

# Homemade Insulation

By Keola



## Question

Is there a difference in temperature between bottled water wrapped in 1 layer of aluminum foil, 5 layers of aluminum foil, 10 layers of aluminum foil and no layers of aluminum foil?

## Hypothesis

When using silver foil as an insulator for bottled water if another layer of foil is added around the bottle, then there will be a difference in temperature because your making the insulation better.

# Purpose

I go to school all the way in Kekaha and it is a very long time that I let my drink sit until lunch. So I wanted to figure out a way to keep my water cool for this experiment



# Procedure

1. Cut 16 pieces of aluminum foil 12 by 6 ½ in.
2. Leave the water in the fridge for 3 hours
3. Take temperature of the water before wrapped
4. Wrap 1 layer on bottle water
5. Wrap 5 layers on bottle water
6. Wrap 10 layers on bottle water
7. Have one bottle with no foil wrapped on it (control)
8. Check every 15 minutes for 3 hours
9. Open each bottle and use thermometer to take the temperature of each water
10. Record data on final temperature kept the drink cooler on a graph
11. Graph Data

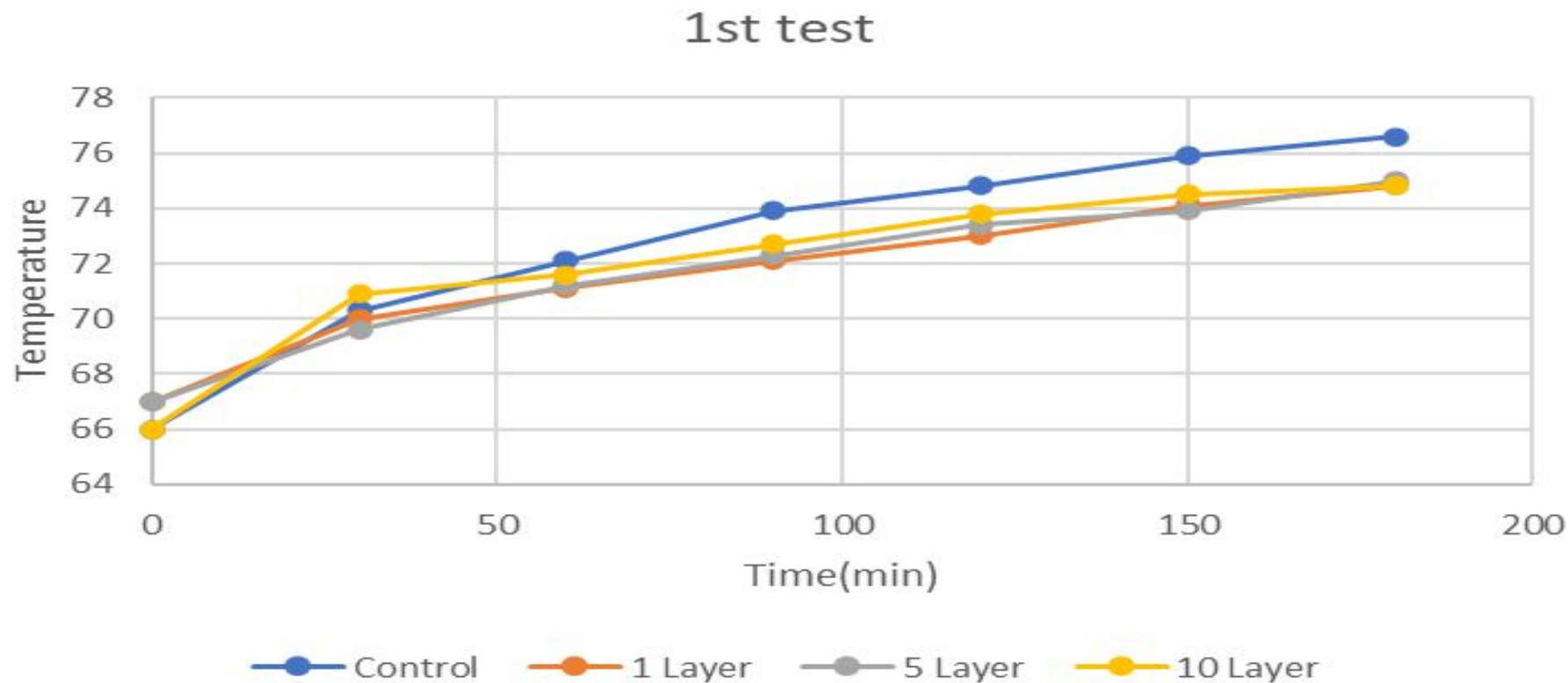


# Materials

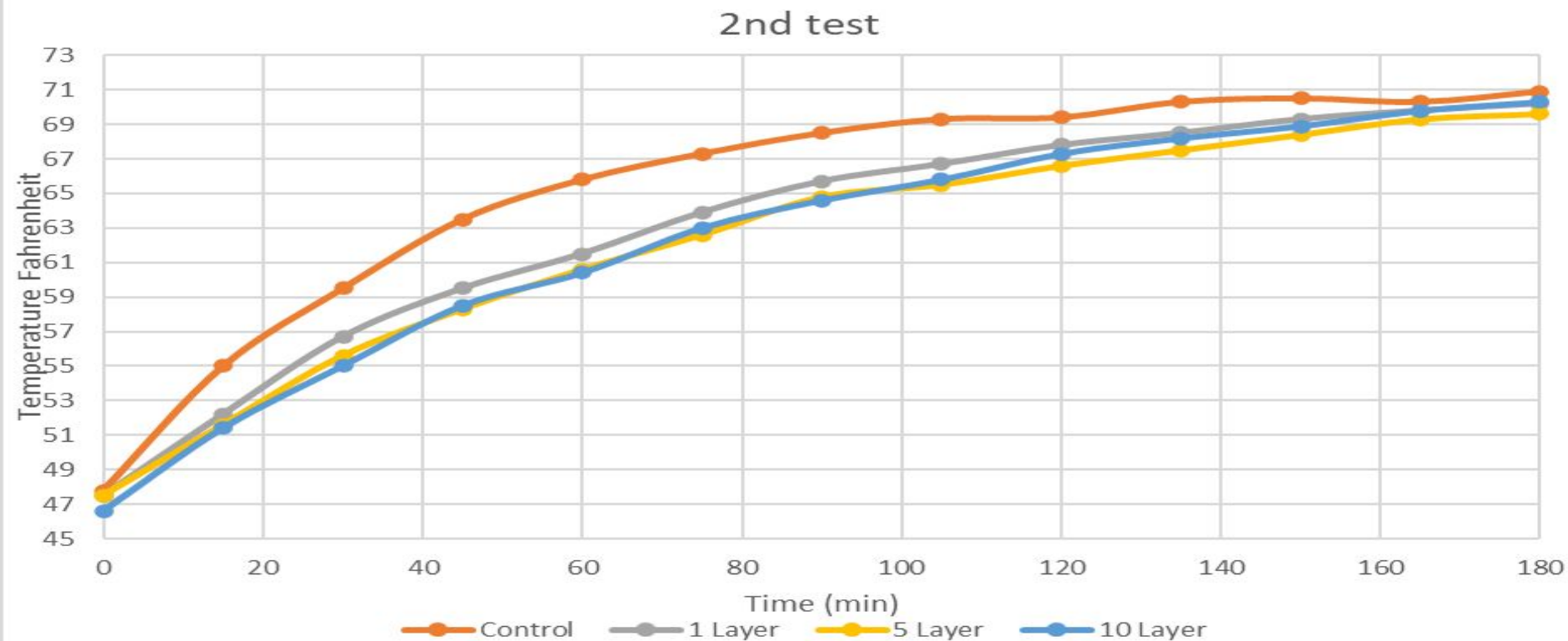
- ❑ Ruler
- ❑ scissors
- ❑ A roll of aluminum foil
- ❑ Thermometer
- ❑ Timer
- ❑ 4 mini KIRKLAND water bottles



