

Going to Great Heights

(Reinforcement Activity)

This activity lets students see for themselves that water will not rise higher than approximately 32 ft. It is a reconstruction of the historical puzzle that led to the discovery of air pressure and its role in pumps and siphons.

Materials

- 40 feet of transparent plastic tubing
- One gallon jug of water
- A bucket or tub filled with water
- Access to a building that is taller than 40 feet high.

Steps

- Take 40 feet of transparent plastic tubing and a gallon of water, and go to the roof of the building (or to a window that is higher up than 40 feet.)
- Let the tubing down the side of the building and have somebody put the lower tip of the tubing inside a bucket sitting on the ground that is filled with water.
- Pour water from the jug into the top of the tubing. Lots of bubbles will be observed in the tub, but will the water spill out? (*The water you pour from above stays inside the tubing instead of flowing out.*) Can you fill the whole 40 feet of tubing with water? What happens?

Follow-up Questions for Class Discussion

Explain to your students why barometer readings on TV weather reports are always given as 30 inches or thereabouts. Ask: “Does the height to which you could fill the tubing (about 32 to 33 feet) and the 30-inch readings have anything to do with each other?” (*Yes, they are related. Air pressure acts on water in a tube in a similar way that it acts on a tube of mercury. If you put them side by side, they would rise and fall in a similar fashion as the air pressure changes. It’s much easier, however, for scientists to use mercury rather than water. Since mercury (13.6 g/ml) is much denser than water (1 g/ml), the tube of water would need to be 13.6 times the tube of mercury for the same results, or about 32 to 33 feet.*)