



Educational Outreach
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DIY Air Force Activities: Erosion Experiment



Materials:

- ¼ to ½ cup baking soda
- bowl or dish (preferably glass so you can see through it)
- teaspoon
- measuring cup
- rocks (small and large)
- water (about ½ cup total)
- vinegar
- straw or pipette

*bonus experiment: sand and twigs



Erosion is the process of land, soil, or rock being gradually worn away by water, wind, and ice. This differs from weathering, which is the breaking down of materials into smaller pieces from exposure to things such as air, water, or organisms. New landforms can be created and destroyed by weathering and erosion! Sometimes this process can happen quickly, and sometimes it takes hundreds of years. These natural processes help to form the landscape around us. The following experiment will allow you to model the weathering and erosion processes to better understand these phenomena.

Directions: Be sure to ask an adult for permission before beginning the experiment!

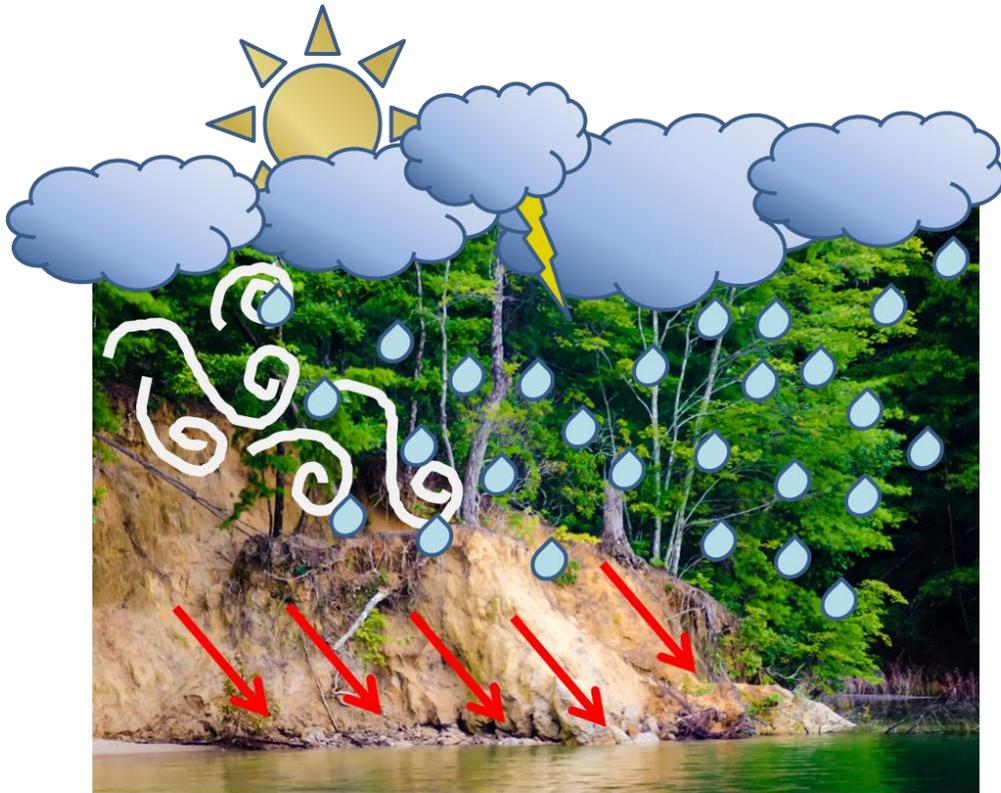
1. Pile your rocks in a formation in your dish or bowl.
2. Measure out ¼ - ½ cup of baking soda.
3. Add water 1 teaspoon at a time to the baking soda and mix with your spoon. Continue until you form a smooth paste. You do not want it to be too runny or too thick!
4. Pour your paste over your rock formation to “glue” it together. Feel free to sculpt shapes!
5. Place the bowl with your creation in the fridge for about 2 hours to set.
6. Once it is ready, pour a little less than ¼ cup vinegar in a clean measuring cup. Use your pipette to drop it on your rock formation and observe what happens! If you do not have a pipette, you can take a straw, submerge it in the vinegar and cap the other end with your thumb (see picture on back). Then remove your thumb once the straw is over your formation to drop the vinegar on!
7. After you have “weathered” your formation with some vinegar, slowly pour ¼ cup warm water over the formation to erode it away!

What did you observe during your experiment? Did you notice any interesting shapes and patterns? Have you seen similar results in nature after a storm or by a river bank? Now repeat the experiment but add sand and twigs when you build your structure up. Does this alter your results?

Air Force Associations:

The US Air Force’s Rain Erosion Test Facility at Wright Patterson Air Force Base is part of the Air Force Research Laboratory’s material degradation test facility. It has an 8 ft diameter rotating arm and 96 calibrated needles that simulate 1 inch of rainfall per hour at speeds up to 650 mph! Real time video is monitored and recorded for “time to failure” testing. Another facility tests particle erosion in a “dust rig” to simulate the effects on air craft surfaces in dust laden environments!





Erosion occurs when wind, water, and ice displace (move) broken up dirt and rock. You can observe this along river banks or after rainstorms. Plants can help prevent this!



Chemical reactions occur when you mix two or more things together and they form something new. Did you notice the baking soda “soil” bubble and fizz? Baking soda is what is called a base and vinegar is an acid. When you mix the two together they react and form a gas called carbon dioxide. You can see the carbon dioxide in the form of bubbles. Chemical erosion, or chemical weathering, occurs when water reacts with minerals in the rocks and soil, causing them to breakdown. New minerals such as clays and salts are formed. This is an important step in the erosion process. Chemical reactions happen all around us, including in our kitchens, bathrooms, and laundry rooms! What other chemical reactions can you think of that take place in your home?