Geo-Gelatin

By Kim Sowder and Carolyn Estell

Grade Level: 4 – 8

Purpose: Part 1, demonstrates how animals or plants are buried in different types of rock to eventually become fossils. Part 2 demonstrates the concept of stratigraphy, namely, how rock is formed in layers.

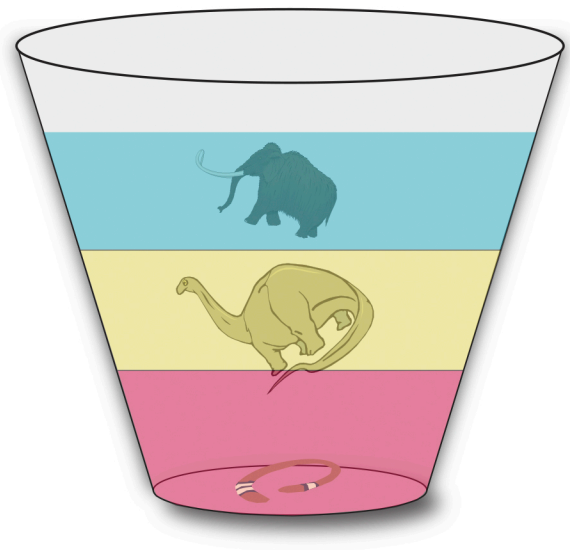
Preparation Materials:
9 oz. clear plastic cups
Red gelatin
Yellow gelatin
Blue gelatin
Green gelatin (for Part 2)
Gummy worms
Small gummy dinosaurs
Small gummy mammals (tigers, elephants, etc.)

Teacher Preparations: If doing both Parts 1 and 2, each group will need two cups of gelatin one for Part 1 and one for Part 2.
Part 1: Mix the red gelatin according to the rapid gelling instructions on the box. Make sure the solution is cooled to near room temperature. Pour it into several plastic cups, filling 1/4 to 1/3 full. Drop one gummy worm in each cup and refrigerate until the gelatin is set. Prepare the yellow gelatin, again using the rapid gelling method. When it is near room temperature, take a dinosaur and lay it on top of the red layer. Pour yellow gelatin on top, filling the cups to 1/2 to 2/3 full. Refrigerate until set. Prepare the blue gelatin and cool to room temperature. Drop the mammal on top of the yellow layer and add the blue gelatin to the top of the cups. Chill until set.

Part 2: Repeat the steps for Part 1, except put green gelatin in the cups first and let it gel before adding the other colors. In some cups, leave the yellow layer and dinosaur out completely. Vary the thickness of the layers from the original portions in Part 1.

Read the General Information section aloud to the class.

General Information: Fossils are the mineralized remains of plants and animals. Fossilization occurs when rapid burial in sediments preserves the body from decomposition; this is followed by the replacement of the original animal's or plant's cells with minerals over time. It is very rare to find the actual bone of a dinosaur because the mineral replacement process has had such a long time to work. Bones of more recent animals are often found; mammoth and mastodon bones, tusks, and teeth have been found in Indiana.



Each color of gelatin represents a different age and type of sedimentary rock. Stratigraphy is the scientific name for the layering of rock; layers of rock are named based on their physical characteristics. Sediments are deposited over time with the newest sediments located 'stratigraphically' above the older sediments. This is known as the **Law of Superposition**. The type of sediment can change, for instance, from sandstone to limestone depending on the source rock (or the rock from which the sediment is formed) for the deposited grains. The layering process illustrated with this activity would take place over millions of years.

In a closed environment, all layers of rock that were deposited would be present in the rock record. However, the Earth is constantly changing. Rock layers may be missing from the rock record because of erosion or other geologic processes. Geologists can still identify the ages and types of rocks even if part of the sedimentary record is missing. Geologists know that rocks found in a particular layer (color of gelatin) in one area (or cup) will be the same as rocks with matching characteristics in another area (or cup). Red gelatin is still red gelatin regardless of what order it appears in the cups. The fossils found in the red gelatin are also similar in age.

