



It's Not Easy to Be a Fossil!

Teacher Background

Fossils are the remains or imprints of prehistoric animals preserved in petrified form or as a mold or cast. Very few plants and animals actually become fossils. In order for a plant or animal to turn into a fossil specific conditions must all happen in a relatively short period of time. In most cases, a plant or animal dies in a watery environment and its remains lay on top of soft sediments (clay, silt, or sand). The animal then becomes buried relatively quickly after dying. This happens during catastrophic events, such as floods, landslides, earthquakes, etc. The soft parts of the animal eventually decay away and leave behind the hard parts like bones and shells. Over millions of years, the sediment and animal remains continues to get buried beneath more and more layers of sediment.

There are many ways a plant or animal forms a fossil. The different types of fossils are:

Mineralization: The hard parts of animal remains that are hardened into rock through minerals filling in the tiny spaces in the animals cellular structure.

Amber: Insects and small animals can become trapped inside a trees sap. This sap will harden and preserve the remains inside.

Carbonization: Carbonization is when all the parts of an animal disappear except the carbon. This leaves a residue that outlines the plant or animal.

Cast and Mold: A mold is formed when buried remains dissolves and leaves behind a hollow space. This would leave an imprint of the animal in the rock. If that hollow space or imprint is filled in with minerals a cast is created. A cast would be a 3-dimensional solid recreation of the animal.

Freezing: Some animals can be found preserved in ice. If the ice remains frozen the animal can remain preserved for thousands of years.

Trace Fossil: These are not the physical remains of an animal but evidence that a plant or animal lived nearby. For example, footprints left behind by an animal walking over soft sediment.

Lesson Instructions

**This lesson can be done as one longer lesson or broken up into two or three days.

Pre-Lesson set up:

1. Print all ID charts and instructions for the students
2. Set up fossil samples around the room with their sample ID numbers.

Lesson:

1. Begin by discussing fossils with students. Ask the students what is a fossil? Ask them where are fossils found? If they need help guide their answers (do we find dinosaur bones in the sky?). Discuss how fossils form and the different types of fossils.
2. As you discuss you can show the students pictures of each fossil type.
3. You may want students to break into groups to watch some short videos on fossilization. Below are a few from PBS:
 - a. Becoming a Fossil:
<https://mass.pbslearningmedia.org/resource/tdc02.sci.life.evo.becfossil/becoming-a-fossil/#.Xpcu-shKg2w>
 - b. How does a dinosaur become a fossil?
<https://www.youtube.com/watch?v=9f5HehQovx8>
4. Hand out the Fossil ID chart and a Fossil Sample Chart to each student
5. Have the students walk around and observe the fossils. Have them fill out their Fossil Sample Chart by putting the sample number in the box they think is correct. They should use the Fossil ID chart to help them decide.
6. Once everyone has had a chance to look through the fossils. You can discuss as a class what type of fossil each sample is. As you discuss each one, sort them into piles.
7. Then go through each type of fossils and have the students describe what they see.
8. Ask the students how they think each fossil formed?
9. Also ask them if they recognize the type of plant or animal in the fossil. What type of environment do they think the animal lived in? How does this information tell scientists about the environment at the time this animal was alive?
10. You can tell students that shell fossils are found at the top of Mt. Everest! And ask them what that means about the environment of that area?
11. Next the students can make one of three types of replica fossils to take home with them.
12. Have the students decide (or you pick for them) which type of fossil they want to make and break them up into groups accordingly
13. Hand out the materials and go over the instructions for each of the fossil types. Note: The amber fossil will require the help of an adult.
14. See on the following pages instructions for making each fossil type.

Assessment:

To assess their knowledge of the fossil types you can show students pictures or samples of fossils and have them identify the type.

Make your own Fossil Activities!

Now the students can make one of three types of fossils! Have the students decide which type of fossil they want to make (or you can choose for them and divide them into groups). They can make an 'amber' fossil, a trace fossil, or a fossil cast.

Amber Fossil:

Student Materials:

- 3 x 5 index card
- Markers
- pipe cleaners

Teacher Materials:

- Hot glue gun
- glue sticks

Procedure:

1. Give each student one index card and a couple of pipe cleaners.
2. Have the students draw a circle (~1 inch) on the left side of the index card.
3. Have them color in the circle the same color they think is closest to amber.
4. Have them make small plant or bug models with their pipe cleaners and place them inside the circle on the index card.
5. They can then bring their index card to the teacher for them to fill in the circle with hot glue.
6. Explain to them as you are gluing -that their bug has landed on a tree and is getting covered in sap!
7. Once the glue has cooled, they can write on the right side of the index card what type of fossil they have created and how this fossil was formed.

Trace Fossil:

Materials:

- Air-Dry clay
- mini rolling pins
- dinosaur figurines
- wax paper

Procedure:

1. Give each student a fist-sized to tennis ball sized piece of the air-dry clay, a piece of wax paper, and a mini rolling pin.
2. Have the students knead the dough for a few minutes then roll it to about $\frac{1}{4}$ - $\frac{1}{2}$ inch thick.
3. They can then pick out a dinosaur and have the dinosaur 'walk' across the clay.
4. Explain to these students that the clay is a layer of sediment and they can see the dinosaur leave footprints as it walks across the sediment, just like how their footprints are left in the sand at the beach or a muddy trail.
5. They should push down slightly on the models to make imprints, but not so much that they push all the way through the clay.
6. They can use more than one dinosaur to make several tracts.
7. Encourage them to make up a scenario of why they are walking there and what is happening (predator/prey, mom/dad, and baby, etc.).
8. Once they are finished you can discuss with them how now all we have are the tracts left behind and how might scientists look at the tracts to determine what was happening when they were made.
9. Let the clay dry for at least 24 hours it may require a few days to completely dry. The next day it should be dry enough if the students want to paint or decorate their tracks.

Cast Fossil:



Materials:

- fossil molds
- air-dry clay
- wax paper

Procedure:

1. Give each student a fist sized piece of clay. Let the students pick a few (depending on size) fossil molds.
2. Have the students knead the clay for a minute or two.
3. Have them break up the dough into smaller pieces depending on how many and the size of the molds they chose.
4. They should then press the clay into the mold until the mold is completely filled, with some of the clay overlapping the edges.
5. Then they can carefully peel the clay out of the mold and place the cast onto their wax paper.
6. They can repeat the process if they have enough clay left over to make more.
7. Let the clay dry for at least 24 hours (thicker casts will take longer to dry).
8. Once they are dry, they can paint, color, or decorate their fossil cast.

Fossil Type ID Chart

Fossil Type	Description	Picture
Amber	A hard yellowish, often see-through substance. Inside of the yellow resin is the remains of small animals, bugs, or plant materials.	
Mold	A mold is a cavity or imprint of an animal's body or bones.	
Cast	A cast is when a mold fills in with minerals from the mud and water. It is an exact replica of the animal remains.	
Carbonization	A carbonized fossil is a layer of carbon left behind that leaves a 'picture' of the animal printed on rock.	
Trace Fossil	These are not actual animal remains, but traces of animal activity. Such as, footprints, burrows, and tracks.	

Fossil Sample Chart

Fossil Type	Sample Numbers
Amber	
Mold	
Cast	
Carbonization	
Trace Fossil	