

Lesson Plans: Outgassing

Objective

The objective is to demonstrate the concept of outgassing and to explain the origins of the earth's atmosphere.

Materials

Each student or group of students will need the following:

- Two effervescent antacid tablets
- Air-tight jar (approximately 0.5 liters)
- Cold water
- Paper towels or other absorbent material for spills.

Important Points to Understand

- The earth's atmosphere has evolved over time and continues to evolve today.
- The earth's atmosphere was outgassed from its interior (i.e., including solids).
- Gas dissolved in magma within the earth is released to the atmosphere when the magma rises to the surface due to decreases in pressure.

Preparation

Before the demonstration, ask students how the earth's atmosphere was formed and where its constituent gases came from. Inquire if earth's atmosphere can change or if it has always been as it is today. Questions along these lines can help the teacher tailor this demonstration to address misconceptions and confirm accurate ideas (such as the dynamic nature of the atmosphere).

The day before the demonstration, fill the jar(s) three quarters full with cold water, the colder the better. Drop the two antacid tablets in the water and immediately seal the jar. Allow the water to warm to room temperature overnight. If enough jars and antacid tablets are available, one jar can be prepared for each student or group of students rather than just one for the teacher. Be sure to try this demonstration on your own before demonstrating it for the class. The results can be messy!

Procedure

1. Ask students to describe the contents of the jar and the conditions within the jar. Bring the jar close to them so that they can observe it carefully.
2. Have students write down a prediction for what they think will happen when you open the jar.
3. Open the jar and have the students write down what they observe. Caution: Opening the jar can produce the same results as opening a warm can of soda pop. **Teacher and students should be wearing safety goggles.** Hold the jar away from your clothes. If the activity is being performed at each student's desk there should be something underneath the jar to catch or absorb any water that may spill.
4. Ask students what conditions within the jar changed when the lid was released.
5. Continue with a discussion of how this demonstration models the outgassing of the atmosphere.