

Activity 4. Weathering and Surface Area

Objectives:

- To understand the importance of surface area when it comes to weathering of rocks and minerals.
- To learn how to design your own independent experiment.

Background: There are two types of weathering; mechanical and chemical. Mechanical, or physical, weathering is the breakdown into smaller pieces, while chemical weathering breaks a rock or mineral down by altering a rock or mineral's chemical composition. Weathering can be affected by several forces, including exposure, particle size, mineral composition, and climate. This activity will look at the role of particle size and how fast a material can be weathered. See Figure 9-2 in *Brief Review in Earth Science: The Physical Setting* (Prentice Hall, 2002), or an alternative figure illustrating the affect of particle size on surface area.

List of materials:

- Acid solution (dilute vinegar)
- SweeTARTS™ (the same color)
- Hammer
- Stop watch
- Clear cups or beakers
- Safety goggles (if stronger acid)

Procedure:

1. Break into groups of 3 or 4.
2. Develop a question based on your previous knowledge of weathering of rocks and minerals and Figure 9-2.
3. Turn that question into a hypothesis.
4. Design an experiment that could test that hypothesis with the materials provided to you.
5. Carry out your experiment.
6. Determine if your hypothesis was correct.
7. Answer follow-up questions.

Planning your Experiment:

What is your **question** about weathering of rocks and minerals?

What is your **hypothesis**?

Methods: Explain how you will test your hypothesis.

What are your **independent and dependent variables**?

What will you be keeping **constant** during your experiment?

Provide a sketch of your set-up.

Observations: Record what happens. Provide any **measurements** in a table.

Results/Conclusion:

Was your **hypothesis** correct? Explain.

Follow-up questions

1) Based on the results of your experiment, predict which of these would weather the fastest - a smooth round pebble or a jagged piece of rock. Why?

2) Explain how water could be a form of both mechanical and chemical weathering.