



## EXPERIMENT: "FLAME PROOF BALLOON"

What do you think will happen if you hold a balloon over a flame? Will it make a difference if the balloon had water in it?

**HYPOTHESIS:** \_\_\_\_\_

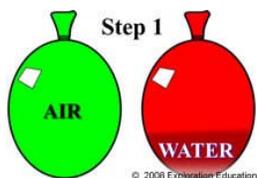
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### Materials Needed

- Two Balloons
- One Candle

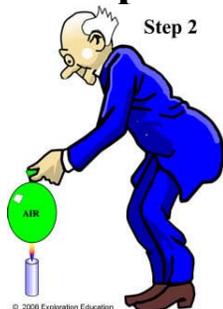
**ADULT SUPERVISION REQUIRED**

### Step 1



Blow up one balloon with air and tie a knot at the top. Fill the second balloon  $\frac{1}{4}$  full of water and the rest with air and tie a knot at the top.

### Step 2



Place the candle on the ground and light it. At arm's length hold the balloon containing only air over the candle. What happened? (Note: it is a good idea to have young children stand back from the balloon so they won't get scared when it pops).

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### Step 3



Now place the balloon with water in it into the flame. What happened?

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*You will notice some black soot on the balloon. This is carbon that came from the burning candle, not the balloon. You may wash this off with soap and water to show that the balloon has not been damaged at all.*

For the accompanying video, additional experiments, and to see our curricula offerings, go to:

**Experiment.EScience.com**



## **Conclusion**

Why do you think the balloon without water popped, but the balloon with water did not?

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## **So What Happened?**

**As you found out, the balloon with water in it did not pop – but why? Water has a tremendous ability to absorb large amounts of heat quickly. In physics, we say water has a high thermal or heat capacity. Even though the flame from the candle can easily burn the balloon, water in the balloon absorbs the heat from the flame so quickly that the balloon itself does not get hot enough to burn. Although there are other factors involved, thermal capacity is related to the density, or number of molecules in a specific volume of an object. Water is quite dense.**