

THE SCIENCE OF FRINGE

EXPLORING: FOSSILIZATION

A SCIENCE OLYMPIAD THEMED LESSON PLAN
SEASON 3 - EPISODE 5: **AMBER 31422**

Overview:

Students will learn about the process of fossilization and identification of species from incomplete information.

Grade Level: 9–12

Episode Summary:

A group of criminals cut a man out of the amber quarantine. The Fringe team investigates the break-in and is informed by Secretary Bishop that people caught in the amber are alive in a state of suspended animation. They then discover that the man freed from the amber was not only a bank robber, but also has a twin brother. The investigation leads them to the twin's front door, where Olivia's close observations reveal a complicated relationship between the brothers.

Related Science Olympiad Event:

Fossils - Teams will demonstrate their knowledge of ancient life by completing selected tasks at a series of stations. Emphasis will be on fossil identification and ability to answer questions about classification, habitat, ecologic relationships, behaviors and the use of fossils to date and correlate rock units.

Learning Objectives:

Students will understand the following:

- The casting and molding process of fossil creation.
- Fragmentary information from preserved fossils can provide insight about the overall original organism (including identification) to a close observer.

Episode Scenes of Relevance:

- Thieves cutting brother out of amber quarantine with laser torches.
- Lincoln, Olivia and Charlie make a cast of the hollow amber face.
- View the above scenes: <http://www.fox.com/fringe/fringe-science>

FOX CODE



FOR SMARTPHONES

Online Resources:

- Fringe “Amber 31422” full episode: <http://www.fox.com/watch/fringe>
- Science Olympiad Fossils event: http://soinc.org/fossils_c
- Everything Fossils: <http://www.fossils-facts-and-finds.com/>
- Smithsonian Magazine articles about fossils: <http://www.smithsonianmag.com/topics/Subject-Fossils.html>

Procedures:

1. Tell your students that they are going to learn about fossilization, specifically the casting method of fossilization (which is different from the permineralization method).
2. Have your students research fossilization and fossil collections in resources such as earth science textbooks and websites and discuss what they have learned.
3. Divide your class into two groups. Have each group complete the following activity:
 - a. Materials: Small fossil (if one is available), clean and dry chicken and turkey bones (the leg is best) or small toy animal/dinosaur figurines (as a substitution if bones are a problem), Plaster of Paris, sand, water, aluminum baking tray, butter knife.
 - b. Mix 4 parts Plaster of Paris with 1 part sand, then spread evenly across the bottom of the tray to a depth of approximately 2-3 cm. Reserve some of the mixture on the side.
 - c. Have one group lightly press a few chicken bones (or figurines) into the plaster/sand mix, while the other presses turkey bones into their tray.
 - d. Pour a small amount of water over the bones, taking care to not thin out the plaster mix.
 - e. Lightly sprinkle extra plaster over the bones
 - f. Let plaster harden.
 - g. Once plaster is hardened, have the teams trade trays and carefully excavate the bones with a butter knife, making sure to leave the plaster below the bones as intact as possible.
 - h. The resulting negative space is a fossil mold and can provide lots of information to the students. You can stop here, but if you want to continue you can treat this just like any other mold and make a positive cast using a softer material such as gelatin or latex.
4. Discuss with the class the results of the activity. Be sure to address:
 - a. Compare and contrast the chicken fossils and the turkey fossils. Would someone who didn't participate in this activity be able to identify each?
 - b. Can you extrapolate any observations from the fossils into more information about the original organisms' anatomies?
 - c. How this method of fossil creation differs from other methods (petrification, permineralization, etc.).

Additional Discussion Suggestions:

- This activity could be extended into a trip to a local natural history museum. At the museum, be sure to ask your students about the original habitat of the fossilized organisms. What about the environment allowed them to be fossilized?
- Most fossils are extremely old and were formed under extreme conditions. Do these conditions still exist on earth anywhere? Will people in the future find the fossils of anything alive today? What are they likely to see and how will they compare to the fossils we currently have?



Extension to Other Subjects:

Art: Many statues are either produced or copied through a cast making process. How are these methods similar to and how do they differ from fossilization?

Biology: Several species alive today are fundamentally the same now as when the fossils we discover were formed. How are these species valuable to paleontologists and others who study fossils?

Social Studies: People have been discovering fossils throughout recorded history. For much of this time, no one knew how fossils were formed and had a variety of explanations for these curiosities. What are some of these explanations and what do they say about the societies that believed them?

National Science Standards Alignment:

D. Earth and Space Science - Earth and space science focuses on science facts, concepts, principles, theories, and models that are important for all students to know, understand, and use.

M.D.2 Earth's history b. Fossils provide important evidence of how life and environmental conditions have changed.

H.D.3 Origin and evolution of the earth system b. Geologic time can be estimated by observing rock sequences and using fossils to correlate the sequences at various locations. Current methods include using the known decay rates of radioactive isotopes present in rocks to measure the time since the rock was formed.