

The Origin of Species: The Making of a Theory (film, 30 minutes; HHMI BioInteractive, <http://www.hhmi.org/biointeractive/origin-species-making-theory>)

“Great minds think alike.” BioInteractive’s new short film tracks the early lives of Charles Darwin and Alfred Russel Wallace as they traveled around the world collecting specimens that shaped their ideas about how life on Earth formed. Despite disagreements from the Church and much of the general public, both men changed their views about immutable creationism, using evidence to reach different conclusions. *The Origin of Species: The Making of a Theory*, hosted by noted evolutionary biologist Sean Carroll and produced by the Howard Hughes Medical Institute, takes viewers on the journeys that brought these men to the same ideas about evolution.

The short film begins with a dramatization of Wallace’s early years on a ship traveling through the Amazon. It was there where Wallace noticed similarities and differences between species that led him to question how they came into being. Although his collections, as well as his notes, were lost in a fire on board, Wallace developed a preliminary evolutionary theory. Little did he know that some 20 years earlier, Charles Darwin had come up with similar ideas, but had not published them, out of fear of ridicule and chastisement from the Church.

During his voyage to the Galápagos on the HMS *Beagle*, Darwin recognized that the giant tortoises and mockingbirds he saw were very similar in body form to those on other islands, but varying slightly. He suggested that ancestral species had arrived on the islands from the mainland and gradually changed over time. This idea went against everything Darwin previously believed. He knew that it would meet with much

opposition. As a result, he shared his conclusions with only a few trusted colleagues.

Some time later, Wallace journeyed to Southeast Asia. While there, he collected thousands of specimens, making connections between the islands the animals were found on and the characteristics of those animals. He revisited his ideas about how species changed over time. Knowing that these were going to be controversial, Wallace wrote a letter to Darwin, whom he respected, for a second opinion.

Shocked by Wallace’s discovery, Darwin felt pressured to publish his ideas quickly. Because of their similarities, Darwin’s colleagues thought that both men’s conclusions should be presented simultaneously. Even though the two men came up with the mechanism for natural selection independently of one another, they did not compete for attention. Instead, they began a life-long friendship, continuously working together to discover the forces that shaped the living world.

This short video is an excellent depiction of how the theory of evolution came to be. It presents its history primarily from Wallace’s perspective, which is a nice change, considering that most students know only about Darwin’s contributions. The format is engaging and includes dramatizations interspersed between live-action scenes. It is appropriate for students in a general biology or AP Biology class and exciting enough to hold their attention. Given the continuous opposition to the teaching of evolution in high school biology classrooms, this film helps cement Theodosius Dobzhansky’s idea that “nothing makes sense in biology except in the light of evolution.”

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Bottle Biology (online guide for science investigation activities; <http://bottlebiology.org/>)

“Bottle Biology” sprang from the musings of Dr. Paul Williams. Studying the compost pile he built one day while raking his yard, he wondered about what occurred inside. Placing some of the leaves in an empty soda bottle, he watched them decompose; thus, the idea for Bottle Biology came to life. With a team and funding from the National Science Foundation, the Bottle Biology Program set out to develop curricular material that makes use of 2-liter plastic soda bottles – items that usually end up in the garbage. Although the program officially ended in 1993, the activities developed by Williams and the Wisconsin Fast Plants Program at the University of Wisconsin-Madison live on via the website and companion book.

The website is divided into seven major sections: Introduction, Bottle Basics, BB Toolkit, Building Blocks, Column Investigations, Hanging Bottles, and Reference Links. These sections contain all the information needed to start transforming bottles into learning opportunities for your students. The website describes the “anatomy” of the bottles and depicts how to cut them. It lists the tools you need to create bottle projects. The site also contains three complete Bottle Biology Investigations, which include Decomposition, Kimchee Fermentation, and the TerrAqua Column.

Of all the investigations, the Decomposition activity stands out. Three 2-liter soda bottles are cut and nested together to create a column. Instructions are given on how to hang the column in order to take up less space in your classroom. After construction, you can then fill the column with a variety of materials – perhaps some that decompose and some that will not. Students’ next step

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is to observe the column and take measurements, such as the pH or temperature. After making basic observations, it is suggested that students explore. They can change some of the variables, such as decreasing the pH by adding vinegar or adjusting the amount of light the bottles receive, and observe changes. They can also conduct controlled experiments by creating replicate columns.

The website offers background reading, which describes some of the organisms that might be present and what might be happening in the column. If you want to delve further into Bottle Biology, you can order the book from Kendall-Hunt – more information is provided on the website. Bottle Biology is an excellent way for your students to explore using the scientific process. I have used the activities in my classroom and highly recommend them. My students enjoy these investigations.

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