

Assignment Discovery Online Curriculum

Lesson title:

Dinosaurs in Argentina

Grade level:

6-8, with an adaptation for younger students

Subject area:

Life Science

Duration:

Two to three class periods

Objectives:

Students will

1. understand why Argentina is a good place to search for dinosaur fossils; and
2. learn basic information about recent dinosaur excavations in Argentina.

Materials:

- Computers with Internet access (optional but very helpful)
- Pens and paper
- Wall map of South America or Argentina (optional)
- Copies of Classroom Activity Sheet: Fossil Hunting in Argentina
- Copies of Take-Home Activity Sheet: Why Paleontology Is Important

Procedures:

1. Discuss with students why Argentina, particularly Patagonia, is a good site for dinosaur research. A land bridge connected North and South America in the beginning of the Cretaceous period about 144 million years ago. When it disappeared later in the Cretaceous period, dinosaurs on the two separate continents evolved in unique ways. (In addition, the terrain in Patagonia is ideal for fossil hunting. The area is rocky, with many layers of sedimentary rocks, such as shale and sandstone. Paleontologists tend to find most fossil remains in areas such as that.) We can learn a lot about these dinosaurs and the environment in which they lived by studying dinosaur fossils.
2. Divide the class into three groups. Assign each group one of the following South American dinosaur discoveries. The Web sites are a good place for students to begin their research.
 - Discovery of dinosaur eggs:
<http://more.abcnews.go.com/sections/science/dailynews/dinoeggs981117.html>
<http://www.enchantedlearning.com/subjects/dinosaurs/news/Eggswithskin.shtml>

<http://www.amnh.org/exhibitions/expeditions/dinosaur/patagonia/discovery.html>

- Discovery of a plant-eating dinosaur:
<http://www.enchantedlearning.com/subjects/dinosaurs/news/Biggestargentina.shtml>
<http://www.enchantedlearning.com/subjects/dinosaurs/glossary/Sauropod.shtml>
- Discovery of a meat-eating dinosaur:
<http://detnews.com/menu/stories/17176.htm>
<http://detnews.com/2000/nation/0003/11/03110053.htm>

3. Distribute copies of the Classroom Activity Sheet: Fossil Hunting in Argentina. Have students answer the questions. Students may want to divide the tasks so that small subgroups work on each question. Have students record their answers on the sheet.
4. After students have completed their research, have each group pretend it works for a news magazine such as *Time* or *Newsweek*. Tell students that they must create a two-page spread featuring their dinosaur discovery. The spreads should include a short story about their research, as well as maps, pictures, and other visuals. Students can create their spreads on the computer, or they can cut out the story and visuals and paste them on a poster board.
5. Have each group present its spread to the class. Make sure everyone understands the significance of each discovery. Then discuss what all the findings combined teach us about dinosaurs and their environment.
6. Assign the Take-Home Activity Sheet: Why Paleontology Is Important. The purpose of the assignment is for students to write paragraphs, based on what they learned during the lesson, about the benefits of sponsoring additional fossil-hunting expeditions to Argentina. Tell students that the paragraphs should be persuasive. If time permits, have students share their paragraphs during the next class period. You can also use them as a final assessment of student learning.

Adaptation for younger students:

Begin the lesson by telling students that Argentina, particularly Patagonia, is a good place to look for dinosaur fossils. The reason for this is that with the disappearance of the land bridge connecting North and South America during the Cretaceous period, dinosaurs on both continents evolved in their own unique ways. Divide students into groups and have them research different South American dinosaur discoveries. (Use the Classroom Activity Sheet and Web sites provided in this lesson.) When students have completed their research, have each group make a poster with a picture of the discovery and short answers to each of the following questions. Have each group share its poster with the class.

Questions:

1. Why is Argentina a particularly good place to look for dinosaur fossils?
2. How did the plant-eating dinosaurs defend themselves against predators, especially the large meat eaters? Try to give two examples.
3. Describe what scientists can learn from studying dinosaur eggs and embryos. What are some limitations to studying eggs and embryos?
4. Would you like to be a paleontologist? Why, or why not? Explain your answer.
5. Scientists are debating whether *Gigantosaurus*, a massive, short-armed dinosaur that walked on two legs, was a fast runner. Do you think it was important for this large meat eater to run fast? Give reasons to support your ideas.
6. How do paleontologists know that sauropods were plant eaters? On what evidence do they base their ideas?

Evaluation:

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

Three points: showed exemplary effort in their research and completion of the Classroom Activity Sheet; actively participated in classroom discussion; worked cooperatively with group members; wrote a clear and thoughtful paragraph addressing the scenario described on the Take-Home Activity Sheet.

Two points: showed average effort in their research and completion of the Classroom Activity Sheet; participated somewhat in classroom discussion; worked cooperatively with group members; wrote a paragraph with few details addressing the scenario described on the Take-Home Activity Sheet.

One point: showed minimal effort in their research and completion of the Classroom Activity Sheet; did not participate in classroom discussion or work cooperatively with group members; did not write a clear and thoughtful paragraph addressing the scenario described on the Take-Home Activity Sheet.

