

ACTIVITY: Preserved Organic Remains



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Objective: Learners will explore different ways organisms can be preserved and how this provides additional evidence for paleontologists to understand ancient life.

Introduction: Preserved remains are the actual parts of organisms that have been preserved in exceptional conditions, such as amber, desiccating conditions, ice, or tar pits. These rare preservation environments protect the organism from decay, allowing delicate details like skin, fur, and even DNA to remain intact, offering a rare glimpse into ancient life.

Have learners:

1. Consider what conditions might cause an organism's body to be preserved.
 - a. Observe the images of preserved materials found in National Parks.
 - i. If possible, observe models of examples (e.g., flower in a block of ice, **insect in a lollipop**). Relate these conditions to how people preserve food (e.g., drying, freezing).
 - ii. Read about the **various ways remains can be preserved**.
2. Discuss where on Earth these conditions might be found.
 - a. Explore a map of climate zones within the U.S. (such as from the **U.S. Energy Information Administration**) and compare it to the map of NPS Units on the handout.
 - b. Consider "microclimates" that could preserve remains. For example, this **brief description of caves** gives insight into why they are good locations paleontologists to find preserved materials (caves are also good sites for archaeologists to find human artifacts).
3. Use what you have learned to make a list of potential **NPS Units that have fossil resources** and that might contain preserved remains.
 - a. Consider parks with cold or dry conditions, as well as parks that are likely to have undisturbed areas (or some combination of these factors).
 - b. Circle or highlight areas on the map where these preservation conditions might be found.
 - c. Then, look through the master list of NPS Units with fossil resources to get the names of at least three parks that could have these preservation conditions.
4. Read about preserved specimens found in National Parks:
 - a. **Packrat middens (nests) with preserved organic material**

b. Preserved bats in caves in Grand Canyon National Park

5. Observe the image of fossilized shark cartilage found in Mammoth Cave and answer the questions that accompany it.

a. Use the **3D model of this fossil** to explore it further.

b. Discuss:

- How shark skeletons are made of cartilage, which is soft tissue that does not normally fossilize.
- How this fossil was found in a cave, which formed long after the fossil was deposited, meaning the cave's conditions are unrelated to the formation of this fossil.
- How the original depositional processes in the shallow marine sediments in which the shark was buried allowed for the cartilage to be preserved long enough that it was able to eventually fossilize as it was replaced by minerals (mineralization).

HANDOUT: Preserved Organic Remains



Observe the following images of preserved materials and note evidence of preserved materials.



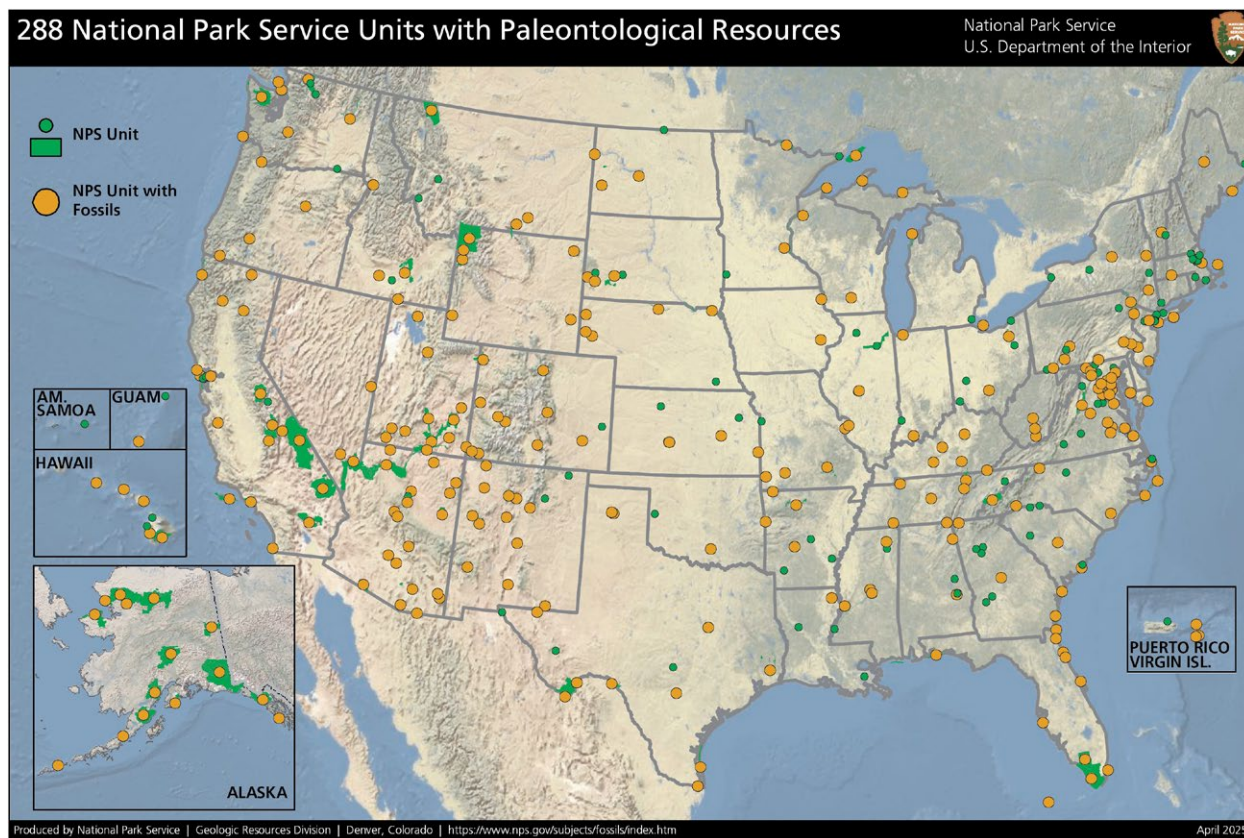
Shasta ground sloth dung, Grand Canyon National Park Museum. Credit: NPS/Mike Quinn



A packrat midden at Wupatki National Monument, Arizona that contains material possibly as old as a few thousand years. Credit: NPS/Justin Tweet

- How do these preserved materials differ from what people think of as fossils?
- What evidence might they provide regarding past life?

Identify at least three NPS Units that you think are most likely to have conditions in which you might discover preserved organisms.



Credit: NPS

- Which NPS Units, states, or regions did you identify as locations that might have preserved remains?

- What preservation methods do you think might occur in each location and why?

Observe the shark skeleton discovered in Mammoth Cave.



Credit: NPS

- While this fossil was found in Mammoth Cave, the shark that fossilized lived in a marine environment that existed long before the cave formed (first the sediment was deposited and turned to rock, then many millions of years later groundwater dissolved areas of the rock to form the cave). What conditions might have existed on the sea floor that allowed for the preservation of the shark's cartilaginous skeleton long enough for it to be fossilized?