

# Lesson Plans: Air Pressure

## Objective

The objective of this activity is to investigate the effects of atmospheric pressure.

## Materials

Each student or group of students will need the following:

- Sturdy paper cup
- Index card
- Straight pin
- Water
- Sink or catch tray

## Important Points to Understand

- Air has weight and exerts pressure on everything with which it comes in contact.
- The force exerted on a surface by air is equal to the weight of a column of air above the surface extending to the top of the atmosphere.
- Air pressure is exerted equally in all directions

## Preparation

No special preparations are required for this activity. Teachers may need to assist students who have trouble getting the activity to work. It is important that students work carefully and slowly. A break in the seal between the cup and card allows air into the cup, causing the water to fall.

**Note:** If students have trouble getting a seal between the cup and the index card, have them fill the cup completely with water and moisten the card slightly before placing it on the cup.)

## Procedure

### Trial 1

1. Working over a sink or a catch basin, fill a cup to the rim with water. In the box marked "Trial 1 Prediction," suggest what will happen when you turn the cup over. Explain your prediction.
2. Turn the cup over. What happened?

### Trial 2

1. Fill the cup again. Cover it with the index card, and make sure that you have created a water seal around the rim of the cup, so no air can seep in. In the box marked "Trial 2 Prediction," suggest what will happen when you turn the cup over with the index card covering it. Explain your prediction.
2. While holding the index card on top of the cup, carefully turn the cup over. Hold the cup around the rim at the bottom so that the cup is not deformed (bent) and remove the hand holding the card. What happened?



Boy with cup

### Trial 3

1. Using the straight pin, carefully make a hole in the bottom of the cup and remove the pin. Write down your prediction first before you try.
2. Record your observations.

Trial	Prediction	Explanation
1		
2		
3		

## Questions

1. In Trial 1, what caused the water to fall out of the cup?

2. In Trial 2, what held the index card to the cup? What prevented the water from falling out of the cup, as it had done in Trial 1?
3. Explain why the water and the index card fell from the cup in Trial 3 of the activity.
4. Based on your observations, in which direction(s) is air pressure being exerted? Draw a picture representing your explanation and explain the phenomenon of air pressure in your own words.
5. Try to explain why we usually do not feel the pressure of the atmosphere around us. When do we feel air pressures?