

Erosion Modeling

Students will explore how weathering and erosion occur by water, wind, ice, and vegetation. They will make observations to provide evidence of the effects of weathering and the rates of erosion.

Grade: 4th **Subject:** Science **Time/Duration:**

Resources

- NGSS 4th grade erosion standard [evidence statements](#)
- [Will a mountain last forever?](#) Mystery Science
- [Erosion lab](#)
- Simple erosion [simulation](#)
- Erosion [NetLogo](#) simulation

Learning Goal

I will be able to make observations to provide evidence of the effects of erosion.

Success Criteria

- I can define and provide examples of weathering and erosion.
- I can make observations to find examples of weathering and erosion by water, ice, wind, and vegetation.
- I can provide evidence of the effects of weathering and the rate of erosion.

Next Generation Science Standards (NGSS)

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.

[Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.]

[Assessment Boundary: Assessment is limited to a single form of weathering or erosion.]

Materials

- Background knowledge activity materials can be found in individual links
- Need access to computer(s) for students to use NetLogo erosion simulation
- Paper + pencil for note taking

Background Knowledge

- Students will work through the exploration and activity in the “Will a mountain last forever?” Mystery Science lesson to learn the basic processes of weathering and erosion.
- Students will engage in the erosion lab to have hands-on experience observing and analyzing erosion in a hands-on way.

- Students will complete other various activities to help them define weathering and erosion and identify examples.

How will students interact with the model, teacher, and peers?

The NetLogo model is a bit abstract for the elementary level, so using this modeling activity will come after students have explored weathering and erosion through other simpler activities. First, they will explore the simple erosion simulation, ideally in class with a partner. They'll have time to explore and then they'll focus on answering questions about their observations (below).

- How many years ago does the process of erosion being modeled begin?
- What is the water doing in the model?
- What happens to the beach? The rocky cliffs?
- How do you see erosion occurring in the model?
- What changes do you predict in the future of this landscape?

After students have an idea of erosion, they'll interact with the NetLogo simulation. Students will again be given explore time, then be encouraged to change the variables described below and reflect on their observations.

- What happens if you set up the model as hilly? Bumpy? Both?
- What happens as you increase or decrease the terrain smoothness?
- What do you see when you show the water?
- How does an increase or decrease in rainfall affect the model? Soil hardness?
- How do you see erosion occurring in the model?

Students will explore the simulations with a partner first and then the class will come together for a discussion on observations and how their learning has deepened.