Nasco Education

LESSON PLAN

Science

Developed with Laura Beres

Can you dig it?

A fossil excavation activity

Volume 25 | Gr. 4-8

Time: 60-90 mins.

Standards

3-LS4-1: Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

MS-ESS2-3: Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

MS-LS4-2: Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

Objective

Students will be able to analyze and interpret data from fossils that are excavated from rocks.

Middle school extension objective: Students will be able to compare and contrast modern organisms to similar fossils in order to infer possible evolutionary relationships.

Materials list

- Fossil Hunt Kit (one per group) **(SB33401)**
- Glue or tape for puzzle activity
- Student handouts:
  Can You Dig It? (p. 6), *Field Guide to Fossils* (p. 5), *Investigating Geologic Time and Fossils* (p. 9), *The Big Dig* (pp. 7–8), and fossil puzzles (pp. 1–4)

Optional extension materials

- Toothpicks
- Long nails or screws
- Chocolate chip cookie (1 per student or group)

Prep

- Set up multiple stations with a fossil kit and handouts. Decide whether you will have students work independently or in groups.
- Decide on your grading criteria prior to starting the activity.
- Decide how you will manage the puzzle activity. You can reproduce a puzzle for each student or group in color, cut out, laminate, and bag them. Alternatively, you can reproduce the puzzles, have each student cut out one and then trade with a partner to solve.
- Reproduce the student handouts for each student or group.
- You may choose to wait to pass out the cookie, toothpick and fossil hunt kit, as they could be distracting to students. Decide before the optional activity if students can eat the cookie.

Directions

1. Create a KWL chart on the board. Discuss what students already know about fossils. During the discussion, identify any possible misconceptions, such as these:
    - Fossils are only from animals
    - Fossils are only from things that lived on land
    - Fossils are only from big animals like dinosaurs
    - Anything that dies can become a fossil
    - Fossils can be found anywhere
2. Then discuss what students want to know about fossils. Have students independently brainstorm questions and then share with a partner and with the class if time allows.
3. Introduce new facts about fossils with the following vocabulary and discussion questions.

Vocabulary

- **Paleontologist**: A scientist who specializes in the study of life forms that existed in previous geologic periods, as represented by their fossils
- **Fossil**: The remains or impression of a prehistoric organism preserved in petrified form or as a mold or cast in rock
- **Matrix**: The material in which something is embedded
- **Mold**: A type of fossil clearly showing the outside features of an organism
- **Cast**: A type of fossil formed by hardened sediments within a mold
- **Petrified**: A description of plants or animals that have been preserved by being "turned to stone"

Discussion questions

How do scientists know where to look?

- Weather can wear away (erode) the soil and uncover a fossil.
- Sometimes builders and construction workers find them while digging.
- If a fossil is found, scientists continue to look in that area for others.

How do they dig up fossils?

- Workers use shovels, drills, hammers, and chisels to get the fossils out of the ground.
- They must work very carefully so they do not break up the fossils as they work.
- Sometimes fossils are removed from the ground in a large mass of dirt and then carefully excavated.

How are fossils kept safe?

- The part of the fossil that is exposed out of the ground is sprayed with a special glue to help make it strong.
- Once the fossil is removed, it is wrapped in bandages and covered in plaster to be safely transported.

What data do scientists collect about fossils?

- Careful records are kept of fossils, including location found, measurements, drawings, and pictures of the fossils.

4. Hand out the *Can You Dig It?* sheet to each student and have them fill in the "thinking" section.
5. Then hand out the *Field Guide for Fossils* sheet and a baggie of precut puzzle pieces for each student. Have them put together their puzzles and add details to their finished puzzles using their field guides.
6. Optional practice excavation: If doing the optional cookie activity, pass out the cookie, toothpicks, and paper towels. This activity will likely take 5–10 minutes for most students. Let students "excavate" the chocolate chips out of their cookies and answer the questions on their *Can You Dig It?* worksheet.
7. Pass out the Fossil Hunt Kits to students or groups, along with *The Big Dig* worksheet and *Investigating Geologic Time & Fossils*. Have students excavate their fossils and fill in the information on their *The Big Dig* worksheets.

Extensions

- Have middle school students answer the last question on *The Big Dig* by connecting the fossils they see to modern organisms.
- Connect instruction on rock layers and Earth's cycles and processes to the lesson. Discuss where fossils can be found in different rock layers or how a fossil may have happened based on processes of the Earth (landslide, earthquake, mudslide, avalanche, etc.).

Modifications

- If students are learning virtually or need to maintain safety protocol, they may use materials commonly found at home. If students are in person for school but material sharing could be a risk, ask students to bring in common materials from home for their own experiment.