



Making Fossil Imprints

Background:

Fossils are formed in several different ways. The first way involves imprints, also known as impression fossils. Impression fossils usually contain footprints, plants, or tracks and can be found in silt or clay sediment. These fossils are common and usually do not contain carbon. They are also referred to as mold or cast fossils because when an organism decays a hole is left as the “mold”. Sometimes these fossils are compressed in sedimentary rock and undergo physical compression. Another way is from mineral replacement, done underground with the heat and pressure of the earth over thousands of years, which forms a hard, rock like fossil. They are formed when an organism is buried in sediment. Water dissolves the bone and the bone is replaced by minerals. Petrified wood is another example of a mineral replacement fossil. Body fossils are rare and can be formed when actual remains are trapped in amber or tar, which then preserves it. Amber is fossilized tree sap. Organisms get trapped in the sap and then the sap hardens becoming amber. The organism can also be preserved by freezing or being trapped in wax, or asphalt (tar). Tar is crude oil that travels to the earth’s surface and thickens. Organisms get trapped in the thick oil and become encased when the tar hardens and become fossils. These fossils include teeth, bones, or even the entire organism. Much of what we know about ancient plants and animals comes from fossils. Many scientific theories also come from information gathered from fossils. A theory is an explanation for some phenomenon that is based on observation, experimentation, and reasoning. The idea is supported by a large quantity of evidence that does not conflict with any existing experimental results or observations.

Standards:

SC.D.1.3.1 SC.D.1.3.2 SC.G.1.2.7 SC.H.1.2.5 SS.B.1.3.1 SC.H.2.2.1
MA.6.A.3.5 SS.7.G.3.1 SC.8.P.9.1
SC.912.L.15.1 SC.912.P.10.11 MA.912.A.3.5

Objectives:

- Differentiate between the three different kinds of fossil formations: impression, mineral replacement, body fossils
- Make an imprint fossil from plaster
- Understand that physical changes can be caused with forces like motion, temperature and pressure
- Understand how fossils impact scientific theories

Vocabulary:

fossil
sediment
compression
sedimentary rock
mineral
body fossil
impression fossil
mineral replacement fossil
theory

Materials:

Wax paper or parchment paper
Petri dishes
Coffee filters
Petroleum jelly
Assorted leaves
Sharks teeth
Shells
Plastic cups
Wooden stirring sticks
Paper towels
Permanent markers
Newspaper
Sponges or rags for clean-up

For Impressions:

Store-bought Plaster of Paris (follow directions on package)

“Stone” Dough Mix:

½ cup salt
1 cup flour
½ cup cold brewed coffee
1 cup used coffee grounds
Mixing spoon
Mixing bowl

