

MINI ICE MOUNTAINS

Fast-Forward the Process of Erosion



Curriculum topics

- Data Collection and Analysis
- Erosion (Weathering)
- Human Impacts
- Interacting Earth Systems
- Landform Changes & Materials
- Phases of Matter
- Water Cycle

Subjects

- Physical Science
- Earth & Space Science

Grade range: 2 – 8

Who we are: Resource Area for Teaching (RAFT) helps transform the learning experience by inspiring joy through hands-on learning.

Earth is a very dynamic planet with different systems that interact and affect one another. The oceans, flowing rivers, rainfall, and snow are examples of one system called the hydrosphere (*hydro* meaning water). This system often interacts with the geosphere (*geo* meaning Earth's surface, rocks, etc.). The picture above shows what happens to soil/dirt, rocks, and vegetation when waves crash into the shore. Water can be a powerful agent that reshapes the land. While it is possible to observe these events outside, this activity allows students to model and simulate the effects of water erosion using ice, water, and a few other materials indoors.



Share Your feedback!

<http://bit.ly/RAFTkitsurvey>

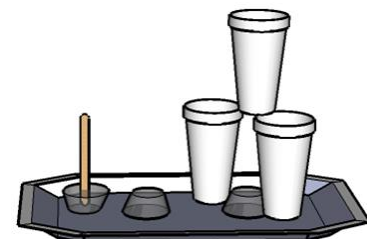
Materials

Materials in the kit may vary but generally, this kit contains the following:

- Craft stick (1)
- Portion cups, 2 oz. w/ lid (2)
- Portion cup, 4 oz. w/ lid (1)
- Large cup, paper or plastic, 6-12 oz. (3)
- Bulb pipette or eye dropper (1)
- Food coloring or watercolor
- **Not included:** Scissors, pencil, salt, large tray

To Do and Notice

1. **Assembly:** Use a pencil to mark a craft stick at $\frac{1}{4}$ " intervals along its length. Make a slit, the width of the craft stick, in the top of a 2 oz. portion cup lid. Push the craft stick through the slit in the lid.
2. Fill the two 2 oz. portion cups and one 4 oz. portion cup with water to within $\frac{1}{4}$ " of the rim. Snap the lids onto one 2 oz. cup and the 4 oz. cup. Leave a filled 2 oz. cup uncovered.
3. Place the lid, with the craft stick, on the uncovered 2 oz. portion cup from step 2 and push the craft stick in until the end touches the bottom. Place all the portion cups on a level surface in a freezer until frozen.
4. Unsnap the portion cup lids, invert each cup over a large tray, and press on the bottom of the portion cups to push out the ice.
5. **Investigate:** Observe the air bubbles, cracks, and other features in the "ice mountains".
6. Utilize the different sections of the tray to position the ice mountains in a variety of test settings: **a)** 2 oz. ice mountain placed on top of a portion cup lid, **b)** 2 oz. ice mountain with a craft stick to measure the rate of melting over time.
7. Place a large cup on each side of the 4 oz. ice mountain, poke a small hole in the bottom of a 3rd large cup and place the 3rd cup over the ice mountain, supported by the rims of the first 2 large cups (see above).
8. Observe the ice mountains at regular intervals over 25 minutes to several hours. Note your observations.
9. Pour some water into the third cup mentioned in step 6 above. Let the water drip onto the 4 oz. ice mountain. Use an eye dropper or pipette to drop some water on top of one of the other ice mountains. Compare the rate of melting and any erosion patterns (see illustrations on page 3).
10. Mix 2 tbsp of salt and $\frac{1}{4}$ cup warm water. Repeat step 8 using warm saltwater.
11. Apply food coloring or liquid watercolor to highlight pools, channels, and the patterns of meandering streams as water flows off the ice. Note/draw your observations.
12. **Analyze:** What differences in patterns did you observe for the ice mountains? What erosion patterns/features did you notice? What was different about using cold water vs warm saltwater?
13. **Class Discussion:** How does this activity demonstrate landform sculpting/change due to erosion? How does it show an interaction between the Earth's hydrosphere (water on the planet) and the geosphere (Earth's surface)?
14. **Share** your learning with RAFT! Submit photos/video via email at education@raft.net or on social media ([Facebook](#), [Twitter](#), [Instagram](#)).



Core Content Skills:

Science & Engineering (NGSS)

Planning and Conducting Investigations, Analyzing and Interpreting Data, Developing and Using Models, History of Earth, Earth Materials, Interacting Earth Systems, Human Impacts, Structure and Properties of Matter, Cause and Effect, Patterns

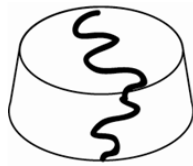
Social Emotional Learning

- Self-awareness
- Self-management
- Responsible decision-making

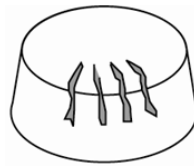
The Science Behind the Activity

This activity demonstrates an interaction between the geosphere (involving layers of Earth, especially the crust) and the hydrosphere (all the available water on the planet). The cup-shaped ice represents mountains, and the water applied to them represents rainfall and running water.

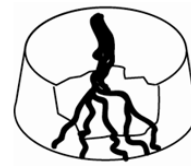
Many substances are most dense and take up the least space when in a solid form rather than a liquid form. Water, however, expands and becomes less dense when frozen solid. Water is most dense as a liquid. The expansion of water during freezing can cause cracks to form in rocks and soil as the outside becomes solid before the inside can freeze and expand. Air that was once dissolved in the water may form bubbles that become trapped as the water turns into ice. Some of the air bubbles expand into wormholes or caverns as the ice melts. Salt accelerates the melting process by lowering the freezing point of water. The melted ice water flows down in a pattern called **meanders**. Meanders can be seen on Earth as a river's path curves, which slows down the flow of water and distributes energy uniformly along the path. Flowing water can move and carry soil and rocks, cutting new meanders to flow downhill and reshape landforms as it moves. The materials moved by flowing water can often travel great distances before being deposited as sediment.



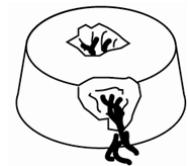
Meander



Crevasses (deep cracks in ice)



Meander that has divided



Ice cave

Reuse

This kit uses 100% reusable materials designed for other uses. To continue making a positive impact in reducing waste, reuse these materials in other projects. Additionally, any unused materials can be collected and delivered back to RAFT.

Feedback

Please comment on this kit by taking this short survey: <http://bit.ly/RAFTkitsurvey>. Let us know of any material concerns (missing, broken, or poorly fitting parts) as well as any suggestions for improvement.

Visit <https://raft.net> to view related activities!

- Making Mountain Models
- Pop Goes the Mountain

Resources

- Water erosion time-lapse - <https://www.youtube.com/watch?v=N8C9OaBRW2g>
- Erosion and deposition - <https://www.youtube.com/watch?v=vphjWgeiGpc>