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Cross Curricular Activity: Fantastic Fossils

Type of Teacher Tool: Small Group, Whole Group, Individual
Targeted Grade Level(s): 5-8
Targeted Curriculum Areas: Earth Science: Paleontology, Language Arts: Writing

Learning Objectives:
The learner will:

1. Identify fossilized objects.
2. Develop physical representations of 2 types of fossils and explain the processes that cause fossilization.
3. Analyze data gathered during the lesson and create a written report to explain their findings.

Featured National Standards:
Create a numbered list of the national standards the activity is targeted to.

1. CCSS
   RST.6-8.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
   INDICATOR / PROFICIENCY WHST.6-8.2(d) Use precise language and domain-specific vocabulary to inform about or explain the topic.
2. Next Generation Science Standards
   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.

Resources/Materials Needed:

1. Educate.Today Videos
   a. **Geology 6: Defining What is a Fossil**
   b. **Geology 7: How Do You Successfully Dig Out a Fossil?**
   c. **Geology 9: How do you clean a fossil?**
   d. **Geology 10: How are fossils formed?**
   e. **Geology 13: Fossil Florescence**
   f. **Geology 14: How do fossils get inside a rock?**
2. Plastic containers (like ice cream or Cool Whip containers)
3. Large container like a dish pan
4. Measuring cups and spoons

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5. Water
6. Salt
7. Sand
8. Sponges
9. Petroleum jelly
10. Plaster of Paris
11. Small natural items gathered outdoors, like a rock, shell, or leaf

Teacher Instructions:

1. Begin by assessing background knowledge on the topic of fossils. Have students write or draw answers to the following questions, then share their thoughts with a partner. Change partners and share again. This will help them clarify misunderstandings and develop questions.

   Questions: What is a fossil?
   How are fossils formed?
   What can we learn from them?

   Discuss the last one as a group – focus on learning about the past from what we see today.

2. Explain to the students that they will be learning about fossils by viewing a scientist as she/he discusses them, and then by creating some of their own.
3. Share the videos listed in the materials section with the students. Pause after each and have the students write their impressions on a sticky note. These can be put on the wall for future reference. Discuss the following facts from the videos:
   a. The properties of organic (living or once living) and inorganic (never living) remains: Organic remains include people, plants, animals, and anything made of plant or animal matter. These will tend to decay unless preserved in an airtight environment. Inorganic remains include stone, metal, clay cement, plastic, and glass. These were never living and will not rot or decay the way organic remains do. They survive especially well in an airtight environment. Students should be given time to reflect and add further facts to the sticky note wall.

   Tell the students they will be creating the types of fossils (Mineral Replacement and Impression Fossils) mentioned in the clips Geology-10 and Geology-14.
4. Mineral Replacement Fossils:
   a. Each group will place their sponge shapes into a large container holding sand, covering the sponge shapes completely. There should be a layer of sand below and above the sponges.
   b. Mix two parts salt to 5 parts water in another container. Make sure that the salt is dissolved into the water.
   c. Slowly poor the saltwater on top of the sand until it completely soaks the sand.
   d. Leave the container of sand in a warm, dry place until it completely dries (It may take several days).
   e. When it is dry, excavate the sponges with a spoon.

f. See how the sponges turned "bonelike." Discuss with students how when the saltwater was added to the sand, it filled the pores in the sponge. When the water evaporated, the salt remained in those pores. This simulates how dissolved minerals replaced the cells in bones, wood, etc.

5. Impression Fossils:
    a. Students can mix their own Plaster of Paris in a margarine tub or their school milk carton that has been opened completely and rinsed out. Have them measure 1⁄2 cup of Plaster of Paris dry, then add approximately 1/4 cup water, and stir. Let it sit for a couple of minutes to start setting up.
    b. Place their leaf, feather, shell, or other small item vein side down, gently into the Plaster of Paris until it makes complete contact with the surface. (Coating the item with petroleum jelly first so it will come out.) Allow this to cure for several hours.
    c. After the object making the impression is removed, have students in different groups trade and match fossils with the objects that made the fossil.
6. Students should respond to these questions. Add to the sticky note wall as the discussion proceeds.
    a. How are your fossil models like a real fossil?
    b. How are your fossil models different from a real fossil?
    c. How can your fossil models help us to understand real fossils?
    d. What can real fossils tell us about the world at the time they were formed?
7. Allow students to revisit the note wall and determine if any of their thoughts need to be revised, give them time to move the notes around and put them in categories. Their final assessment can be a written essay on what they have learned about fossilization.

Extension Activity:

1. Students can further research other processes of fossilization, using websites and written text on the topic.
2. Students can identify current daily objects that our part of our culture and determine if they are organic or non-organic and how they might become fossilized.

Assessment/Evaluation Option

1. Formative Evaluation: Students should be actively engaging in using sticky notes to record impressions, thoughts, questions, etc. and in adding to the wall. Observe how they modify and categorize them and guide them in their decision making (clarify misconceptions if needed).
2. Summative Evaluation: Written short essays on what they have observed. This can be in the form of a scientific report, a narrative report, or anything you wish to teach and assess.