

**GRADES 3-5**

**TIME**

Two Class periods  
(40-50 minutes)

**MOLD AND CAST**



Science



# FOSSIL FORMATION

The Children's Museum's lessons are designed to weave classroom experiences and museum education together. All lessons are interdisciplinary and can be used as individual classroom experiences or in combination to create a cohesive unit. Lessons are optimized when used in connection with museum virtual programs and field trips.

**Fossils** are remnants of things that lived millions of years ago, such as plants, animals, or fungi. A fossil is formed when sediment buries organic materials shortly after it has died. There are two types of fossils, a **mold** and a **cast** fossil. Mold fossils are formed when sediment fills the inside cavity or covers the outside of a dead organism. The shape and texture of the remains are left as evidence of the organic material that was there. Cast fossils are formed when an organism dies, its flesh decays, and bones deteriorate due to chemical reactions. Minerals gradually enter the cavities, resulting in a cast that is in the form of the original organism.

## FOCUS QUESTIONS

- What are fossils?
- What can become a fossil?
- What type of rock do we find fossils in?



Trilobite fossil, mold and cast (*Phacops sp.*) Morocco, Devonian Period

## INDIANA ACADEMIC STANDARDS

Science: 3.2.4 SEPS.1, SEPS.2, SEPS.3, SEPS.4, SEPS.6

## OBJECTIVES

Students will:

- Define the term fossil
- Identify the difference between a mold and a cast fossil
- Understand how scientists use models to learn about the physical structure of something in the natural world.

## MATERIALS

- Seashells (or other natural material like acorns, twigs, etc.)
- Polymer Clay, pre-portioned for each student in a zip top plastic bag
- School scissors
- Plaster impregnated gauze, cut into strips
- Small cup/bowl of water



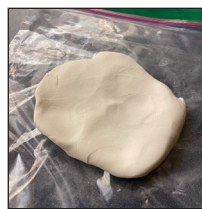
# Creating a Mold

Read all instructions before beginning the lab activity  
Remember to wear safety equipment at all times.

## PROCEDURES

- Share with students that they will create a model, or 3-D representation of an object, to demonstrate how a fossil is formed. Share with students that two types of fossils can be classified by the way they were formed– cast and mold.
- Explain to students that they will use a natural object to create their model of mold and cast fossils.
- As students are brainstorming what type of item they'd like to use to make their fossils, have them discuss or even sort organic vs non-living objects (ie: why can we use an acorn and not a rock?)
- Guide students through the steps to create mold and cast fossils. As the casts require time to dry, share with students they will create their fossils during a class period and will observe them at a later time.
- After students have created their molds, invite them to compare and contrast the mold and cast fossil. The following questions can be used for discussion or as writing prompts in a science journal.
  - o What is the biggest difference between mold fossils and cast fossils?
  - o How might paleontologists use the observations and data that they gather about fossils?
  - o What do fossils help us learn about the history of Earth?

- 1** Form a cookie-shape out of a ball of clay. It should be large enough to fit the item being fossilized in the middle



- 2** To create the model, press the selected natural object into the clay, being sure to press it in as far as you can.



- 3** Remove the object from the clay and set aside.



## GEOLOGIC TIME



The Law of Superposition is used as a basic method for evaluating Earth's history. The law states that, "in an undisturbed stack of rock layers, the oldest layers will always be on the bottom, and the youngest on top." This layering, in any particular place, indicates the ages of rocks and fossils found within each layer and how the layers each relate to one another. A layer cake is a great way to visualize the Law of Superposition. This image of a layer cake represents a cross-section of the Earth; according to the Law of Superposition, the red layer would be the youngest layer of sedimentary rock and the purple would be the oldest. This is a method of relative dating used to date fossils. The remains of dinosaurs that lived millions of years apart wouldn't be found in the same layer! This law helps scientists better understand the sequence of geologic time and give clues to what species lived together and how different organisms have evolved over time.



A permineralized trilobite, *Asaphus kowalewskii*

Procedure steps continued on page 4 >>

## Creating a Mold *cont.*

- 4** Using the scissors, cut small pieces of the plaster gauze.



- 5** Dip the small pieces of gauze into the water to soften and saturate it completely, and press it into the mold left in the clay. (Repeat until mold is completely full with the wet gauze). This is how you create a model of a fossil.



- 6** Let the gauze harden in the clay for at least 4 to 24 hours.



- 7** After it is set, gently flex the clay to separate the cast that has been created from the mold.



### VOCABULARY

- Cast
- Fossil
- Model
- Mold

### DID YOU KNOW?

- A fossil is most likely to be found in a sedimentary rock. Fossils are very unlikely to survive the extreme conditions required for the formation or creation of igneous and metamorphic rocks.
- Fossils are not just dinosaur bones. Fossils can also be formed from bacteria, fungi, plants, and other animals!
- Fossilized poop has a special name! It is called coprolites.



*Crinoid columnals (Isocrinus nicoleti) from the Middle Jurassic Carmel Formation at Mount Carmel Junction, Utah*

## How a Fossil Forms

<b>Step 1: Life</b>	The organism is alive and growing.
<b>Step 2: Death</b>	The organism dies.
<b>Step 3: Sediment</b>	Sediments quickly cover the organism.
<b>Step 4: Time</b>	Over a long time more sediments settle on the organism.
<b>Step 5: Fossilization</b>	Water, sand and minerals fossilize the organism.
<b>Step 6: Exposure</b>	The fossil remains are revealed and found after wind and water remove layers of sediment.