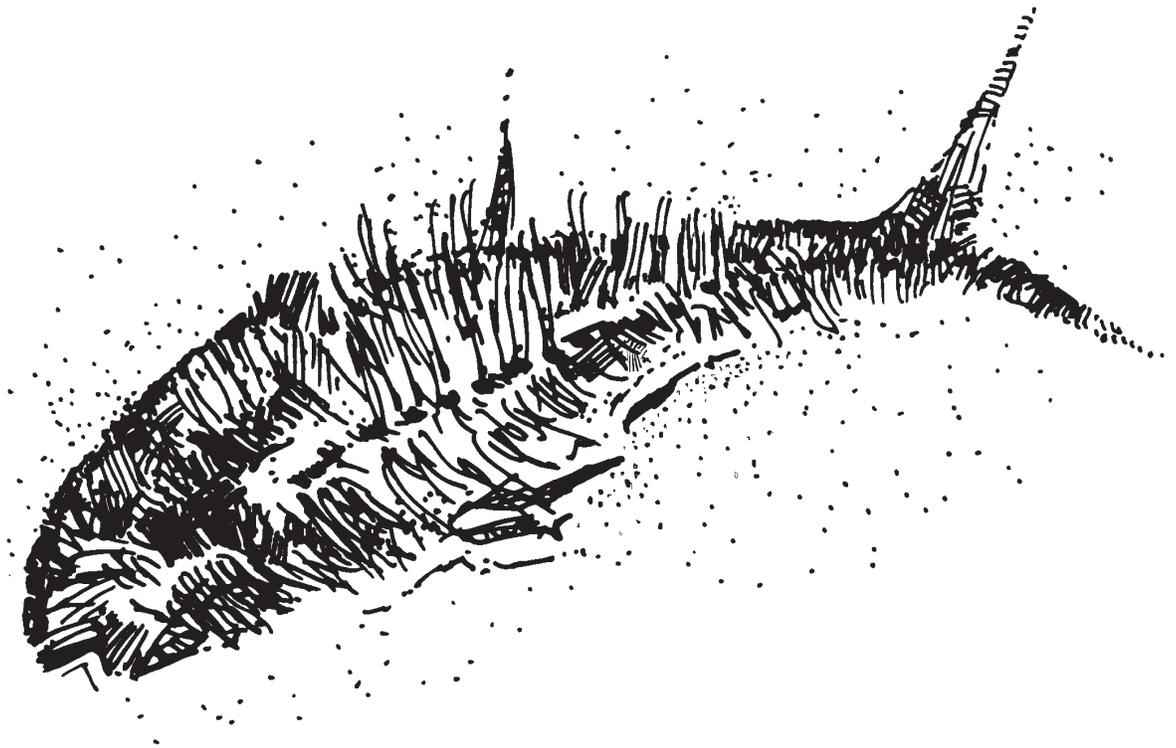




Paleontology

A Curriculum Guide to Mammoth Cave National Park



Gr1-12



Kitchen Geology

GRADE LEVEL: 4-6

TIME REQUIRED: Two to three class periods

SETTING: Classroom

GOAL: To create a layered edible dish that demonstrates: (1) the layering of rock strata, and (2) the movement of rocks that expose fossils

OUTCOMES: At the end of the lesson the student will:

- state the defining characteristic of sedimentary rock
- define index fossil
- define uplifting, overthrust, faulting
- state how fossils are exposed

KERA GOALS: Meets KERA goals 1.3, 1.4, 2.1, 2.2, 2.4, 2.6, 5.3, 5.4, 6.1, 6.2, 6.3

BACKGROUND INFORMATION

Sedimentary rocks are layered rocks. Chemicals in rivers, lakes, and oceans precipitate particles from water. This precipitate then mixes with inorganic remains (such as shells and skeletons) of organisms. Wind, rain, and ice wear down surface rocks into bits of sand, soil, mud, pebbles, clay, and loose sediments. All these various sediments eventually pile up layer upon layer. Over time, pressure exerted by the weight of the top layers compacts and cements the lower sediments to form solid rock. Younger rock is placed on older rock. Each layer captures life forms of that period in time. These preserved species are called index fossils. By observing these index fossils the geologist can determine the age of the rock.

Sandstone is a sedimentary rock made of layers of compressed and cemented sand grains. Shale is a sedimentary rock made of layers of silt and mud. Limestone is a sedimentary rock made of layers of carbonated sediments (sea life) that thrived in a warm shallow sea. Fossils can be found in any sedimentary rock, but in the Mammoth Cave area they are most typically seen in the layers of limestone.

