

Non Burning Money

https://www.youtube.com/embed/H2lwo4Q_6D8

As with all fire demonstrations, keep a fire extinguisher nearby as a precaution. This demonstration is a favorite among both presenters and students, and is often requested and performed at all grade levels.

Materials

- Nonburning Solution
 - Ethanol or Isopropyl Alcohol
 - Water
 - Table Salt

- Dollar Bill & Cloth
- 2 Small Tubs
- 2 Large Tubs
- Lighter
- Tongs

Safety Precautions

Please read the Fire Safety section of the [Demonstration Safety](#) page before performing this demonstration.

This demonstration requires: Safety glasses, small blast shield, fireproof gloves

Demonstration

Preparation

Prepare the nonburning solution: In a 1 quart bottle, combine the alcohol and the water in equal amounts, making a 50/50 solution. To make the flame more visible, you may want to mix in 2-3 tablespoons of salt, which will make it a bright orange-yellow flame rather than a faint blue flame.

Presentation

Set out the tubs (small tubs if using a dollar bill, large tubs if using the cloth) and fill one halfway with water. Fill the other tub with the nonburning solution, enough to cover the bottom of the tub with a thin layer. Close the bottle with the nonburning solution and move it off the table, setting it at least five feet away from the demonstration area. Put the dollar bill or cloth into the solution, and have it soak thoroughly. Explain to the audience that you will be making a fire. Have the students list the three things needed for a fire (oxygen, a fuel source, an ignition source). Explain that you will be using an alcohol, and that alcohols are flammable. Ask the students for ideas on what will happen when you ignite the dollar bill/cloth that is soaked in alcohol. During this time, put on the safety gear and use the tongs to pick up the dollar bill/cloth and hold it over the tub of water. Have students do a countdown, and ignite the dollar bill/cloth. It will burn for several seconds, but then the flame will go out, leaving it intact! dunk it briefly in the water afterwards to cool it down before handling it, and ask the students for ideas on why it didn't burn. Is there something else in the solution?

Why This Works

Alcohols are extremely flammable, and burn very hot and very quickly. This is because alcohols are Volatile, which means they easily turn into a vapor and mix into the air. This means that we have to be careful about having alcohol near a fire or anything really hot, because if not carefully watched it might ignite! With the Dollar bill/cloth, we had it soaked in a solution that was half alcohol and half water. The water did not stop the alcohol from burning, and it was able to ignite and start burning quickly. However, water has a high Heat Capacity, meaning it can absorb a lot of heat before turning into steam. This means the water was able to absorb all the heat from the alcohol, and kept the dollar bill/cloth safe from the fire!

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