

# *Extinction: Why Some and Not Others?*

## Lesson Plan

**Grade Level:** 6-8

**Curriculum Focus:** Fossils

**Lesson Duration:** Two to three class

### ***Student Objectives***

- Understand the term “living fossils.”
- Explore possible reasons these prehistoric creatures have survived.
- Form a hypothesis and use scientific data to determine whether the hypothesis is accurate.

### ***Materials***

- Video on *unitedstreaming: Discover Magazine: Living Fossils*  
Search for this video by using the video title (or a portion of it) as the keyword.

Selected clips that support this lesson plan:

1. Part One: Living Fossils

- Living Legends: Bigfoot and Coelacanth
  - Prehistoric Survivors: The Horseshoe Crab
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- Computers with Internet access (optional but very helpful)
  - Pens and paper

### ***Procedures***

1. Begin the lesson by asking students if they know of any animals that have been living on Earth since the time of the dinosaurs. Once you’ve discussed several examples, write the following animals on the board:
  - coelacanth
  - horseshoe crab
  - crocodile
  - cockroach
2. Discuss with students how long ago each of these animals first appeared: coelacanth, 410 million years ago; cockroach, 350 million years ago; horseshoe crab, 250 million years ago; and

crocodile, 200 million years ago. Point out that these animals lived at the same time as dinosaurs, yet they have survived. Scientists are still debating why these animals have survived.

3. Discuss accepted scientific theories about why dinosaurs became extinct, including increased volcanic activity; gradual climate change; an asteroid, meteor, or comet hitting Earth; changes in the types of vegetation available; and the arrival of new predators. Make sure that students understand how each could have led to dinosaur extinction. For example, a change of climate could have led to a change in vegetation, making it impossible for plant-eating dinosaurs to find food. Or a change from a tropical to arid climate could have depleted the food supply.
4. Discuss ways that prehistoric species could have survived an asteroid hitting Earth. Explain that some animal species are generalists, which means that they can adapt to a wide variety of habitats and climates. Other animal species are specialists, which means they are specifically suited to a habitat that has remained largely unchanged for millions of years. Ask students to think about how generalists and specialists might be able to survive an event that wipes out other animal species. For example, a generalist might adapt to a different type of food, and a specialist on the ocean floor might not be affected by an event that destroys other habitats.
5. Show students pictures of the four animals introduced at the beginning of the lesson, and share the following facts.
  - Coelacanths are fish that date from 410 million years ago. Of the original 120 species, only one survived the event that killed the dinosaurs 65 million years ago. This species was small; ate cuttlefish, squids, snipe eels, small sharks, and other fish; and was dark blue, much like the color of its ocean habitat.
  - Crocodiles have been on Earth more than 200 million years. They have undergone few anatomical changes. Generalists that eat a wide variety of food, they are extremely tough and can survive serious injuries.
  - Horseshoe crabs have changed little over the past 250 million years. They have a hard, curved shell that protects their soft bodies and can live a full year without eating. They have survived severe temperatures and high levels of saltwater.
  - Cockroaches first appeared 350 million years ago and have changed little since then. They can be found all over the world in every possible climate, from hot, dry deserts to warm, wet tropical forests to cold, dry mountains. Because cockroaches can eat almost anything, they are extremely adaptable.
6. Ask each student to pick one animal for in-depth research. First, have students develop a hypothesis about why their animal did not become extinct. Tell students that a hypothesis is a theory or prediction based on current knowledge. Students should base their hypotheses on the facts above and the class discussion about why dinosaurs became extinct.
7. Students may use the following questions in their research: How long has this animal existed? Describe its appearance. How do you think its physical structure contributed to its survival? Where does this animal live? Has its habitat changed over the time it has existed? How does this animal reproduce? Does this strategy contribute to the animal's survival? What are the animal's predators, if any? Students will use these and other facts they uncover to decide whether or not their hypothesis was correct.

## Assessment

Use the following three-point rubric to evaluate students' work during this lesson.

- **3 points:** Students actively participated in class discussions; wrote a logical hypothesis based on careful consideration of the information available; and wrote a clear and logical report that includes a revised hypothesis if necessary, taking into consideration new information about the animal.
- **2 points:** Students participated in class discussions; wrote a logical hypothesis based on some of the information available; and wrote a somewhat clear and logical report that includes a revised hypothesis if necessary, taking into consideration new information about the animal.
- **1 point:** Students participated minimally in class discussions; wrote a hypothesis that did not reflect careful consideration of the information available; and wrote an unclear and illogical report.

## Vocabulary

### **coelacanth** [SEE luh canth]

*Definition:* A prehistoric fish that lives in the Indian Ocean and off the coast of Sulawesi, Indonesia

*Context:* The coelacanth has survived millions of years in the same form as its prehistoric ancestors.

### **extinction**

*Definition:* The total disappearance of a species, so that it no longer exists anywhere

*Context:* Scientists are unsure about the cause of the extinction of the dinosaurs about 65 million years ago.

### **generalist**

*Definition:* An organism that has adapted to survive in different habitats

*Context:* Cockroaches are successful generalists because they can adapt to many habitats.

### **hypothesis**

*Definition:* A tentative assumption made to draw out and test its logical or empirical consequences

*Context:* You cannot support or refute a hypothesis until you conduct research or a scientific experiment.

### **living fossil**

*Definition:* A prehistoric animal species, generally one that lived during the time of the dinosaurs, that continues to survive in its ancient form today

*Context:* The horseshoe crab is a living fossil because it has flourished for more than 200 million years.

## ***Academic Standards***

### **National Academy of Sciences**

The National Academy of Sciences provides guidelines for teaching science in grades K–12 to promote scientific literacy. To view the standards, visit this Web site:

<http://books.nap.edu/html/nses/html/overview.html#content>.

This lesson plan addresses the following science standards:

- Life Science: Diversity and adaptations of organisms
- Science as Inquiry: Abilities necessary to do scientific inquiry, understanding about scientific inquiry

### **Mid-continent Research for Education and Learning (McREL)**

McREL's Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education addresses 14 content areas. To view the standards and benchmarks, visit link:

<http://www.mcrel.org/compendium/browse.asp>

This lesson plan addresses the following national standards:

- Science— Life Sciences: Understands biological evolution and the diversity of life; Nature of Science: Understands the nature of scientific knowledge, Understands the nature of scientific inquiry
- Language Arts— Writing: Uses the general skills and strategies of the writing process, Gathers and uses information for research purposes

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## **Support Materials**

Develop custom worksheets, educational puzzles, online quizzes, and more with the free teaching tools offered on the Discoveryschool.com Web site. Create and print support materials, or save them to a Custom Classroom account for future use. To learn more, visit

- <http://school.discovery.com/teachingtools/teachingtools.html>