Rock strata can stretch, bend, and break when they are subjected to heat and pressure. They are constantly worn away on the surface by wind, rain, and ice. As the rocks change, fossils become exposed.

Kitchen Geology

MATERIALS NEEDED

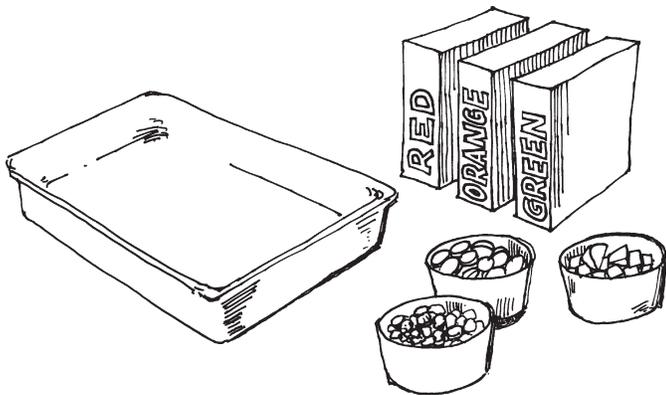
- Clear glass container 12" X 18"
- Three boxes of Jell-O of contrasting colors (red, orange, green)
- 1½ cup Coolwhip or cottage cheese (blended)
- ¼ - ½ cup each of carrots, nuts, pieces of apples. (Avoid candies with food coloring such as M & M's)

PROCEDURE

ACTIVITY ONE: SEDIMENTARY ROCK

Create a series of rock strata with fossils.

1. Following the directions on the box, mix a box of one color Jell-O and allow to partially set-up (follow directions for soft-set or thickened Jell-O as shown on box).
2. When partially set-up, stir in Coolwhip or blended cottage cheese to make the Jell-O opaque. Add ¼ cup sliced carrots to represent fossils. Allow to set until firm.
3. Mix a box of the second color Jell-O and when partially set, stir in Coolwhip or blended cottage cheese. Add ¼ cup nuts to represent fossils. Pour this mixture on top of the first layer of Jell-O. Allow to set until firm.
4. Mix the third box of Jell-O and when partially set, stir in Coolwhip or blended cottage cheese. Add pieces of apples to represent fossils. Pour this mixture on top of the first two layers of Jell-O. Allow to set until firm.

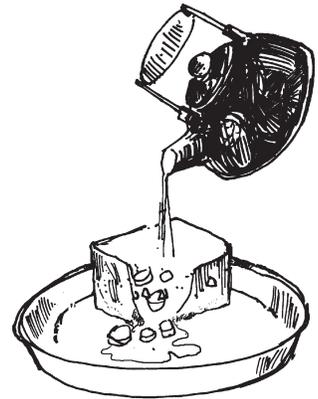


PROCEDURE

ACTIVITY TWO: EXTRUSION OF FOSSILS

Create movement of Jell-O that is characteristic of earth's movement to expose the fossils. Cut 4"x4" squares of Jell-O. Use one square for each of the following demonstrations:

1. **Uplifting.** Place a four- by four-inch square of Jell-O on a plate. Slide a knife under the piece of Jell-O and gently lift. First the strata will bend and then it will break. Once the pieces are standing on end, some of the fossils may be exposed.
2. **Overthrust.** Cut another four- by four-inch square of Jell-O. Gently and evenly push in from opposite sides of the square so the center rises up and one half flops over the other half. Geologists call this overthrust. Notice the older stratum is no longer under the younger strata.
3. **Faulting.** The surface of the earth is covered with cracks called faults. Sometimes the land on one side can be uplifted and raised above the land on the other side. Cut another 4" square of gelatin. Slice the gelatin into two parts. Use a spatula to raise one side. This will show the way rocks can move in relation to each other.
4. **Erosion.** Wind and rain constantly wears away sedimentary rocks, thus exposing fossils. This may be demonstrated in various ways. Allow hot water to run over a square of gelatin until fossils are exposed. Use a hair dryer to dissolve and expose the fossils in a second square.



NOTE: Examine how fossils are exposed with each type of earth movement. Hopefully, molds, imprints, as well as fossil pieces will be exposed.

This activity was adapted from *The Big Beast Book* by Jury Both.