

**Lesson:**  
Whale Evolution

**# Days:** 4-6

**Course:**  
Science 7 Pre-AP/IB Prep

**Standards/Benchmarks:**

- MASS IV D 7 a) 4 The student will comprehend that interactions with the environment affect some inherited traits.
- MASS IV E 7 a) The students will understand how biological evolution provides a scientific explanation for the fossil record of ancient life forms, as well as for the striking similarities observed among the diverse species of living organisms.
1. The student will recognize extinction is a common event. Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival.
  4. The student will recognize that scientific evidence can be used to infer common ancestry among some organisms.
  5. The student will explain how diversity of species develops through gradual processes over generations as a result of small differences between parents and offspring.

**Content and Habits of Thinking:**

Contribution of substantial evidence in the development of a theory is a habit of scientific thinking that this lesson addresses. Misconceptions that may be righted include the beliefs that adaptations are design, rather than random; that certain traits are expressed as needed to suit environmental change; and that the whole of a population shifts, rather than that population change starts from a few individuals that are relatively fit.

**Guiding Questions:**

What evidence do we have for common ancestry?  
How does common ancestry show the path of a species' evolution?

**Lesson Sequence and Instructional Strategies:**

*Introductory Activity: Modeling Natural Selection with Paper Airplanes*  
(Engage & Explore)

- Each student in the classroom makes their own style of paper airplane.
- All of the airplanes are flown.
- ONE environmental criterion determines which airplanes are going to be "successful" (farthest flier, lowest flier, planes that weave the most in the air, etc.). A reason for the success of these specific airplanes should be given; i.e., a predator takes down all of the low-flying planes.
- The three planes that are deemed the most successful provide the design for the next generation of planes. Everyone in the class makes a plane in one of the three designs.
- The planes are flown again and hopefully the change in design modifies the overall "success" of the class's airplanes (the population).

*Main Lesson: Whale Evolution Kiosk*

(Explore & Explain)

<http://www.indiana.edu/~ensiweb/lessons/whalekiosk.html>

This wonderful interactive website provides a rich array of data leading students through the evolution of whales. There are three main sections: whale anatomy, fossil record, and the molecular picture. The first two sections are most appropriate for middle school students. There is an accompanying worksheet that can help guide students through the site. Options for instructional approaches include projecting the website in a lecture-discussion format or independent or group student-driven interface with the site. Students' degree of facility with navigating websites could be a guide when selecting an instructional approach.

*Follow-Up Discussion*

(Explain and Elaborate)