



# STEM clubs

co-ordinated by merseySTEM

## CHOCOLATE TESTING

### Focus: Chemistry

'Polymorphism' is the ability of a structure to take on many different crystalline forms, i.e. the atoms are the same but they are arranged differently. Chocolate contains cocoa butter, which is a fat, and can come in at least six different crystalline forms. When chocolate is melted and re-hardened it sets into a different structure, which gives it a different taste, texture and melting point. It's a bit like using the same Lego bricks to build different structures; some are stronger, and some look better.



**To investigate the different properties of different chocolate samples.**

#### Equipment:

- 2 identical bars of chocolate (e.g. the thin Dairy Milk bars).
- kettle
- boiling tube
- 250cm<sup>3</sup> beaker
- timer
- thermometer
- results table
- graph paper
- pencil
- ruler

#### Instructions:

Prior to the club, melt one chocolate bar (in its wrapper) on a windowsill or on a radiator etc. then place in a fridge. Once solidified, return to room temperature.

##### Taste Tests

Note any differences in the taste, texture & 'snap' of the chocolate that has been melted / re-hardened and the one that has not. (N.B. Do this outside of a lab for H&S purposes).

##### Melting Point Tests

Wear eye protection; 50°C water will cause burns. Repeat the stages below for each chocolate bar.

- Put some hot water (at no more than 50°C) into the beaker.
- Place enough chocolate to cover the bulb of a thermometer when melted, into a boiling tube & take its temperature.
- Put the boiling tube into the beaker and start the timer.
- Stir continuously with the thermometer. Every 20 seconds for five minutes, use a results table to record the temperature of the chocolate. Note any other changes.

##### Recording Your Data

Draw a graph to show your results. Use the horizontal axis, to show the number of seconds & the vertical axis to show the temperature of the chocolate. Indicate the melting point of the sample.

#### Discuss:

1. Can you describe any differences in taste and texture between the two samples?
2. Do you think the samples had the same structure? Why?



Tweet or email your conclusions or your findings to:

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