

Sydney's Chimney

Sidney Christopher Alford (born 1935) is an inventor, explosives engineer and a doctor of chemistry. In this demonstration, Dr. Alford explains the components necessary for an elementary explosion. Mr. Gonyo is a teacher of 8th grade science.

Background

Flour, although flammable, is not known for its high energy content and is not typically used as an explosive. When suspended in the air, enough oxygen is available to cause the fire to ignite when coming in contact with a source of ignition. If that ignition occurs, inside a combustion chamber (the tube), an elementary explosion will result.

Materials

Candle on block of wood or similar base

Long cardboard mailing tube or PVC Pipe (4" to 6" diameter and taller than the demonstrator)

Flour (yup, the stuff you bake in a cake)

Flour sifter

Protective clothing and safety glasses (a hat is helpful)

Safety Precautions

You will be generating an open flame therefore if done indoors, the area must be free of combustible objects. Flour will get all over the place so be prepared to clean up after. As always, start small until you find the right amount of flour and the right technique for your classroom situation. Keep kids far enough back and always practice without students present.

Preparation

1. Fasten a candle to a block of wood or lab tray (or use a sturdy candle holder)
2. Clear the room of flammable objects or set up outdoors.

Procedure

1. Discuss the elements of an elementary explosion: fuel, source of ignition, combustion chamber.
2. Light the candle and place the tube over the candle. Dim the lights.
3. Wearing protective clothing, quickly sift a small amount of flour into the top of the tube with a flour sifter. Get your hand out of the way (that goes for your face as well).
4. Remove the combustion chamber to show students the smoke that resulted from the combustion of the flour.
5. Discuss with students. Lead them to identify the candle as the source of ignition, the tube as the combustion chamber, and the flour as the fuel source.
6. Be prepared to “do it again” because they are going to ask. Just make sure you clear the smoke out of the tube so enough oxygen is available for the next demo.

Disposal

Sweep up the flour and dispose of in trash.

Tips

- Sift the flour so that it has maximum suspension in the air. A clump of flour will put out the candle.
- Place the tube over the lit candle just before sifting the flour. This will increase the chances of the candle staying lit.
- Practice your technique. Sift flour lightly.
- If it doesn't work, check to make sure the candle is still lit and the tube is not filled with smoke.

