Explore Your Cake and Eat it Too!!

Adapted from an idea appearing in, *Layer Cake Earth*, which was published in the December 2006 issue of *Science and Children* by the National Science Teachers Association.

**Objective:** Students will simulate how geologists determine the geologic history of an area based on rock and fossil evidence.

**Materials:**
- As many cakes as desired (for the example shown below four 9X13 cakes were made) - use several different types of cake (white, yellow, chocolate, yellow with sprinkles, etc) coloring one cake with red food coloring to represent sandstone
- As many cans of premade frosting as desired—again use different flavors/colors
- Several varieties of chocolate chips— examples include small chips, regular chips, white/dark chocolate swirls
- Gummy candies in a variety of shapes— examples include green rings to represent plants, fish or sharks, dinosaurs
- Large piece of cardboard covered with aluminum foil to act as the base
- Plastic forks and knives to act as shovels and trowels
- Plates and napkins

**Preparation:**
1. Decide if your cake will have non-conformities or be solid across.
2. Bake each of the cakes being careful to oil and flour the pan so the cakes can be turned out.
3. Frost the aluminum foil below the first layer of cake (only frost one side if you will be staggering your cakes—the example shown is staggered). Embed one type of chocolate chip in this layer of frosting. The chips represent a type of fossil gastropod. This layer can represent an early aquatic habitat. Figure 1 at right shows how the first layer of frosting and chocolate chips is only under the chocolate cake to create a non-conformity.
4. Lay down the first portion of cake.
5. Add another layer of frosting, embedding a different type of chocolate chip along with the green ring-shaped gummies (or another type of gummy candy that can represent plant fossils. This layer of fossils will represent a terrestrial environment. Figure 3.

6. Add another layer of cake followed by a layer of frosting, again embedding a different type of chocolate chips but this time add the gummy fish or sharks. This layer of frosting will represent another marine environment. Figure 4 and 5

7. Add another layer of cake topping it with the final layer of frosting with the gummy dinosaurs to represent another terrestrial environment if the original layer was a partial cake to start a staggered effect place the remainder of the first cake in place now on top of the dinosaur layer. Figure 6.

Note the fracturing, erosion, and weathering that is occurring in the top white layer. While this was largely caused by removing the cake from the pan the effect is a more natural look to the exposed layers.
**In Class Procedure:**

1. Group students into groups of four or five.
2. Assign each group a portion of the cake to observe.
3. Students should sketch, in their journal, the assigned portion of the cake they can see without touching the cake.
4. Once students have had time to sketch the cake cut each group a section of cake within their assigned area. It will be difficult to keep the cake vertical so the cake will need to be laid down with the layering intact.
5. Students should now use their tools (knives and forks) to further explore the cake. Students might recognize that the outer edges of the cake do not represent the true color so they will need to scrape off the outer crust. Students should also be encouraged to search the frosting layers for fossils that might not be visible. Some portions of cake may be completely missing fossils, groups can compare results and use the chocolate chip index fossils to match layers.
6. Prior to eating the cake students should be required to present their drawing along with the geological history of their cake layers.
7. As an assessment students can be given questions from released state exams such as those shown below.

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**5th Grade TAKS 2006**

![Rock column](image1) ![Area 1](image2) ![Area 2](image3) ![Area 3](image4)

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24. The rock column above shows the layers in a rock formation. The three diagrams above show the positions of fossils in different rock layers. According to this information, which fossil is the youngest?
Standardized Test Questions Continued:

New York Intermediate Sample Exam

11  A rock that contains fossil seashells was most likely formed as a result of

   1  volcanic activity  
   2  sedimentation   
   3  heat and pressure
   4  magma cooling

California Standards Test, Grade 5, 2007

34  Why are most fossils found in sedimentary rocks?

   A  Sedimentary rocks are not very old.  
   B  Organisms live only in areas with sedimentary rock.   
   C  Organisms can be preserved in sedimentary rock. 
   D  Sedimentary rocks are found only at the surface of the ground.

California Standards Test, Earth Science, 2007

4   In an area where a river has cut deep into Earth, there are several layers of very different rock exposed. The oldest rock layer is most likely to be the layer that is

   A  below the other layers. 
   B  the thickest layer. 
   C  the most rich in fossils.    
   D  igneous intrusive rock.