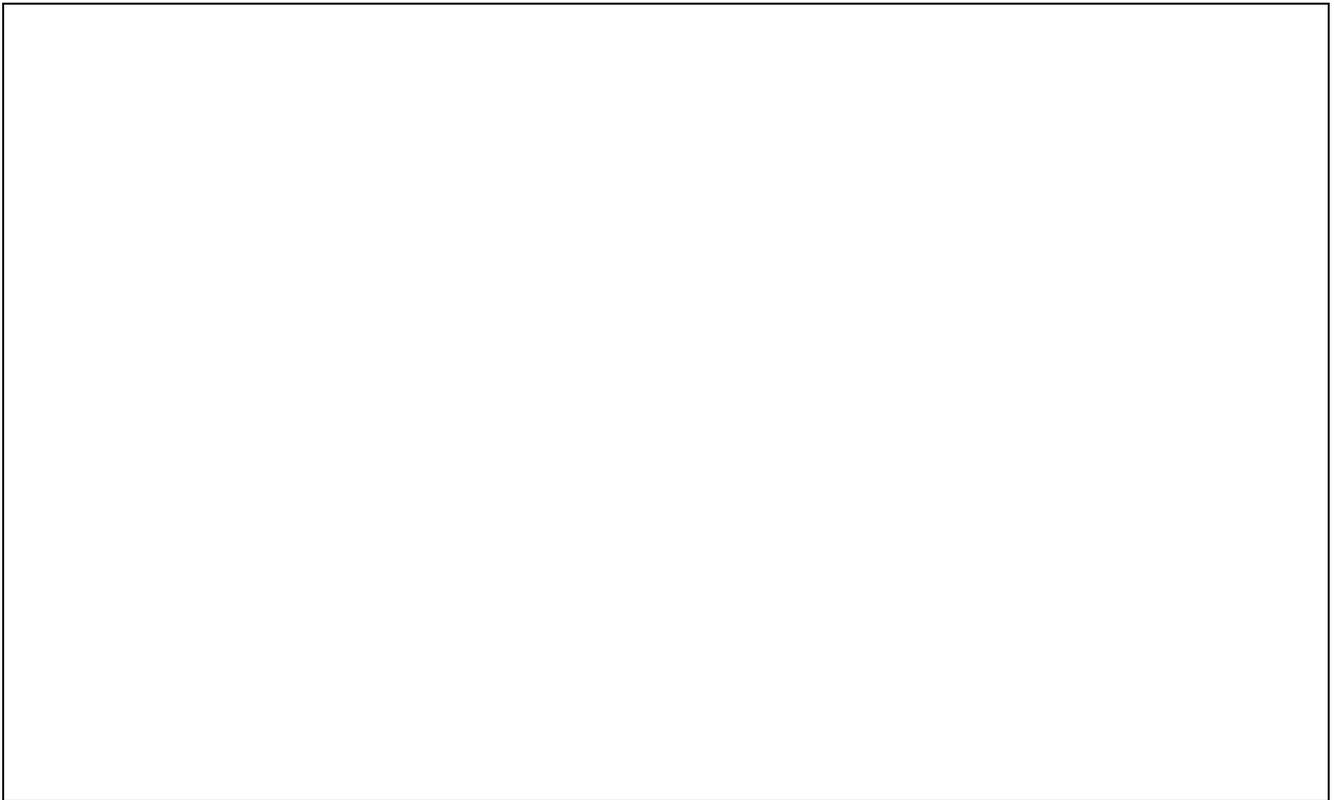
Procedure:*To Make Imprints:*

1. Use a permanent marker to write your name on a coffee filter.
2. Place the coffee filter on a Petri dish.
3. Place either ¼ cup mixed Plaster of Paris or approximately ¼ cup “stone” dough mix in the bottom of the coffee filter. (If using Plaster of Paris gently tap a few times to get air bubbles out)
4. Select the fossils you would like to make an impression of.

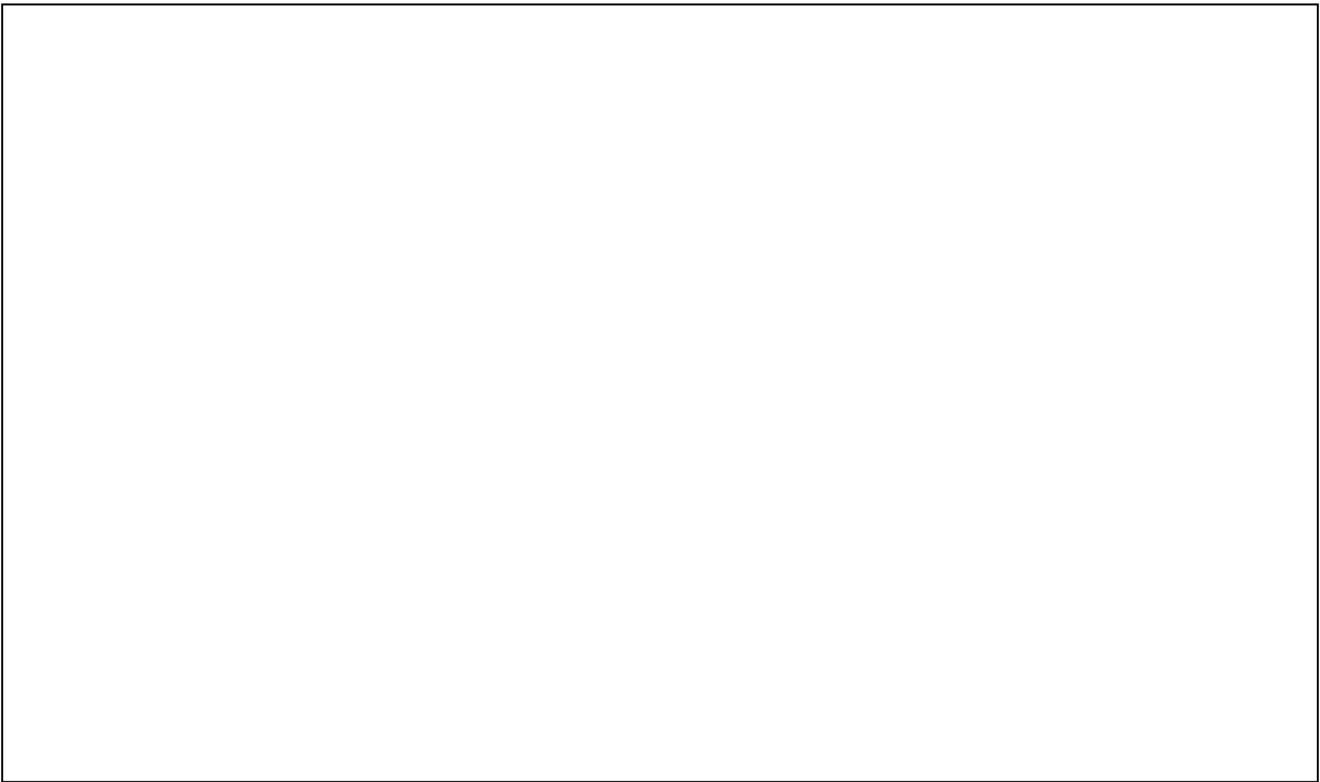
5. Coat the items with a thin layer of Petroleum jelly.
6. Place the items (sharks tooth, shell, and leaf) with the textured surface down onto the Plaster of Paris or “Stone” dough. Do not submerge.
7. Leave the fossil in the Plaster of Paris overnight. Remove the fossil from the “stone” dough once impression is made.
8. Move Petri dishes to a counter and allow to dry overnight.
9. Clean up your work area.
10. Remove fossils from Plaster of Paris the following day.
11. Remove hardened Plaster of Paris or “stone” dough from coffee filter and Petri dish.

