



# HOW DO YOU BECOME A FOSSIL?

**GRADE LEVEL:** 1-6

**TIME REQUIRED:** One class period

**SETTING:** Classroom or outdoors

**GOAL:** To participate in a role-playing exercise designed to help children understand the fossilization process and to teach them how to “read” a fossil history

**OUTCOMES:** By the end of this activity students will be able to:

- list three conditions necessary for fossils to be preserved,
- tell where fossils are usually found,
- understand that only a representative selection of individuals or species from a time period actually become fossilized,
- conceptualize the statistical odds against becoming a fossil, and
- visualize the process of layering and stratification.

**KERA GOALS:** Meets KERA goals 1.1, 1.3, 1.4, 1.5, 1.8, 1.10, 1.15, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.13, 3.7, 4.2, 4.6, 5.1, 5.3, 5.4, 5.5, 6.1, 6.2, 6.3

## BACKGROUND INFORMATION

It is not easy to become a fossil. Many plants and animals never leave a trace of having lived on this planet because their soft body parts (leaves, skin, feathers, muscles) do not survive over time. Hard body parts (bones and teeth) may decay or be eaten by other creatures. To become a fossil, the plant or animal must become buried quickly in an environment that keeps air away from the body. Fossilization can occur when the remains are buried in a mudslide, covered in a thick layer of leaves along the edge of a pond or lake, trapped in the ooze at the bottom of lakes or oceans, or sucked into a tar pit. Once covered, the remains may harden and the entire plant or animal will be preserved.

If the remains are slowly dissolved or washed away and replaced by minerals, it is said that they are **petrified**.

The remains may also be seen as a **mold or cast**. This means the remains were dissolved but NOT replaced by minerals. Instead nothing is left but an outline in the surrounding rock. Finally, the remains may be seen as a **print or trace** fossil. A print or trace is a footprint or leaf print made when mud becomes solid rock.

After a plant or animal is preserved, sediment layers will constantly be added above the fossilized remains. Over time remains of other species may be preserved in these new layers of water, soil, or mud. Additional layers of sediments may build up on top of these newest remains. This means that the oldest fossil evidence will be found in the lowest layers of rock and sediment and the most recent (or youngest) fossils will be found closer to the surface in the top-most layers of rock and sediment.

Once the plant or animal is preserved its remains are not always discovered. Over a long period of time the fossil may be washed out of the surrounding rock and soils, or it may be so deeply buried that it is never discovered. Only when these early remains are eventually exposed by erosion, found, identified, recorded and compared to other fossils do they become valuable clues to our past.

We may not be able to make a complete and accurate list of all plants and animals that lived at any one particular time. As demonstrated in this activity, not every species became a fossil. However, we can describe the habitat and climate of a time period by looking carefully at the types of fossil remains that we do locate. By studying known fossils we can tell if the plant or animal lived in water or on land. If it lived in water, we can tell if the plant or animal lived in the ocean or in fresh water by comparing the fossil to similar species around us today. By comparing with living creatures, we should be able to tell if they lived in fast flowing water (streams or rivers) or in quiet pools (small lakes or ponds). If it is a land species, we can look at tooth remains to tell if it was a carnivore or herbivore. By looking at foot and leg bones we can tell if the animal was a good swimmer, fast runner, or climber. We can compare the temperature (climate) preferences to living creatures and make assumptions about the earlier climate of an area.

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## MATERIALS

- Ten squares each of red, blue, green and brown paper
- Animal cards, one for each student
- 5"x 8" index card or piece of cardboard, one for each student
- 25" string, large safety pin, or masking tape, one for each student
- One blackboard, dry erase board, flip chart, or large piece of paper taped to the wall
- Marker or chalk
- One set of Situation Cards

