

## Consuming Oxygen

**Overview:** This experiment not only explains how your body uses oxygen, but it is also an experiment in air pressure circles – bonus! You will be putting a dime in a tart pan that has a bit of water in it. Then you will put a lit candle next to the dime and put a glass over the candle with the glass's edge on the dime. Once all of the air inside the glass is used up by the candle, the dime will be easy to pick up without even getting your fingers wet!

## Materials

- aluminum tart pan
- votive candle
- matches
- drinking glass, (clear, 12 or 16 oz.)
- dime
- water
- goggles
- Adult supervision!

## Experiment

1. Pour about  $\frac{1}{4}$  inch of water in the pan and place the dime right in the middle.
2. Position the candle next to the dime and ask an adult to light it for you
3. Put the drinking glass over the candle with its edge resting on the dime. Watch closely to observe what happens.
4. Once the water is inside the glass, you can carefully remove the dime from under its edge. If done properly, the water will stay in the glass.

## Consuming Oxygen Data Table

[illegible]

## Reading

This lab serves to illustrate that oxygen is consumable. It's the same thing that happens inside your body, but at a much slower rate than what you witnessed with the candle. Your lungs contain about 1,490 miles (2,400 km) of air passages to help absorb oxygen. If they could be spread out flat, an average set of lungs have a surface area of approximately 650 square feet. The sheer size of this system gives you the chance to absorb all the oxygen that your body needs.

When you put the glass over the candle, you create a closed system. The candle only had the gas trapped inside the air beneath the glass to burn. As the candle burned, the gases in the glass burned as well. They were transformed from a state of gas to a very compact solid state that stuck to the wick of the candle (this is why the wick gets black when a candle burns).

An important thing to note is that as the air was removed, the pressure inside the glass was reduced. Lower air pressure inside your closed system created an imbalance with the regular air pressure on the outside of the glass. Since there was more pressure on the outside, the water was pushed inside the glass. The dime helped to make a gateway for the water to be more easily pushed into the glass.

## Exercises

1. What do we mean when we say that oxygen is consumable?
2. What is the difference between an open and a closed system?
3. Where is the higher pressure in this experiment?
4. Why does water rise inside the glass?

### **Answers to Exercises: Consuming Oxygen**

1. What do we mean when we say that oxygen is consumable? (It gets used up in a chemical reaction.)
2. What is the difference between an open and a closed system? (A closed system has a limited amount of a resource, like oxygen, available. An open system has an unlimited amount of oxygen, like the atmosphere. Note that the “unlimited” amount isn’t really infinite, it’s just a *huge* amount when compared to what’s available in a cup.)
3. Where is the higher pressure in this experiment? (on the outside of the glass)
4. Why does water rise inside the glass? (Higher pressure pushes, and when the amount of oxygen inside the glass decreases, it creates a lower pressure inside the glass. This difference in pressure causes the higher pressure on the outside to push on the water, forcing it under the glass and up the cup.)