Earth Science Curriculum

Developed by University of Utah Mining Engineering students for the Utah Mining Association

Piloted and refined by Alpine School District teachers

Earth as a Cupcake??

<table>
<thead>
<tr>
<th>Topic: Deposition of rock materials</th>
<th>Estimated Length (minutes): 30-35</th>
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<tr>
<td><strong>Standard:</strong> 8th grade, Standard 3.</td>
<td><strong>Objective:</strong> 3a, Describe how the deposition of rock materials produces layering of sedimentary rocks over time.</td>
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**Description:**

- The students will understand how the interior of the Earth is researched.

**Required Materials/Resources:**

- A straw, preferably rigid with a large diameter.
- Hostess cupcake or other similar type of snack cake. Snack cakes with filling and frosting work best to represent differing layers.
- A solid, rigid, object that fits in the straw. (pen or pencil)
Teacher Background:

- As students may or may not already know, how the layers of the Earth’s crust are formed. In this lesson these processes will be reviewed. The importance of the ordering of the layers and what would have been occurring to create those layers at the time should be emphasized.
- Another major focus of this lesson is explaining how the layers of the Earth are researched and examined. To teach this principle the practice of core drilling must be understood. Many common facts for this particular type of drilling can be found online.
- [http://www.youtube.com/watch?v=a3anE3PEPP8](http://www.youtube.com/watch?v=a3anE3PEPP8)

Discussion:

- Review the Earth’s structure:
  (Length: 5 minutes)
  - Display an image showing layering of rocks.
  - Discuss the process of how rock layers are formed in the crust.
  - Ask questions to guide students from the layering they can see to what is occurring underground....
    - Why do you think the layers look the way they do?
    - What caused the layers to happen?
    - Which layer would be the oldest?
    - Why are these layers visible?
    - Do you think these types of layers happen underground? (use this question to lead into the activity)
- What the Earth’s crust looks like:
  (Length: 5 minutes)
  - Discuss that no one really knows what is far beneath the Earth’s surface. These
observations have never been made, but there is a lot of evidence to the inferences that have been made.

- Discuss the physical depth to which most holes are dug (world record depth is 2,466 meters below the seafloor).
  - How many of you have ever dug a hole?
  - How deep did you dig?
  - So how do we get down thousands of feet?
  - Did you see any layers in the hole that you dug?

- Discuss the difference between topsoil and bedrock. Explain that these are part of the crust but are different layers.

- Discuss the layering involved in the Earth’s crust that we can see above ground has also happened below ground.

- Explain how the layers of the crust are determined when simply digging a hole won’t work. Explain that this is when core sampling must be performed.
  - Core Sampling:
    (Length: 5 – 10 minutes)
    - Discuss what core sampling is.
    - Discuss how it is performed.
    - Expound upon why core sampling is performed.

Example of ICE CORE SAMPLE

![Example of ICE CORE SAMPLE](image-url)
EXAMPLE OF HOW CRUST CORE SAMPLE IS TAKEN

EXAMPLE OF CRUST CORE SAMPLE

Activity: Core Sampling (Length: 10 – 15 minutes)

- Perform a core sample using the straw and snack cake obtained beforehand.
- Activity procedure:
  - Explain that the snack cake will represent a small portion of the Earth’s crust.
  - Ask students what they believe is on the inside of the snack cake.
Make it obvious that no one can really know what is on the inside of the cake without either opening it up or taking a sample of the whole thing.
  - Can we easily cut the whole earth in half?
    - another reason why we need core samples

Be sure to explain that this sample is independent of any other sample taken previously, i.e. if one of the students has eaten this type of snack cake before.

Explain that the straw will represent a core drill and will be used to take a small sample of what is on the inside “beneath the surface” of the snack cake.

Push the straw into the snack cake.

Remove the straw from the snack cake.

Push the “core” out of the straw using the solid, rigid, object obtained beforehand.

Explain that the material removed from the straw (the core drill) is representative of what is on the inside of the snack cake.

Establish the similarities between this exercise and the Earth’s crust.

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**Real World Application: Where and why is this performed around the world**

(Length: 5 – 10 minutes)

- After activity is performed and any remaining questions are answered. Explain how and why core sampling is performed around the world.

  - Discuss things that geologists or others would possibly be interested in finding in the Earth’s crust. This list may include things such as water, oil, natural gas, gold, etc.

  - Discuss how the things we use every day such as computers, cell phones, televisions, etc. all come from minerals that have been found in the Earth. Explain that most of these minerals were not just lying on the Earth’s surface but were found by this method shown and discussed today.