

Investigation Three - Examining Your Fossil

Standard IV

Students will understand how fossils are formed, where they may be found in Utah, and how they can be used to make inferences.

Objective 1

Describe Utah fossils and explain how they were formed.

Intended Learning Outcomes

1. Use science process and thinking skills
2. Manifest scientific attitudes and interests
3. Understand science concepts and principles
4. Communicate effectively using science language and reasoning

Standard IV

Objective 1

Background Information

It is important that students learn to identify fossils by examining them with a hand lens to look at their different characteristics. Each of the fossils they made and discussed in Investigation Two can be examined by hand lenses.

Examining fossils helps us learn about Earth's history. They help make inferences about past life, climate, geology, and environments. Scientists are able to construct geologic time scales when they find fossils. They are used to determine the time period an unknown rock layer was deposited. Certain fossils have been found to occur only in specific layers of rock. Fossils that have this characteristic are called index fossils. When scientists find index fossils in rock layers in different locations, they are able to establish time relationships between these areas. We know that all dinosaurs became extinct before any saber-toothed tigers or humans appeared on Earth. We know this because the rocks containing dinosaur remains are older than rocks with saber-toothed tiger or human remains.

In this investigation the students will look at the fossils they made previously. They will look at the details of the fossil with a hand lens and come up with conclusions about the fossils. They will record what they see and draw conclusions about the environment of the fossil.

Pre-Assessment/Invitation to Learn

Review with the students what each fossil replica represents and how they made each one. Discuss how nature made each of these types of fossils and how it compares with the way they were made in class. Tell the students that they are going to look at each fossil and make inferences of what the conditions were like when these types of fossils were made. They can answer their questions in their journals during their group discussions.

Materials

Have the students take out the fossils they made in the last session.

- Leaf imprint (impression fossil)
- Mold and cast (impression fossil)
- Footprints (trace fossils)
- Ant in glue (preserved fossil)
- Hard sponge (mineral replacement fossil)

Instructional Procedure:

Activity One - Examining an Imprint Fossil (Impression)

Materials

for each student:

- ▣ Imprint fossil replica
- ▣ Hand lens
- ▣ Journal or Paper
- ▣ Pencil

1. Carefully take the leaf off the plaster. (It is okay if it breaks up.)
2. Ask the students: What do you see? (An exact impression)
3. Have the students look at the imprint with their hand lenses.
4. Ask the students: What can you see with the hand lens that you couldn't see with just your eyes? (Very fine details of the leaf.)
5. Ask the student these questions:
 - What can you learn from this fossil? (It shows what leaves look like even though the leaf doesn't exist anymore.)
 - How can this fossil tell us about the past? (It tells us what types of trees existed in the past.)
 - What did the conditions have to be like for this fossil to be made? (The soil was moist; leaves were falling off trees; the soil quickly dried up.)
 - If a scientist found an imprint fossil of a leaf, feather, or fish and it didn't look like any he had seen before, what would this tell the scientist? (The organism was now extinct.)

Activity Two - Examining the Mold and Cast Fossils (Impression)

Materials

for each student:

- ▣ Mold and cast fossil replica
- ▣ The real shell that made the mold
- ▣ Hand lens
- ▣ Journal or Paper
- ▣ Pencil
- ▣ Hammer
- ▣ Screwdriver

1. Carefully break the two plaster parts away from each other with a hammer and a screwdriver.
2. Tell the students to look at the mold, the cast, and the real shell. What do they notice about the mold replica and the shell? (They look alike.)
3. Have the students look at the mold and cast fossils with their hand lenses.
4. Ask the students: What can you see with the hand lens that you couldn't see with just your eyes? (Very fine details.)
5. Ask the student these questions:
 - What can you learn from this fossil? (The impression of the mold has the same details as the real shell. The cast has the same details as the real shell.)
 - How can these fossils tell us about the past? (They tell us what types of shelled animals existed in the past.)
 - What did the conditions have to be like for these fossils to be made? (The soil was moist; the shell was completely covered by sediments; seeping water dissolved the shell and left a hole in the sediments. Over the period of many years, sediments filled the hole.)
 - If a scientist found mold and cast fossils of a shell and they didn't look like any he had seen before, what would this tell the scientist? (The animal is extinct.)

