Erosion, Deposition, and Lithification

Standards Covered in this Module

NGSS:

4-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.

4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

Common Core:

MP.2 Reason abstractly and quantitatively.

4.MD.A.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.

Guiding Questions

How can erosion and deposition change the appearance of a coastline? How can deposition change how rocks appear over time?

Word wall

- Sedimentary Rock – Rock formed in layers. Often found near water sources and a result of deposition and erosion.

- Erosion – The carrying away of sediments from rocks and minerals through wind or water moving past it.

- Deposition – When sediments are eroded from rocks and minerals, they will travel and be deposited in a new location

- Lithification – The process where loose gravel is compacted over time and forms new rock.

Procedure

1. Video – Ben explains deposition and lithification

2. Junior Archaeologist Assignment

3. Record data in log book

4. Interactive homework

Junior Archaeologist Assignment

Warning-This assignment is MESSY!

For this assignment, you will model the process of how layers of sediment are compressed into rock. With a parent's permission, you will need three slices of bread, peanut butter, jelly, and a Ziplock bag. These will represent your different layers of loose sediment.

First, lay your piece of bread on a plate. This is your first (and oldest) layer of sediment. Draw what just this layer looks like in your logbook and measure how thick the bread layer is.

Next, spread out a thick layer of peanut butter on your piece of bread. This will be your next layer of sediment, and it is younger than your bread layer. Draw what just this layer looks like in your logbook and measure how thick the peanut butter layer is.

You will continue this process by adding another bread layer, a layer of jelly, and the final bread layer. Make sure to fill out your logbook after each layer is added.

The sandwich you have now made shows how different layers of sediment settle on top of each other over time. The first and oldest layer is at the bottom, while the youngest layer is at the top.

Next, you will put your sandwich in your Ziplock bag and try the best you can to push all the air out of it. You will choose a heavy item in your house, such as a book, and put it on top of your sandwich for 30 minutes (you can also sit on it if you feel brave!). After 30 minutes, take your sandwich out of the back and record what it looks like now. How does the sandwich look the same, and how does it look different? Are all of your layers the same thickness or have they changed?

Interactive Homework

Read about Earthcaching here. With this site and with the use of a GPS device, you can find examples of lithification and striation in rocks near where you live. Geocaching allows you to use GPS to go to millions of different sites around the world using GPS coordinates to find a special prize that people before you have left. Earthcaching is similar, but you search for different landforms instead of small prizes.

To sign up, just create a Geocache account for free (make sure you have your parents permission before using the internet) and use and free GPS app on your phone (an example would be Commander Compass Light, it also tells you elevation) or a handheld GPS system to start your game of digital hide and seek!