



LESSON: Thermal Displacement

OBJECTIVE: To demonstrate how materials can be used to remove heat for cooling

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## Materials

12" balloon, Bunsen burner, balloon pump

## Instructions

1. Use a balloon pump to inflate the balloon to 12"
2. Hold the balloon over a naked Bunsen burner flame – the balloon should burst
3. Take another balloon and add water to the balloon
4. Use the balloon pump and inflate the balloon to 12"
5. Hold the inflated balloon over the naked Bunsen burner with the water in the balloon over the flame – the balloon should not burst

## Conclusion

The balloon without water clearly bursts when the latex is hot enough to break down the polymer and it melts.

With the addition of water, the balloon does not burst when holding over the flame since the water inside the balloon absorbs the thermal energy from the Bunsen burner.

Interestingly, the same amount of heat is being applied, through the same material. The heat is being transferred through the wall of the latex balloon by conduction, and the water inside the balloon is absorbing that heat energy. The heat transfer properties of the water result in a convection current inside the balloon, in effect cooling down the latex wall of the balloon.

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