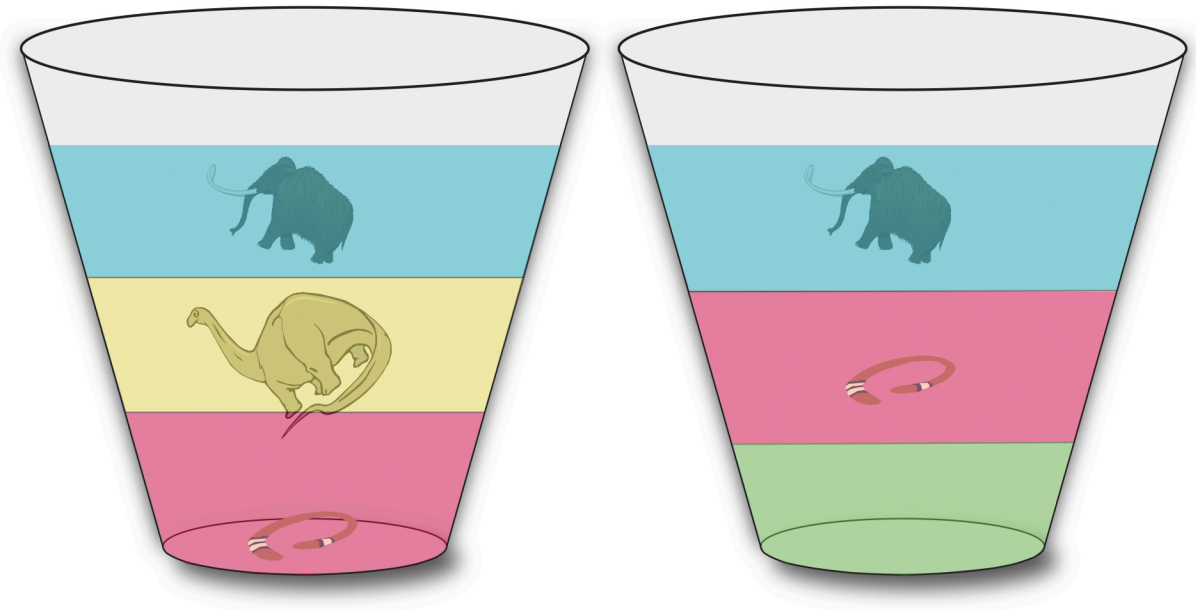
Activity Materials (for each group):
- Two gelatin filled cups (see instructions above)
- Student handout: Activity instructions
- Student handout: Identification Sheet
- Student handout: Geologic Time Scale (See Handy Handouts I)
- Colored pencils
- Place to store cups of gelatin before they are used.
- Spoons (if you want to let the students eat the gelatin)

Please note: the rock formation names used in this activity are fictitious.

Student Vocabulary: model, sedimentary rocks, stratigraphy, fossils, relative age, law of Superposition

Procedure:
1. Introduce activity. Ask the students if they know what a fossil is. (Most students will probably raise their hands). If you have some fossils available to you, they will help keep students' attention.
2. Ask the student where fossils come from (Student: ground or rocks). Once you have established that fossils are found in rocks, tell them they are going to learn about how fossils get into rocks.
3. Discuss fossilization at an appropriate level for your class. Be sure to point out that it is not actual bone that is found in the dinosaur, but the bone has been replaced by minerals. (See general information section.)
4. Bring out the first cup of gelatin (red, yellow, and blue). Explain to the student that this is a model of sedimentary rocks that contain fossils. Review what a model is, if necessary. Discuss the Law of Superposition by asking them which layer they think is the oldest and how they know this.
5. Explain to students that it is their job to figure out the name of each layer and the name of the fossils in each layer. Tell them that the class will go over how to determine the era and period name for the fossil after we have determined what fossils they are.
6. Pass out the student handout and read over it. Ask if there are any questions about the activity. Remind students not to eat the gelatin yet!
7. Have the students break into groups. Either have the students come and get supplies or distribute supplies to each group (whatever will work better for your class).
8. Walk around the class to be sure students are on task and to help if necessary. Once most are done identifying the rock layers and fossils, gather everyone's attention.

9. Ask the students to name one of the fossils, using the chart in the handout to determine the time-range in which this fossil existed. Then look the time-range up on the geologic time scale to determine the era and period for each fossil. Record this information.
10. Have the students do this for the rest of the fossils.
11. When they have completed Part 1, give them the second cup of gelatin and complete Part 2 of the activity.
12. Continue to walk amongst the groups, answering questions and assisting where needed.
13. Have the students turn in the completed activity sheet at the end of class. Be sure they clean up after they are finished with their gelatin.
14. Wrap up the activity. Review what they learned, if time allows.



Gelatin Stratigraphy: Student Activity Instructions

Each color of gelatin represents a different age and type of sedimentary rock. Stratigraphy is the scientific name for the layering of rock; layers of rock are named based on their physical characteristics. Sediments are deposited over time with the newest sediments located 'stratigraphically' above the older sediments. This is known as the **Law of Superposition**. The type of sediment can change, for instance, from sandstone to limestone depending on the source rock (or the rock from which the sediment is formed) for the deposited grains. The layering process illustrated with this activity would take place over millions of years.