Data/Observations:

Draw a picture of your impression(s):



Draw a picture of what you think the organism your fossil came from looked like:



Analysis/Conclusion:

Analysis/Conclusion: Grades 3-5

1. How do models help us understand how things work?
2. How do fossils affect scientific ideas?
3. What are some processes that cause materials to change and have different characteristics?
4. What are minerals and how are they formed?
5. How can you identify Earth's landforms and what is below the Earth's surface?

Grades 6-8

1. How do fossils impact scientific theories?
2. How do models express scientific explanations?
3. How does new evidence impact an existing theory?
4. How do physical changes reflect the law of conservation of mass?
5. What are some processes that cause materials to change and have different characteristics?
6. What are minerals and how are they formed?
7. How can you identify Earth's landforms and what is below the Earth's surface?

Grades 9-12

1. How do models illustrate scientific explanations?

2. How do fossils impact scientific theories of evolution?
3. How do theories reflect scientific explanations?
4. How does new evidence impact an existing theory?
5. What is the relationship between rocks and minerals?
6. What are the similarities and differences between relative and absolute age in determining the fossil record?
7. How do the Law of Superposition and the Law of Crosscutting relationships work together to determine the relative age of rocks?
8. How can I use half-life to find the absolute age?
9. How do scientists determine if a mass extinction has occurred?
10. What influence do mechanical and chemical weathering have on surface features?
11. What influence do the agents of erosion have on the Earth's surface?

Extension: (varies by age group) Elementary:

1. Students can learn more about the plants and animals they made impressions of so that they can picture what the organism looked like before it was a fossil.
2. Students can learn about weathering and erosion.
3. Students can learn about the types of rock fossils are found in.
4. Students can discover where, geographically, the fossils were found.

Secondary:

1. Students can learn about the different methods of aging and identifying fossils—relative age, absolute age, varve count, carbon dating, radiometric dating, index fossils, and the Law of Superposition.
2. Students can research careers in which fossils play a key role: paleontologist, geologist, anthropologist, etc.
3. Students can learn more about the types of rocks fossils are found in and how they are formed, leading into a lesson on weathering, erosion, deposition, rocks and minerals, etc.
4. A geography project can be done where students learn about the areas where fossils are found and the change in conditions over time.
5. Students can research the histories of the areas where fossils are found and monitor how the discoveries of fossils and new organisms affected the areas (politically, economically, etc.).
6. Students can use math to determine the approximate size of their organisms (see Shark Tooth activity).

“Stone” Dough Mix adapted from **Reach Out!** Reachoutmichigan.org