Extensions:

Dino Time Line

Have students draw a geologic time line of the Mesozoic era (when the dinosaurs lived), beginning with the Triassic period. Here are some helpful Web sites:

- Web Time Machine: <http://www.ucmp.berkeley.edu/help/timeform.html>

- Walking with Dinosaurs—Chronology: <http://www.bbc.co.uk/dinosaurs/chronology/index.shtml>

Encourage students to include dinosaur fossils found in Argentina on their time line. Then ask them to look at the time line and decide whether dinosaur excavations in Argentina have uncovered dinosaurs from any particular period of the Mesozoic. Have the more recent dinosaur discoveries been from a particular period?

Where Else Will You Find Fossils?

Have students review the specific geologic and geographic conditions (e.g., climate, terrain, soil) that make Patagonia an ideal place to look for dinosaur fossils. Have them research the world's climatic regions to figure out other places that might be good areas to look for fossils. (*Africa and Australia are two other good spots.*) Ask students to predict the other places that might be good fossil-hunting spots and to label them on a world map. Have them research at least one of these places to see if there have indeed been any discoveries of dinosaurs or other fossils. Visit the following Web site: <http://www.enchantedlearning.com/subjects/dinosaurs>.

Suggested Reading:

Eggs, Nests, and Baby Dinosaurs: A Look at Dinosaur Reproduction

Kenneth Carpenter. Indiana University Press, 1999.

You might be surprised to learn how much scientists have been able to determine about dinosaur reproduction, but it's all here in this book! Through the discovery of dinosaur eggs and baby fossils, and applying what is known about the reproductive behavior of living animals, the author makes a very plausible case for dinosaur reproductive behavior. Lots of detailed drawings, photographs, charts, and diagrams make the information even clearer.

The Tiniest Giants: Discovering Dinosaur Eggs

Lowell Dingus. Doubleday, 1999.

On a trip to Patagonia, Argentina, to look for fossil birds, a team of American paleontologists found instead a vast dinosaur nesting ground, with hundreds of fossilized dinosaurs eggs. They also found the first sauropod (giant plant-eating dinosaur), embryo fossil, and fossil embryo skin. Color photographs and sidebar information are included.

Vocabulary:

carnivore

Definition: An animal that eats only meat.

Context: *Gigantosaurus* was a **carnivore** that may have lived in packs, posing an even greater threat to other dinosaurs than if it had lived alone.

embryo

Definition: A vertebrate at any stage of development prior to birth or hatching.

Context: Paleontologists in Argentina have discovered thousands of eggs containing sauropod **embryos**.

herbivore

Definition: An animal that eats only plants.

Context: The sauropod that paleontologists recently discovered in Argentina may be the largest dinosaur ever found, but it was an **herbivore** so it would not have been a danger to other dinosaurs.

paleontology

Definition: The study of the forms of life existing in prehistoric or geologic times, as represented by the fossils of plants, animals, and other organisms.

Context: If you're interested in **paleontology**, you might want to consider signing up for a dig in Argentina, where you can help excavate the fossils of dinosaurs and other prehistoric creatures.

sauropod

Definition: A suborder of herbivorous dinosaurs characterized by long necks, small heads with blunt teeth, small brains, and long tails.

Context: Scientists have recently discovered a new kind of **sauropod** in Argentina.

Academic standards

Grade level:

6-8

Subject area:

Science: Nature of Science

Standard:

Understands the nature of scientific inquiry.

Benchmark:

Knows possible outcomes of scientific investigations (e.g., some may result in new ideas and phenomena for study; some may generate new methods or procedures for an investigation; some may result in the development of new technologies to improve the collection of data; some may lead to new investigations).

Grade level:

6-8

Subject area:

Science: Life Science

Standard:

Understands biological evolution and the diversity of life.

Benchmark:

Knows that the fossil record, through geologic evidence, documents the appearance, diversification, and extinction of many life-forms.

Grade level:

6-8

Subject area:

Science: Life Science

Standard:

Understands biological evolution and the diversity of life.

Benchmark:

Understands the concept of extinction and its importance in biological evolution (e.g., when the environment changes, the adaptive characteristics of some species are insufficient to allow their survival; extinction is common; most of the species that have lived on Earth no longer exist).

Credit

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Fossil Hunting in Argentina

Answer the questions below as your group conducts research about a dinosaur discovery:

1. What is the discovery?
2. Who made the discovery?
3. When was the discovery made?
4. Where was the discovery made? Try to locate the site on a map.
5. When did the dinosaur or dinosaurs live?
6. What is the significance of the discovery?

Why Paleontology is Important

Pretend you're a paleontologist who is getting ready to go on a dig in Argentina. You're hoping that a museum will sponsor you and help pay your way, so you must convince the museum's board of directors that your work is important. Write a paragraph explaining why you think it is critical to look for dinosaur fossils in Argentina. Include descriptions of the type of dinosaur fossils that have already been found there, the additional fossils you hope to find, and how you plan to add to the current knowledge about dinosaurs. Make your paragraph as convincing as possible.