Western Engineering

# Outreach

## Fossils

## SK- Grade 2

## Meet Today's ENG HERO!

Naomi Klinghoffer - Professor with Western Engineering

Dr. Klinghoffer is a professor of Chemical Engineering at Western. Her research focuses on alternative and renewable fuels. Her work includes the conversion of biomass and waste into fuel, catalytic synthesis of renewable transportation fuels, the conversion of hydrocarbons, and finding ways to use the carbon dioxide already in the atmosphere for useful applications to help fight climate change. To learn more about her research, visit: https://www.eng.uwo.ca/chemical/faculty/klinghoffer_n/index.html

## Learning Goal:

- Students will learn about scientific exploration
- Students will be introduced to types of fossils and their characteristics
- Understanding how fossils are formed and why they are important
- Curriculum Connections: Grade 1 - Needs and Characteristics of Living Things and Materials

## Materials Needed:

- 1/2 Cup Flour
- 1/2 Cup Used Coffee Grounds
- 1/4 Cup Salt
- 1/4 Cup Sand
- Water
- Fossil Objects (find on a nature walk - rocks, sticks, leaves, etc)
- Cardboard (if you want to make your own fossil object mining tools) and string
- Cookie cutters

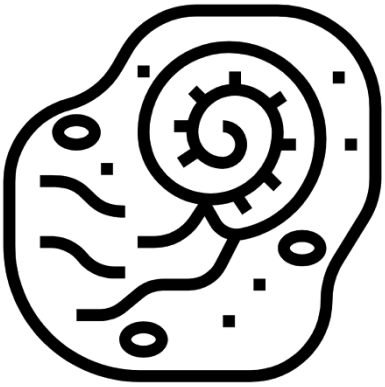
## Engineering and Science Connections:

Today we will be talking about lenses and scientific exploration and fossils!
Have you ever seen a fossil or know what they are?

### Fossils

**What is a fossil?**

Fossils are the preserved remains of plants or animals. This means that the shape of the plant or animal can be seen in a rock but the actual plant or animal no longer exists.



For remains to qualify as fossils, scientists have decided that they have to be over 10,000 years old! Fossils are a great way for scientists to learn about the past and what the world looked like thousands of years ago.

**Types of Fossils**

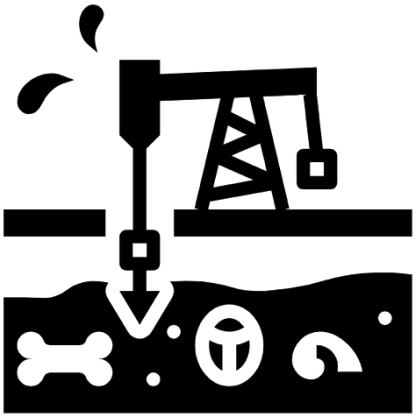
There are two main types of fossils: **body fossils** and **trace fossils**. Body fossils are the preserved remains of a plant or animal's body, such as the imprint of a dinosaur's skeleton. Trace fossils are the remains of the activity of the animal, such as preserved trackways, footprints, fossilized eggshells, and nests. Body fossils help scientists have an idea of the size and shape of old species, whereas trace fossils help them to better understand the species and their activities and needs.

**How Fossils Are Formed**

After an animal dies, the soft parts of its body decompose and leave the hard parts, such as the skeleton, behind. This becomes buried by small particles of rock called sediment. As more layers of sediment build up on top, the skeleton begins to compact and turn to rock. The bones then start to be dissolved by water seeping through the rock. Minerals in the water then replace the bone and leave a rock imprint of the original skeleton, known as a fossil!

### Fossils and Fuel

Fossil fuels are crucial to daily life in today's society. Coal, crude oil and natural gas are what we use to power most homes, factories, and cars. These are non-renewable energy sources called **fossil fuels** that are formed from the fossilized remains of plants and animals that lived millions of years ago. Because of their organic origins, fossil fuels have a very high carbon content that leads to their role in climate change.



# FOSSILS

**Connection to Science and Engineering**

Scientists use fossils to understand how living things and the environment have changed over time. Fossils date back thousands, millions, and even billions of years and contain evidence of some species that have died out or become extinct. Additionally, they help scientists learn about how the surface of the Earth changes over time as well. For example, fossils of sea creatures can be found at the peak of mountains, showing that the rocks that once formed the sea floor were forced upwards. Learning about past environmental and physical changes in the Earth can help scientists predict future conditions and establish patterns that help understand current phenomenon such as climate change and species extinction.

Additionally, the oil and gas (fossil fuel) industry is huge and impacts everyone's daily life. Engineers are continuously looking for alternatives to fossil fuels and ways that our current processes using these fuels can be improved to lessen their negative environmental impact. However, fossil fuels remain the dominant power source for many applications and are used by many industries and types of scientists and engineers.

## Video Recommendation: What are fossils and how are they formed | Learn about Fossils

https://www.youtube.com/watch?v=xQBkawjFVIA

## Activity:

Before you start, think about the following question:

- What sort of objects could be fossilized today that would tell future scientists about our society?
- What kind of fossils have you seen or heard of already?

### Time Travelling Scientists

A scientist from the future just sent an SOS message that they need fossils from our current environment in order to understand the environmental collapse in the future! They have asked that the fossils include at least 3 different species of tree, plant or trace item (ie footprint, shell, etc). Make a fossil of some objects that a future scientist could find that would help them understand the world as it is today.

**Making the Fossils**

Collect your fossilisable items outside or around the house. You can also make a fossil object out of cardboard and be creative with it. Next, mix all the flour, coffee grounds, salt, and sand together. Next, slowly add water mixing in between additions. Add water a bit at a time until you have a thick dough that is not crumbly but also not overly sticky.

Flatten your dough so it is about 1 inch thick and form it into a cool rock shape (you can use cookie cutters to make it a fun shape). Press your fossil object into the dough hard enough to make a clear imprint.

Finally, let your fossil dry. This may take a few days depending on the humidity of the room.

**Extension:** Once your fossils are dry, bury them in the sand and become an archaeologist and go mining for them! You can use screens, shovels and other tools you either find or make.

## What Did You Learn?

- What are the different types of fossils?
- How are fossils made?
- What oil and natural gas made from?
- How old are fossils?
- Why are fossils important to scientists?

## Future Learning

- Compare the real object to your fossil. What details are missing from the fossilized version?
- Find out the difference between the types of fossil fuels and what kind of fossils form each one!

## Share your creations!

We would love to see what you made. Email as at discover@uwo.ca or tag us on social media.

Instagram: @westernueng
Twitter: @westernueng
Facebook: @westernueng

## Thanks for discovering with us!