

Investigating Heat Loss in Animals.

Aim: My aim is to, investigate how the body size of an animal affects the rate of heat loss.

Prediction: I predict that as the smaller the animal/tube the longer it will take for the heat to be lost. This is because there is a larger SURFACE AREA; therefore it will have a smaller VOLUME and thus take longer for the heat to escape.

Plan: I am going to be using four test tubes, which represent four animals. All of the test tubes will be different sizes to show the different size in animals. I will heat water to 37° as this is the normal temperature of a body and I will place the water in each test tube, I will be taking temperature readings every minute for ten minutes.

Apparatus:

- ◆ Four tubes - Boiling tube
 - Test tube
 - Centrifuge tube
 - Ignition tube

- ◆ Stop Watch
- ◆ Thermometers
- ◆ Test Tube Rack
- ◆ Beaker
- ◆ Bunsen Burner
- ◆ Tripod
- ◆ Heat Proof Mat

Method:

- 1) Collect equipment and put safety goggles on.
- 2) Heat the water and place in the test tubes with a thermometer.
- 3) Using the stopwatch, record the temperature every minute. Repeat for each tube.
- 4) Repeat this experiment to ensure fair results.

Results:

The volume and the surface area affect the results so I have measured to find the difference.

	Surface Area	Volume
Boiling tube	116	48
Test tube	62	19
Centrifuge tube	41	12
Ignition tube	20	4

Boiling Tube:

Time (min)	Temp (°C) 1	Temp (°C) 2
0	37	37
1	37	36
2	36	36
3	35	35
4	34	34
5	34	34
6	34	32
7	33	32
8	32	32
9	31	31
10	31	31

Test tube:

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Time (min)	Temp (°C) 1	Temp (°C) 2
0	37	37
1	36	36
2	34	34
3	31	33
4	31	31
5	30	30
6	28	30
7	28	30
8	28	29
9	27	29
10	27	29

Centrifuge tube:

Time (min)	Temp (°C) 1	Temp (°C) 2
0	37	37
1	36	34
2	35	33
3	32	32
4	31	31
5	31	31
6	31	29
7	29	29
8	29	28
9	28	28
10	26	28

Ignition tube:

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Time (min)	Temp (°C) 1	Temp (°C) 2
0	37	37
1	34	34
2	32	30
3	31	29
4	29	29
5	29	27
6	28	26
7	28	26
8	26	26
9	26	25
10	25	25

Average Results:

Time (minutes)	Boiling tube	Test tube	Centrifuge tube	Ignition tube
0	37	37	37	37
1	36.5	36	35	34
2	36	34	34	31
3	35	32	32	30
4	34	31	31	29
5	34	30	31	28
6	33	29	30	27
7	32	29	29	27
8	32	29	28	26
9	31	28	28	26
10	31	28	27	25

Analysis:

The graphs show that the time decreased for the tubes with the smaller surface area. The results also show that the smaller the surface area the LONGER it takes for the heat to escape as there is a smaller VOLUME.

So the larger the animal the FASTER it will lose heat . This is because of the larger area for the heat to escape from. Even though small animals are likely to lose heat much more quicker, they wont because they have a small surface area and volume compared to the larger animal.

Evaluation:

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Overall I came up with the results I expected to come up with, but this investigation could be improved by:

Repeating it over and over to get ACCURATE results,

Using different sizes of tubes,

By investigating other factors that affect heat loss.

I tried to keep the investigation a fair test but, I had to round the measurements up to the nearest mm or cm, the temperature readings have been read to the nearest integer; therefore not accurate.

My graph shows proves my prediction as the VOLUME decreases the time taken for the heat to be lost does as well decrease.

Again I could have done this investigatio several times to get morea ccurate results to find out WHAT affects the actual HEAT LOSS and I could also investigate different factors.