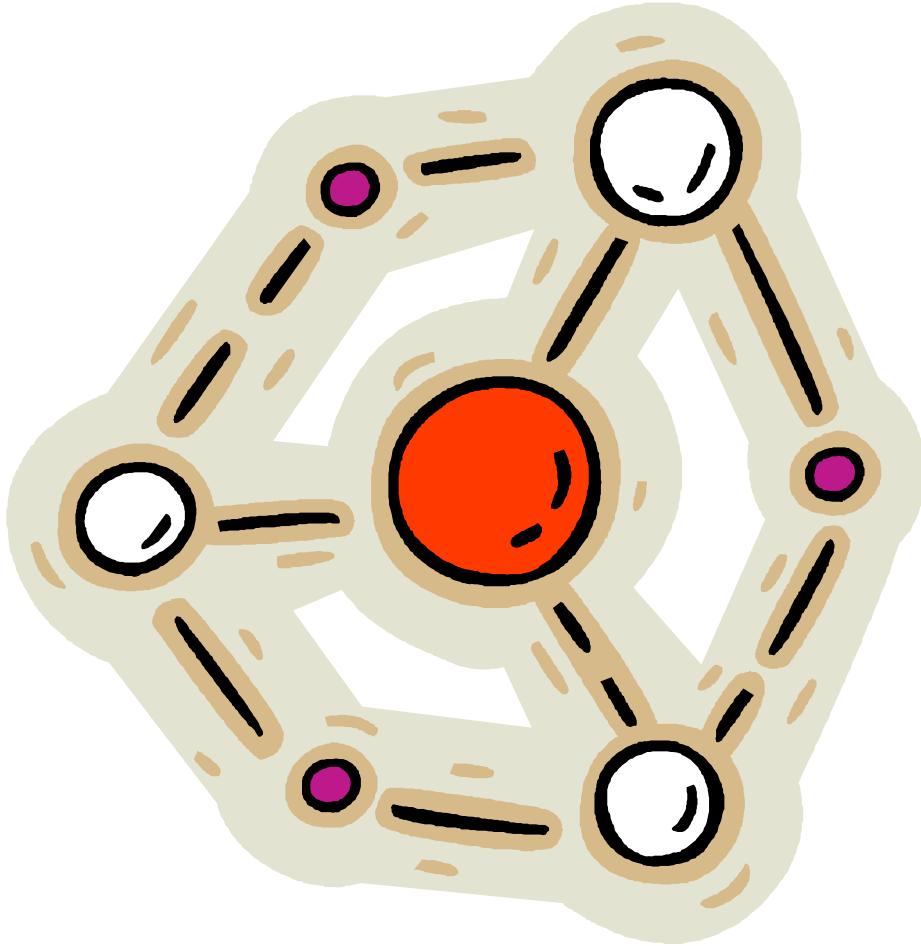


Keeping Things Warm



By Luke Warren 11a

Aim

To find out which material is the most useful for keeping in heat.

Introduction

I am planning to do an experiment to find out which materials will act as insulators the best. I will use 5 of the same beakers with the same volume of water, the water to all be at the exact same temperature. The materials I am planning on using are Bubble Wrap, Cotton Wool, Tin Foil, Tissue and a lid. These will either be placed around the beaker or placed on top to try to prevent the heat escaping. To measure the temperature loss I will use a thermometer which I will take a reading every 30 seconds.

Prediction

I predict that the thicker the material the slower it will release the heat. Also when I change the materials the water will either loose heat slower or quicker.

Plan:

I plan to do an experiment to find out the speed of heat loss with different materials which can act as a barrier to stop the heat escaping.