## PROCEDURE

1. Glue the animal card pictures onto 5"x 8" index cards or pieces of cardboard. Attach a piece of string 25" long to each card so the card can be worn around the neck (you may prefer to use a large safety pin or masking tape).
2. Give each student a completed animal card. They will become that animal for the duration of the game.
3. Place all the colored squares in a central location. Allow each student to choose a colored square. The color will be used to determine their fate.
4. The students will stand up and listen as the teacher reads from one of the Situation Cards. These cards describe what happens to each animal.
5. During Round 1, the teacher reads a scenario from one of the Situation Cards. As their color is called, the students will sit down if they did **not** become a fossil. They remain standing if they **do** become a fossil. At the end of the scenario, all student species that are still standing will be listed at the bottom of the board or flip chart. Draw a line above the list to represent the top of a sediment layer. This represents the oldest layer of rock and the species that became fossilized during that time period.
6. Students may trade colored squares if they desire.
7. All students stand up again and Round 2 of the game is played. At the end of this round all student species still standing should be listed on the board above the first list. Draw a line above this second list to represent the top of the second sediment layer. You have now created the next youngest layer of rock filled with younger fossils.
8. All students stand up and the game is played again for Round 3. Again list all student species remaining at the end of this round above the second list. This represents the youngest layer of fossil remains. Draw a line above this third list.
9. After all rounds are complete, go back and look at the types of plants and animals that survived as a fossil. Are all species represented? Why or why not? Look at the number of each species listed. Are these numbers proportionate to the number of living species alive during that time period? Why or why not?

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## DISCUSSION

Discuss the implications of fossil finds.

- What assumptions about early life would scientists make based on the fossil remains found in each sediment layer (and time period) listed on the board?
- What do fossils tell us about any particular era of time?
- Can scientists be absolutely certain which plant or animal was dominant during a particular time period? Why or why not?
- Was it possible to have other creatures or plants living during a particular time period that we don't yet know anything about?
- Is it possible for scientists to discover new, unknown plant or animal fossils?
- Is it possible for scientists to accurately describe the climate or habitat of a particular place during any one particular time period? How can they do that?

## EXTENSION

- Conduct research on the plants and animals found during various pre-historic eras and time periods. After the research is completed, have each student draw a picture of his or her species. Use these drawings with the above activity.
- Using the results of the activity above, have students complete a graph that shows the number of each species before and after each round of the activity.

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This activity adapted from Fossil Butte National Monument, "The Fossilization Game", found in *Teaching Paleontology in the National Parks and Monuments and Public Lands: A Curriculum Guide for Teachers of the Second and Third Grade Levels*

## SITUATION CARD ROUND 1: THE FOREST HABITAT

**Green circles** — These creatures died in the forest. Vultures ate their remains. We never knew they existed!

**Red circles** — These creatures were caught in a forest fire. They were burned up and we never knew they existed! Ouch!

**Blue circles** — These creatures were caught in a flood. They were washed down the river and out to sea. We never saw them again!

**Brown circles** — These creatures were covered in mud and became fossils. We thought they were the only ones that lived during this time period!

## SITUATION CARD ROUND 2: THE LANDSCAPE DRIES OUT

**Brown circles** — These creatures lived in a desert. When they died their remains dried up and they were blown away by the wind. We never knew they existed!

**Green circles** — These creatures couldn't find water. They died of thirst and their remains rotted away. Ugh!

**Red circles** — These were eaten by carnivores. We never knew about them!

**Blue circles** — There was a sudden, welcoming rainstorm, which produced pools of water. The animals rushed over for a drink. These creatures fell into the pond and were covered by mud. Because their remains were protected from the water and air, they became fossils!

## SITUATION CARD ROUND 3: A VERY WET LANDSCAPE

**Blue circles** — These creatures tried to swim across a fast-moving river and were washed away by the current. Large fish ate some and the others were carried so far downstream that we never knew they existed!

**Brown circles** — Dinosaurs swallowed these creatures. So long!

**Green circles** — These creatures lived and died in the over-grown forest along the riverbanks. Scavengers ate their remains! We never knew they existed!

**Red circles** — These creatures were caught in a mudslide. Because they were buried so quickly, they were able to become fossils!

## SITUATION CARD ROUND 4: THE ICE AGE CAME

**Red Circles** — The climate was getting colder. These creatures were not able to adapt. Since they did not grow longer fur to stay warm, they decided to migrate to a warmer climate. We never saw them here again!

**Green circles** — These creatures depended upon the green plants for their food supply. When the ice and snows came the plants disappeared and so did these animals!

**Brown circles** — These creatures depended upon small reptiles for their lunch. When the climate became colder their food supply disappeared! These creatures slowly starved to death, dried up, and disappeared!

