

## How to Open a Light Bulb Without Breaking the Insides\*

### Materials

- 1 regular light bulb
- 1 hand-held propane blow torch (available at hardware and kitchen stores)
- Matches
- Protective gloves and glasses
- 1 hammer
- 1 paper bag or paper towels.

**Note to Teacher:** This is a safe way to open a light bulb. It should not shatter or explode in your hand.

### Steps

1. Put on your gloves and glasses.
2. Light the torch with a match.
3. Bring the torch flame to a sharp cone – this is important, the sharp cone should be a bright blue flame that is approximately 1 ½ inches long. The sharp cone is what melts the bulb, and it directs the heat to a small area.
4. Hold the light bulb at the bottom, by the metal part.
5. Put the flame close to the top of the bulb on the side, far enough away to make you comfortable.
6. Heat the bulb until there is a small hole. You have just broken the vacuum seal without breaking the filament inside (you hope). You may hear a popping sound as the seal is broken.
7. Let the bulb cool on a table for 30 seconds or so.
8. Either wrap the bulb in paper towels or put it into the paper bag.
9. Take the hammer and lightly hit the bulb until it breaks. Apply gentle pressure, enough to break the bulb but not to break the insides.
10. Throw away the broken glass. You should be left with an intact inside view of the light bulb.
11. If you think you will break the bulb too much or you are afraid, don't worry. You might want to prepare more than one bulb in case the insides of the first one break.

### What you see

- You can follow the circuit—it goes from the bottom point of the bulb up through the filament and back down. What you want the students to see is that the circuit connects to the side of the bulb.
- The black stuff on the bottom of the bulb is glass, which is an insulator.

\*Instruction provided by John Papadonis, Burlington Science Center, as taught by Lawrence B. White, past director of the Needham Science Center.