**HOW DOES SWEATING COOL US DOWN?**

**AIM:** To investigate how sweating cools down the body . **Skill: MM**

**APPARATUS and MATERIALS:**

* Hot water
* Tap water
* Scale balance
* Cotton wool or tissue paper
* Tape
* 2 Bungs with thermometers
* 2 conical flasks
* Measuring cylinder
* Stopclock
* Labels

**DIAGRAM:**



Drawing showing set up of apparatus - control

b) Drawing showing set up of apparatus - sweating

**METHOD:**

1. The outside of two conical flasks were covered with dry tissue paper held with tape.
2. 200cm3 of hot water was measured with a measuring cylinder and carefully placed in each conical flask.
3. The bung with thermometer was attached to each flask. When the **temperature of both had fallen to 60oC**, the time was taken as 0 minutes.
4. One flask was thoroughly moistened with tap water and the other left dry
5. The **temperature of the water in each flask** was recorded in the table every minute for 10 mintues.
6. A cooling curve for each flask was plotted.

**RESULTS:**

Table showing cooling of dry and moist covered conical flasks over 10 minutes

|  |  |
| --- | --- |
| **Time (mins)** | **Temperature of** |
| **Dry flask (0C)** | **Moist flask (0C)** |
| **0** | 60 | 60 |
| **1** |  |  |
| **2** |  |  |
| **3** |  |  |
| **4** |  |  |
| **5** |  |  |
| **6** |  |  |
| **7** |  |  |
| **8** |  |  |
| **9** |  |  |
| **10** |  |  |
|  |  |  |

Title of graph: Graph showing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Scale: X axis: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Y axis:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**DISCUSSION:**

In this experiment, the conical flasks of hot water represents (models) our \_\_\_\_\_\_\_\_\_\_\_. The moist tissue paper represents\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. When sweat evaporates, it takes some of the body heat with it.

The manipulated variable was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The responding variable was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The following were kept constant \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

*Other key ideas to explain your results:*

* The air in dry tissue paper cannot move
* Wetting the tissue paper removes the air
* Water is a much better conductor of heat than air
* The hot water in the flask touches the glass, which touches the tissue paper
* Particles that are touching can transfer heat by conduction
* Particles need to move to transfer heat by convection

**CONCLUSION:** *How does sweating cool us down? How did you know.*

According to the results of the experiment, sweating cools down the body by \_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**MARKSCHEME – MANIPULATION AND MEASUREMENT (MM)**

|  |  |
| --- | --- |
| **Criteria** | **Marks** |
| **Use of thermometer** |  |
| 1 | Immersion of bulb completely in liquid | 1 |
| 2 | Stirring liquid to ensure even distribution of heat | - |
| 3 | Lack of contact of bulb with container | 1 |
| 4 | Immersion time adequate for equilibrium | 1 |
| 5 | Reading taken while bulb is immersed | - |
| 6 | Reading taken at eye level | 1 |
| 7 | Careful handling and temporary storage to prevent breakage | 1 |
| 8 | Accurate interpretation of scale | 1 |
| **Use of measuring cylinder** |  |
| 9 | Cylinder is placed on a flat, horizontal surface  | 1 |
| 10 | Readings are taken at eye level  | 1 |
| 11 | All liquid is completely poured out of the cylinder  | 1 |
| 12 | The cylinder is washed after use and allowed to drain | 1 |
| TOTAL | 10 |