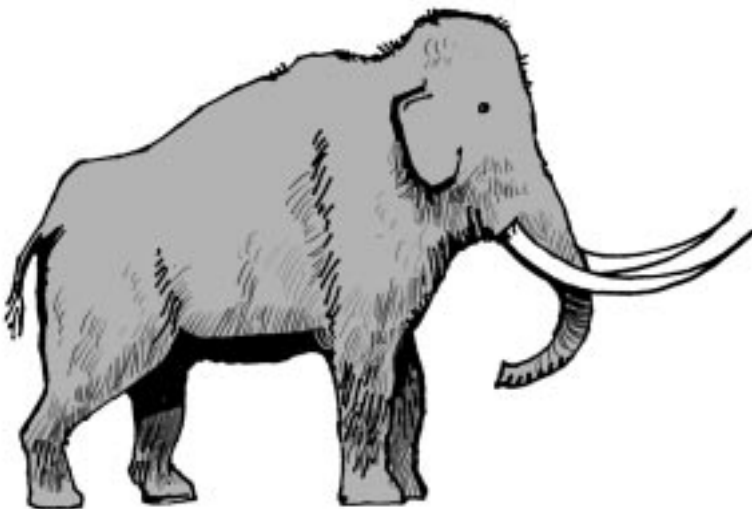
**Blue circles** — These creatures were walking along the edge of the glacier when they fell through the snow into a large crack. They froze quickly and became frozen fossils!



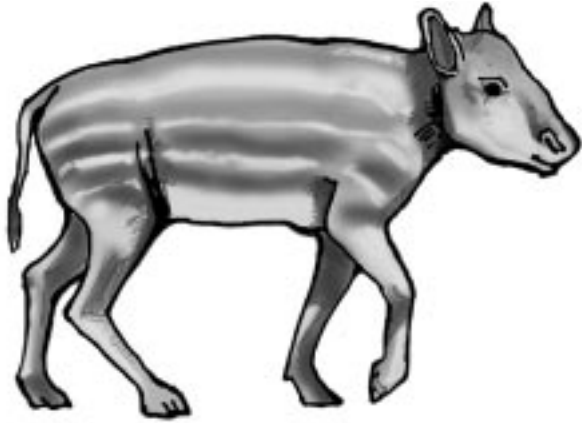
FREE-TAILED  
BAT



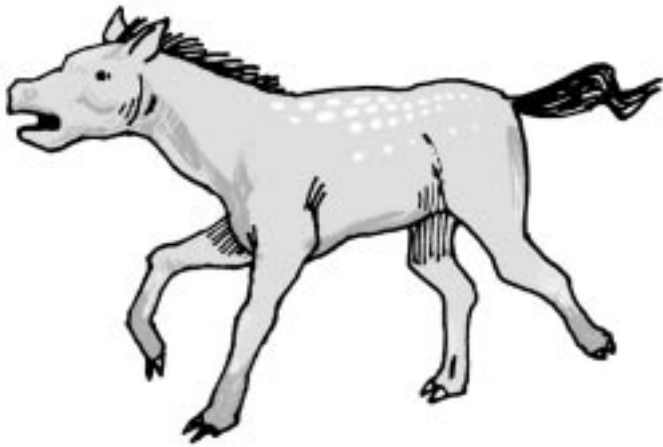
GIANT  
GROUND  
SLOTH



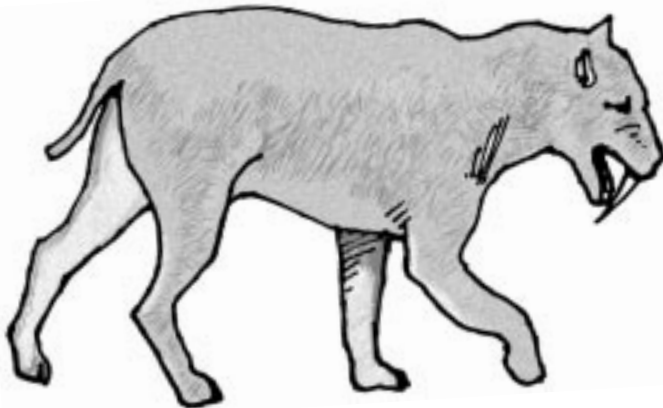
WOOLLY  
MAMMOTH



TAPIR



MESOHIPPUS



SABER-  
TOOTHED  
CAT