Apparatus

5 beakers

Water

Bubble wrap

Cotton Wool

Tin Foil

Polystyrene Lid

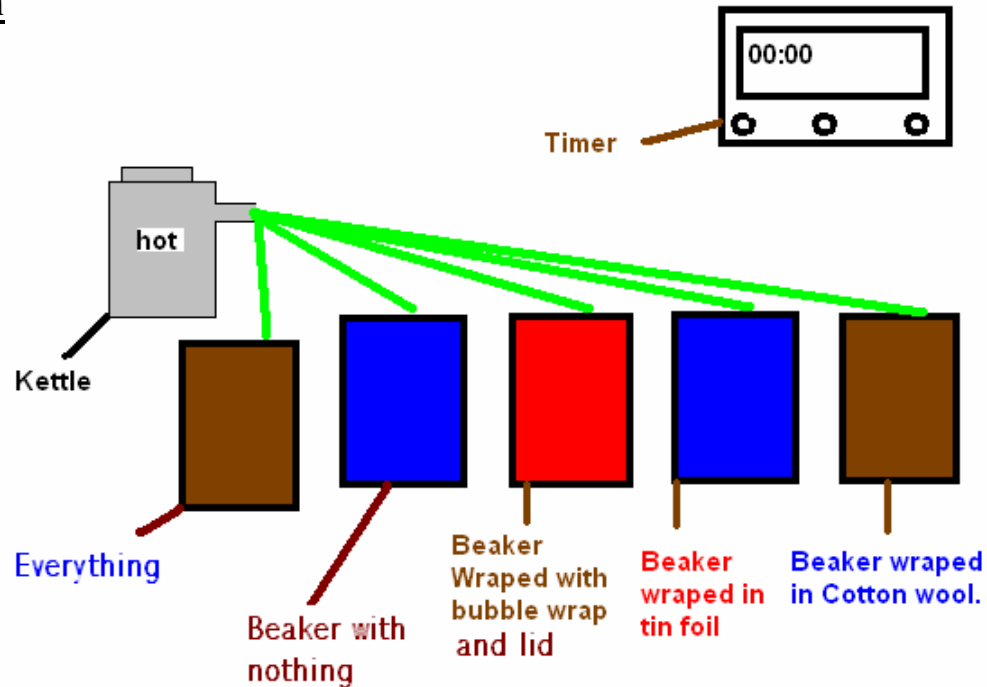
Kettle

Thermometer

Stop Clock

Measuring Cylinder

Diagram



Method

1. I will set up the apparatus as shown above in the diagram.
2. Boil Water
3. Put the 5 different materials round and on top of the 5 beakers.
4. Fill the beakers; put exactly the same amount of water in.
5. Take the temperature every 30 seconds and record.

The measurements I will take are the temperature of the beakers after each 30 seconds. I will take 10 readings. The first measurement I will take is the beaker wrapped in bubble wrap. The last measurement I will take is the beaker wrapped in cotton wool. To make my results more accurate I may consult a fellow pupil and compare our results to his/hers. This may make my experiment more correct as everyone will be doing the same experiment so everyone should have the same results of near the same results.

Safety

At all times wear goggles
Be Careful with the hot water.

