopus): part II: conservation methods*

*Barking, England [etc.]: Applied Science Publishers [etc.], July 1974*

1. One of the Galapagos Islands' best-known residents is the giant tortoise. These two resources explore the ecosystem of these animals and their threatened existence.
2. Have students compare the information in these two texts with a current species fact sheet from the Charles Darwin Foundation (<http://www.darwinfoundation.org/files/species/pdf/tortoises-en.pdf>).

- What are some of the changes that have taken place in the Galapagos ecosystem? Causes for the changes?
- How many species of giant tortoise still exist today?
- Why is it important to preserve these animals?
- As a member of the scientific community, what conservation methods would you recommend to help this species?

### Activity 3

3. After exploring the habitat of the islands through those historical texts, have students compare and apply what they have learned so far to Charles Darwin's theory of natural selection using the following resources:

Charles Darwin's field notebook from the Galapagos Islands ([http://darwin-online.org.uk/EditorialIntroductions/Chancellor\\_Keynes\\_Galapagos.html](http://darwin-online.org.uk/EditorialIntroductions/Chancellor_Keynes_Galapagos.html))

Darwin's *Origin of Species* (<http://darwin-online.org.uk/content/frameset?itemID=F391&viewtype=text&pageseq=1>)

- Have students look at the introduction and Chapter 1 of the online text. This can either be done as homework, or split students into groups and assign each group a section to summarize.
4. Compare observations from Darwin's field notebook to the observations made in texts we read earlier.

### Concluding the lesson:

5. To wrap up the activity summarize the important concepts embedded within the lesson (biological diversity, evolution, habitat, conservation) and discuss the impact and influence Darwin's theories have had on modern scientific thought. Examples include:
  - Accepted theory by modern biologists
  - Concept of natural selection has influenced modern evolutionary theory
  - Diversity of the world firmly grounded in science (ask students to think about the world view during the Victorian era prior to Darwin's *Origin*. How were things different?)
  - Modern genetics research

### Extra Credit Opportunity/Expanding the lesson

6. Have students research and write a short essay on the Pro-Darwin and Anti-Darwin arguments that arose from publishing *Origin of the Species* and extended far beyond the late 19<sup>th</sup> century.