Activity Three - Examining Trace Fossils

1. Ask the students these questions while they examine the trace fossil. Have them write their answers in their journals.
 - What can you learn from this fossil? (Animals made the marks or holes and then they left.)
 - How can this type of fossil tell us about the past? (It tells us what animals feet looked like; if they had tails; what designs their skins had, the size of holes they dug.)
 - What did the conditions have to be like for this fossil to be made? (The soil was moist; the animal had to walk on the wet soil to make an impression; it dried in the sun with the print still there; soil had to come and cover it up to preserve it; it was covered for many, many years.)
 - Why is this a fossil? (It is something that was preserved for us for many years and we can see what animals did.)
 - If a scientist found a footprint and it didn't look like any he had seen before, what would this tell the scientist? (The animal is extinct.)

Materials

for each student:

- Trace fossil replica
- Journal or Paper
- Pencil

Activity Four - Examining "Amber" (Preserved) Fossils

1. Ask the student questions while they examine the preserved fossil. Have them write their answers in their journals.
2. With a hand lens, have the students look at the ant in the "amber."
3. Ask the students:
 - What do you see? (An ant stuck in the "amber.")
 - Is the ant all in tact (Yes.)
 - Why? (Because the sap preserved it. No air, water or possibly sunlight got to it.)
 - How would the ant have gotten stuck in the "amber"? (Answers will vary.)
 - What makes this type of fossil impressive? (An insect caught in sap and the sap turning into amber will be kept all in one piece so it can be examined.)
 - How can this fossil tell us about the past? (It shows us what some of the tiny bugs looked like in the past; what bugs lived in each area; if there were any that we don't have on Earth now.)
 - What did the conditions have to be like for this fossil to be made? (A bug would have to have gotten stuck and covered by tree sap. The tree and/or sap was buried in the ground away from the elements. The sap fossilized into amber and preserved the bug.)
 - If a scientist found a bug in amber and it didn't look like any he had seen before, what would this tell the scientist? (The bug is extinct.)

Materials

for each student:

- Preserved fossil replica
- Hand lens
- Journal or Paper
- Pencil

Curriculum Extensions

Language Arts-

- With the knowledge the students have of these types of impression fossils, have them write a fictional essay about a fossil of their choice.
 1. Ask the students to pick a fossil they want to write about.
 2. Ask them to pick a type of character they want to turn into a fossil.
 3. Ask them to write it in the form of an adventure.
 4. The essay should have a beginning, middle, and end.
 5. The beginning introduces the character(s), setting, and problem.
 6. The middle tells of problems getting worse, actions taken by the character, and decisions that have to be made.
 7. The end tells how the fossil was formed and discovered in our day.
 8. As students write, they need to use vocabulary words about fossils. Students also need to use the facts they have learned about fossils.
(Standard VIII, Objectives 1, 2, 3, 4, 5, 6)
- Have the students read their stories in class or in groups. (Standard I, Objective 2)

Fine Arts/Visual Arts-

- Have the students illustrate their stories with captions, giving a science angle to them. (Standard III, Objective 1)

Assessment Suggestions

- Read the students' journals to see if they answered the questions correctly that were asked after the examination of each fossil.
- If the students wrote stories, make sure they wrote the stories using science words and expressions about fossils, showing that they understand what they learned.

Resources

- See the Resources List at the end of these Investigations.

Homework & Family Connections

- Have the students take home the fossil they made in school. Have them explain to their families how they made the fossil and how it represents the way nature makes these types of fossils.
- If the students wrote stories, have them take the stories home to read to their families.
- Have the students check out library books about fossils. Have them read the books with their parents and families. Have the students tell if they come across fossils they made in schools.