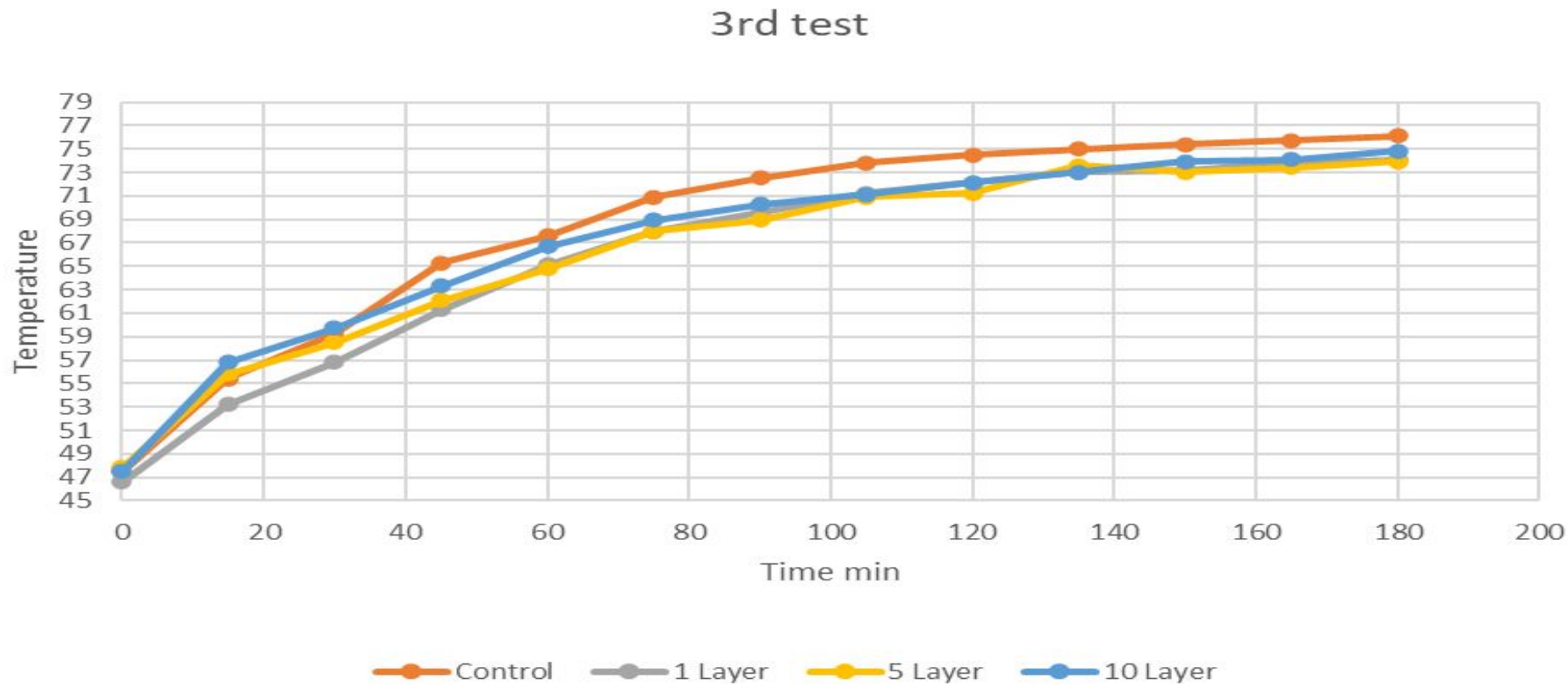
# 1st Test Graph



# 2nd Test Graph



# 3rd Test Graph



# Data analysis

- 1st test control had a relatively same temperature as the layers when first checked
  - 1st test control had a different temperature than the layers on the last test
  - 2nd test control ended on the same temperature as the layers
  - 2nd test the control got warmer faster
  - 3rd test control ended on the same temperature as the layers
  - 3rd test 10 layers was the warmest the first fifteen min
  - 3rd test 10 layers had a warmer temperature than the rest of the layers
- My hypothesis was wrong because there was no difference in temperatures.



# How does aluminum foil keep water cold?

Aluminum foil itself conducts heat very well so it isn't considered an insulator. Instead it is a barrier that limits the mixing of the hot air inside with the cooler air outside. Shiny things reflect light, and in particular they reflect heat. If you put something cold in a container that is shiny on the outside, then it will reflect any radiant heat that strikes it.

# What happens when you use aluminum foil as an insulator?

Aluminum foil can be used as an insulator because the insulation reflects heat but, aluminum foil is a good conductor which means the insulation can allow heat to pass through. So in this case, the more foil used the faster the temperature will increase.

# Reflection

In conclusion, The more layers creates more heat and less layers of aluminum foil is needed to keep water cool and there is no difference in the temperatures.

According to my research, next time I would use different types of wraps for insulation and see if there is a difference.

# Citations

Source-

<https://www.quora.com/How-does-a-foil-keep-lit-cold-for-up-to-4-hours>

Source-

<https://huntingwaterfalls.com/is-aluminium-foil-a-good-insulator/>