



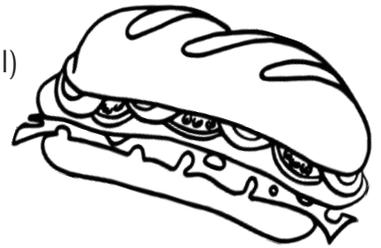
Story of a Sedimentary Sandwich

Story Activity

Have you ever wondered what is beneath all the soil in the state of Nebraska? Or wondered about all the rocks that are in the mountains? As you read this story you will get an idea of how those rock layers formed.

What you need:

- Slice of white bread, rye and wheat bread (cut off the crusts), or several tortillas or pita bread cut to the shape of bread
- Jam
- Chunky peanut butter/or other chunky spread
- Raisins (optional)
- Animal crackers (optional)
- Plate
- Knife
- Spoons



- Start with a plate. That represents the igneous basement rock that is at the base of all the continents. This igneous rock was once molten or melted rock and is very old. On top of the basement rocks are many different rock layers. Let's see what sedimentary rock layers you can create. Sedimentary rocks are made up sediments, and sediments are bits and pieces of rock like gravel, sand, silt and clay.
- First, imagine that there is a river flowing over our basement rock. This river is carrying white sand. The white sand came from rock that was being eroded (broken down) by rain and other processes. Sometimes the river slows down, and when it does, the sand falls to the river bottom. When this happens over a long period of time, you have a lot of sand. That sand is eventually compacted and cemented/glued together to form a white sandstone. Put your white bread/tortilla/pita bread slice down on your plate... that is your white sandstone.
- A lot of time has passed, and one year there is a major flood. Lots of mud, sand, and gravel/rocks are carried by the fast-moving water and flows over your white sandstone. Spread chunky peanut butter over the white bread – that represents the mud and gravels/rocks that are deposited (laid down) on top of your sandstone. You can add some raisins representing big boulders caught up by the rushing water. After a long time, this mud, gravel, and boulder mixture becomes another type of sedimentary rock called a conglomerate.
- More time passes, and the flow of water has really slowed down. The river can no longer carry big pieces of sediment - only tiny pieces that make the water look muddy. Those tiny pieces are called silt, and over a long period of time and with some compaction and cementation (minerals gluing the sediments together), they become a sedimentary rock called shale. Add a slice of dark brown bread to your rock layers to represent this layer of shale.
- A lot more time passes, and sea levels begin to rise because glaciers have started to melt. The sea rises and covers up all your rock layers. In the seas are all kinds of living creatures. Eventually they die and their shells and skeletons fall to the sea floor. Over many years the layers of shells become another sedimentary rock called limestone. Spread a thick layer of jam on the dark brown bread to represent the limestone. (You could add an animal cracker – if it is a land animal maybe it was swept into the sea after it died. It would become fossilized in this layer.)

CREATE



- Now the oceans are receding because more ice is forming at the poles and your rock layers are no longer covered with water. Once again, rivers are flowing over your layers and they are carrying sand and silt. But nearby a volcano exploded and a very thick layer of ash has covered your rock layers. With time the ash is compacted and cemented together to form a rock called tuff. Place your light brown bread on top to represent tuff, your last layer of rocks.
- This is one segment of the long story that the rocks in Nebraska tell. There are numerous times that the seas swept across our land and that sand and mud were deposited along with many layers of ash.

Questions and Conversation Starters:

- Which rock layer is the oldest? Why do you think that?
- Which rock layer is the youngest? Why do you think that?
- Do you remember how each layer formed or what type of rock it is?
- Geologists can tell the age of a rock based on fossils and certain minerals, but if they don't have the right minerals or fossils with a known date, they can give it a relative age based on the rocks below and above it.
- Paleontologists often use rocks to help them date a fossil. Sometimes it is relative date – they know the age of the rock below and above the fossil, but not the layer the fossil is in, but they can narrow down the age. If you used an animal cracker in your story, is your fossil older or younger than your ash layer? Is it older or younger than the conglomerate (the layer with the sand, gravel and boulders)?
- Rock layers are often bent or broken because of earthquakes. Bend your rock layers to form a mountain. What happened to the rock layers?

IMAGINE

Add On:

- How do you think geologists know what is in the ground under us if they can't see it? They take a drill and drill down into the Earth to the rock layers below. Humans have drilled about 7.5 miles into the Earth's continental crust. You can do the same with your rock layers. Store your sandwich in a plastic bag in the refrigerator overnight. It will solidify and then it will be possible to 'core' your rock layers. Take a biscuit or round cookie cutter and gently push it down into your rock layers. Carefully bring your core up and gently pushing out the core using a straw or your fingers. Look at the rock layers. Can you tell what each rock layer is? Can you see what layer was on top? Which layer is the youngest? Which is the oldest?

LAYER