Fossils are the mineralized remains of plants and animals. Fossilization occurs when rapid burial in sediments preserves the body from decomposition; this is followed by the replacement of the original animal's or plant's cells with minerals over time. It is very rare to find the actual bone of a dinosaur because the mineral replacement process has had such a long time to work. Bones of more recent animals are often found; mammoth and mastodon bones, tusks, and teeth have been found in Indiana.

Read Part 1 and then complete the questions.

Part 1
Cup 1 contains the red, yellow, and blue gelatin.
Red represents a rock layer having the following characteristics: fine-grained sandstone containing ripple marks, with a uniform tan color; may contain fossils.
Yellow represents a rock layer with the following characteristics: very fine-grained mudstone, dark gray to black in color; may contain fossils.
Blue represents a rock layer with the following characteristics: massive limestone; contains many primitive fossils.

1. Determine what the name of the rock layer is using your handouts and record the names for each layer below.

   RED = _____

   YELLOW = _____

   BLUE = _____

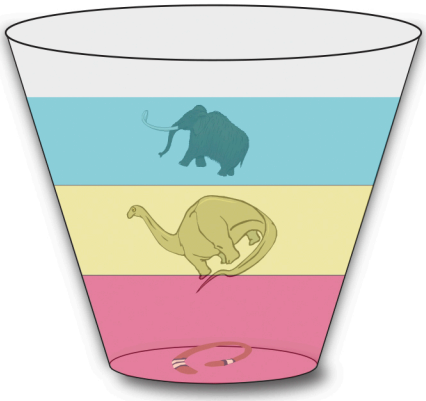
2. For each layer, identify the fossil found in this layer and record the fossils age-range.

   _____ Formation = _____ fossil with an age-range of _____.

   _____ Formation = _____ fossil with an age-range of _____.

   _____ Formation = _____ fossil with an age-range of _____.

Answer the following question.
1. What are the ages of the red, yellow, and blue layers?



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Read Part 2 and complete the questions.

Part 2

Cup 1 contains the green, red, and blue gelatin.

Green represents a rock layer having the following characteristics. Coarse-grained sandstone; rust color; contains no fossils.

1. Determine the name of the green rock layer by using your handouts and record the information below.
   GREEN = _____
2. For green layer, identify the fossil found in this layer and record the fossil's age-range.
   _____ Formation = _____ fossil has an age-range of _____.

Answer the following questions.

1. What is the age-range for the green layer ? (Use what you know about the other layers to help you.)

2. Place the two cups of gelatin next to each other. In the space below, sketch each cup and label the layers with the appropriate formation names. Draw dashed lines connecting the top of one blue layer in cup one to the blue layer in cup two. Do the same for the red layer. Locate where the yellow layer should be in cup two. Draw a line from the top of the yellow layer to that point.

What happens to the thickness of the yellow layer as you move from cup one to cup two? What do you think might cause this to happen?

Student handout: Identification Sheet

Rock Names and Descriptions:

Sowder Formation: Massive, medium-grained, gray limestone. Contains many primitive fossils.

Steinmetz Formation: Fine-grained sandstone containing ripple marks, uniform tan color. May contain fossils.

Rupp Formation: Shale, light-gray in color. Contains fossils.

Shaffer Formation: Massive, fine-grained dolomite. Contains some fossils.

Baker Formation: Coarse-grained sandstone, rust in color. Contains no fossils.

Hill Formation: Very fine-grained mudstone, dark-gray to black in color. May contain fossils.

Fossils and Age-Ranges

Animals

Monkey- Represents a Megatherium (ground sloth) , age: 2 million to 8,000 years ago

Zebra- Represents an early horse (Hyracotherium), age: 52 to 45 million years ago

Tiger- Represents a Smilodon (saber-toothed cat), age: 1 million to 10,000 years ago

Elephant- Represents a mammoth, age: 4.8 million to around 3,500 years ago

Crocodile- Represents a crocodile, age: 200 million years ago to present

Dinosaurs

Tyrannosaurs Rex- age: 65 million years ago

Apatosaurus- age: 140 million years ago

Pterodactyl- age: 228 to 65 million years ago

Triceratops- age: 70 to 65 million years ago

Stegosaurus- age: 155 to 145 million years ago

Other

Gummy Worm- age: Represents an Annelida (worm), age: 600 to 570 million years ago