

Lesson Title

Analyzing the interchange among major faunal families of the Great American Biotic Interchange

Intended Audience

Middle School

Time Frame

60-75 minutes

Standards

NGSS ETS1-2 Engineering Design

California State Standards: Biological Evolution 3 a, c, and e.

Resources & Materials

Article, "Battle for the Americas," (Science, July 19, 2003)

www.sciencemag.org/content/341/6143/230.short

Visual of the GABI map including the main faunal interchange between North and South America (from STRI resource guide).

Guiding questions

- How did the formation of the Isthmus of Panama transform the animal family distribution in North America and South America?
- Which species, which are extinct in North America, came from South American originally?
- Which species, which are still extant in North America, originated in South America?

Key Academic and/or Scientific Language

Isthmus, extinct, Great American Biotic Interchange (GABI)

Objectives

Students will analyze how the Great American Biotic Interchange transformed the current animal distribution of North America.

Students will imagine how the GABI animal migration would have been altered if the Isthmus of Panama had never been formed.

Assessments

Students will create an essay titled, “If the Isthmus of Panama had never formed.” This will include their analysis and speculations as to what might have occurred if the animal families had never migrated to North America, like the porcupine, or armadillo.

Teaching Phase

The teacher will begin by showing students PowerPoint images of the main animal families from the Great American Biotic Interchange, such as bear, elephant, horse, pig (from North America) and porcupine, armadillo, sloth, and possum (from South America).

The teacher will have the students discuss where these animals originated and how they populated North or South America.

Then the teacher will give an overview of the formation of the Isthmus of Panama about three million years ago, and how this created a land bridge which allowed species to migrate over the once impassable geography.

Students will then be given a map of North and South America and sketch on the map images of the main animal families, including where these families originated and which direction they moved toward (north or south).

Students will be directed to complete a sheet entitled, “What if there was no formation of the isthmus?”

For this students will analyze targeted questions that focus them on what the continents of the Americas would be like today without the isthmus.

Finally students will be tasked with writing an essay titled: “A continent without the ____.” The blank space would be the students’ choice of animal family affected in the GABI. For this essay they will imagine how the absence of a specific animal family would affect their community if the Isthmus of Panama had never formed. They will focus on a specific animal family for this essay.

As an extension, students will be tasked with reading “Battle for the Americas” and form reading partners in which one student would argue for the theory proposed in this article (that the Isthmus formed millions of years earlier than most researchers state), and the other will argue against the theory purported in the article, (using existing research that the isthmus formed three million years ago).

Reading | Writing | Speaking | Listening Strategies

Students will practice writing, reasoning through discussion, listening and reading through the various activities outlined in this lesson plan.

Learning Progression

As outlined in the teaching phase, students will be introduced to the concept of the Great American Biotic Interchange and its impact on the faunal distribution in North and South

America. They will be engaged in activities which engage them in the impact that the Great American biotic interchange had on animal family distribution throughout the Americas.