Fair Test

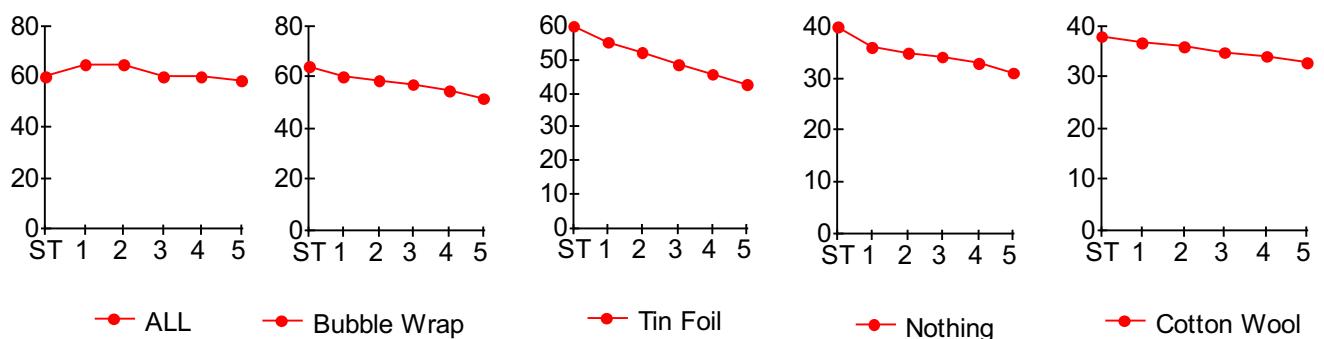
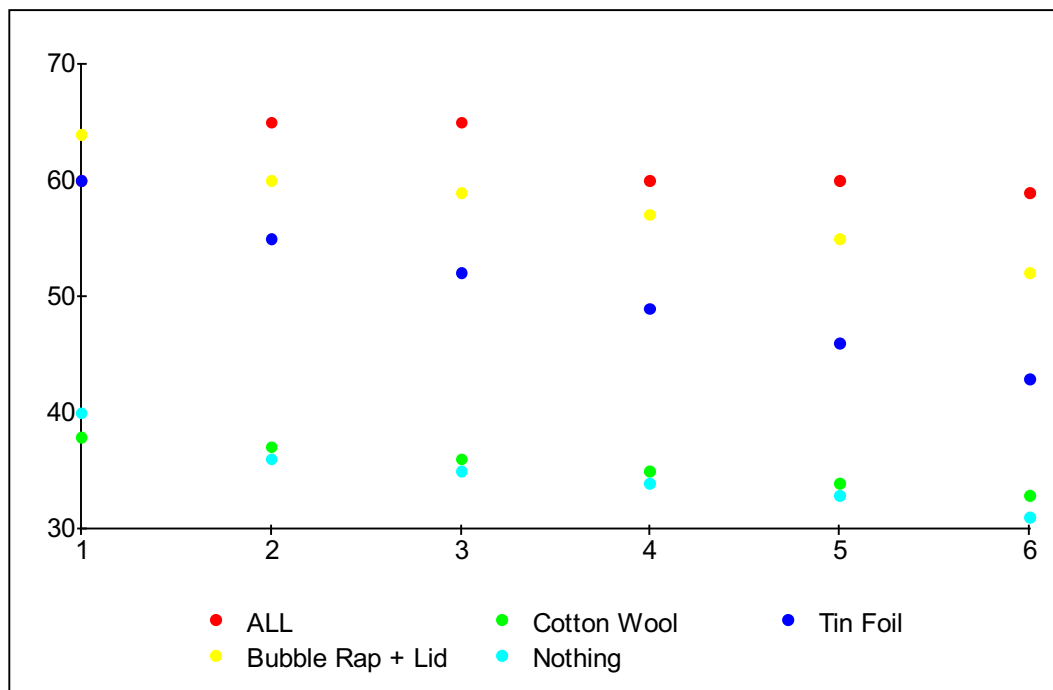
I plan to make this experiment a fair test by making sure I boil to water to the same temperature also to take a reading off the thermometer at exactly 30 seconds. Another thing I will defiantly have to consider to making this experiment fair is to put the exact same amount of boiled water into each beaker.

Results

Table of results:

	<u>ALL</u>	<u>Cotton Wool</u>	<u>Tin Foil</u>	<u>Bubble Rap + Lid</u>	<u>Nothing</u>
<u>START</u>	60	38	60	64	40
<u>1 Min</u>	65	37	55	60	36
<u>2 Min</u>	65	36	52	59	35
<u>3 Min</u>	60	35	49	57	34
<u>4 Min</u>	60	34	46	55	33
<u>5 Min</u>	59	33	43	52	31

Graph



Conclusion

By doing this experiment I have found that the copper beaker with everything on it conserved the heat the best, this may be because there was material around the area of the beaker to act as a barrier to trap and keep the heat in. Although this done the best it still didn't keep 100% of the heat in, it did slowly allow heat to escape. Bubble Wrap also kept the heat in rather efficiently, allowing heat out slowly, like the beaker with everything on. Tin Foil started to do very well allowing very little heat out, then heat started rapidly coming out of the beaker, this may be because the tin foil may have had a point where it had enough and no longer had the strength to keep it in. The beaker with cotton wool let a lot of heat out in the first few minutes but then the heat came out a lot slower after the first few minutes. The beaker with nothing on it unsurprisingly did the worst letting as much heat escape as possible, there was still a little bit of heat in the beaker but this was due to copper being one of the best insulators around so some heat will be kept in. This applies to all of the beakers. Overall the beaker with everything on it did the best, I think this is because that there was so much covering the beaker from top to bottom, side to side that the heat couldn't work its way out through the barriers everything was creating.

Evaluation

Overall I have found that the more "padding" which acts as a barrier the slower the heat is released. Also there are many different materials that could be used as a barrier some maybe 1cm thick and other maybe 1m thick, I found out that this doesn't matter and sometimes doesn't affect the process of heat loss.