

2nd Grade
Fall Fossils Program
Fossils Rock!

Grade Level: 2nd

Length of Lesson: 1.5 hours

Objectives:

Students will be able to:

- define what a fossil is and describe how they are formed
- describe the types of fossils that can be found at River Bend

Minnesota Academic Science Standards

N/A

AAAS Project 2061 Benchmarks

N/A

Core Knowledge Sequence for Science

N/A

Location

Intro/Indoor activity/Conclusion: Trailside classroom

Outside: Hike down along Oak Trail to fossil and to Honor Point to show rock layers and the erosion of the river

Background Information

What is a fossil? Simply put, a fossil is the remains or evidence of any creature or plant that once lived on the Earth. When animals, plants and other organisms die, they typically decay completely. But sometimes, when the conditions are just right, they're preserved as fossils.

Several different physical and chemical processes create fossils, some of them more common than others. Freezing, drying and encasement, such as in tar or resin, can create whole-body fossils that preserve bodily tissues. These fossils represent the organisms as they were when living, but they're very rare.

Most organisms become fossils when they're changed through various other means.

The heat and pressure from being buried in sediment can sometimes cause the tissues of organisms — including plant leaves and the soft body parts of fish, reptiles and marine invertebrates — to release hydrogen and oxygen, leaving behind a residue of carbon. This process — which is called **carbonization**, or distillation — yields a detailed carbon impression of the dead organism in sedimentary rock.

The most common method of fossilization is called **permineralization**, or **petrification**. After an organism's soft tissues decay in sediment, the hard parts — particularly the bones — are left behind.

Water seeps into the remains, and minerals dissolved in the water seep into the spaces within the remains, where they form crystals. These crystallized minerals cause the remains to harden along with the encasing sedimentary rock.

Fossils also form from molds and casts. If an organism completely dissolves in sedimentary rock, it can leave an impression of its exterior in the rock, called an external mold. If that mold gets filled with other minerals, it becomes a cast.

An internal mold forms when sediments or minerals fill the internal cavity of an organism, such as a shell or skull, and the remains dissolve.

Peter Larson and Kristin Donnan in their book, *Bones Rock!* group types of fossils into two categories:

Type I-the remains of the dead animal or plant or the imprint left from the remains.

Type I includes:

- **bones**
- **teeth**
- **skin impressions**
- **hair**
- **the hardened shell of an ancient invertebrate** (an animal without a backbone) like a trilobite or an ammonite, or the
- **impression of an animal or plant**, even if the actual parts are missing.

Type I fossils can be the actual thing that it once was, like a piece of bone or hair or feather. More often the bone material is replaced by different minerals contained in the liquid of the sediments that buried it. What was once bone is now some sort of crystal. In this fossilization process, called replacement, the minerals in groundwater replace the minerals that make up the bodily remains after the water completely dissolves the original hard parts of the organism.

This process also takes place with shells, exoskeletons and wood. If the spaces in the bone are filled with liquid minerals which later harden it is called **permineralization**.

Sometimes the organic material is dissolved by the mineral-laden water. The process happens so slowly that each cell is dissolved and replaced by a particular liquid mineral before it hardens. This is called **petrification**. In petrification, every detail down to the cellular level is duplicated in the minerals.

Type I can also be **molds or casts** of the original animal or plant part. If the original organism decays, leaving an imprint and an empty space, it is called an exterior mold or simply a mold. If a space in the structure is filled with minerals and then the original animal or plant part dissolves, it is called a cast.

Type II- Something that was made by the animal while it was living that has hardened into stone. These are called **trace fossils**.

Type II includes:

- **footprints**
- **burrows**
- **coprolite** or animal poop



Figure 1: Theropod dinosaur footprint Figure 2: Coprolite

Prior to Visit (for teachers)

Before your visit, please review with your students:

- What a fossil is & how they are formed
- The different types of fossilization: **carbonization, permineralization, or petrification, molds or casts, and trace fossils.**
- Behavior expectations

Extensions/Resources (for teachers)

The Scientist – Fossilized Mosquito Blood Meal - <http://www.the-scientist.com/?articles.view/articleNo/37874/title/Fossilized-Mosquito-Blood-Meal/>

Fossils for Kids.com - <http://www.fossilsforkids.com/>

OpenCourtResources.com – Grade 2 Fossil Unit PowerPoints -

http://www.needleworkpictures.com/ocr/grade2/newunitpages/fossils/powerpoints_fossils.html

Scholastic ScienceWorld - Fossil PowerPoint

<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCsQFjAA&url=http%3A%2F%2Fteacher.scholastic.com%2Fscholasticnews%2Fmagazines%2Fscienceworld%2Fassets%2FSW-POWERPOINT-FOSSILS.ppt&ei=5YldUovSCZT7yAGnpoCYDg&usg=AFQjCNE5ABLppI0X6GpoTa3thOQTgwBb-A&bvm=bv.53899372,d.aWc>

LiveScience.com - Gallery of Fantastic Fossils - <http://www.livescience.com/12776-gallery-fantastic-fossils.html>

Facts on Fossils – Extremes in the Fossil World - http://www.fossils-facts-and-finds.com/facts_on_fossils.html

Fossil-facts-and-finds.com – Fossil Lesson Plans http://www.fossils-facts-and-finds.com/fossil_lesson_plans.html

NOVA – Becoming a Fossil (video) -

<http://www.pbs.org/wgbh/nova/education/evolution/becoming-fossil.html> or via YouTube at <http://www.youtube.com/watch?v=Ca3At5V4Jqg>

References

Fossils-Facts-and-Finds.com - <http://www.fossils-facts-and-finds.com/>

Scholastic ScienceWorld - Fossil PowerPoint

<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCsQFjAA&url=http%3A%2F%2Fteacher.scholastic.com%2Fscholasticnews%2Fmagazines%2Fscienceworld%2Fassets%2FSW-POWERPOINT-FOSSILS.ppt&ei=5YldUovSCZT7yAGnpoCYDg&usg=AFQjCNE5ABLppI0X6GpoTa3thOQTgwBb-A&bvm=bv.53899372,d.aWc>

Enchanted Learning.com – How Fossils Form -

<http://www.enchantedlearning.com/subjects/dinosaurs/dinofossils/Fossilhow.html>