

What Melts First?

Aim: To investigate which three liquids including sprite, milk and water melts first.

Hypothesis: The water cube will melt first as it is the least dense of the three solids giving less products with in the cube to melt.

Apparatus:

You will need:

- 2cm x 2cm frozen cubes of full cream milk
- 2cm x 2cm frozen cubes of water
- 2cm x 2cm frozen cubes of sprite
- Stopwatch
- Freezer (-5 degrees celsius)

Method:

1. Gather necessary materials mentioned in apparatus.
2. Place each frozen cube on the same bench 10cm away from each other making sure that they do not effect each other with the liquids that are created from the frozen cubes. Also making sure you keep the test fair by keeping the temperature of the cubes the same, the same amount of time out of the freezer, are on the same surface and also that they came from the same ice cube tray as each other.
3. Begin stopwatch and stay at the bench observing the cubes.
4. Record results, times and observations that occurred in the duration of the experiment.
5. Repeat experiment 100 times to ensure maximum accuracy for results.

In an investigation such as this, it is better to formulate a clear statement describing the purpose addressed by the investigation rather than an aim.



Risk Assessment:

| Risk | Prevention |
|--------------------------|---|
| Stepping on frozen cubes | Wearing shoes to protect the sole of the foot will prevent any injury if cube are stepped on. |
| Frost Bite | Do not hold cubes, only put them straight from the tray to the bench. Touch them as little as you have to to minimise the risk of ice burns. |
| Wet surfaces | Handling all liquids over a sink and cleaning up with an exorbitant cloth will minimise the amount of liquid around reducing the risk of slipping. |
| Electricity Sparks | To minimise liquid from getting to electronics which can cause some sparks, keep camera, stopwatch and any other type of electronics away from the liquid created from the cubes. |

Identifies some appropriate risk assessment and prevention methods.

Results:

| Liquid | Time | Melted First |
|--------|-----------------------------|--------------|
| Sprite | 41 minutes 38 seconds | Sprite |
| Water | 56 minutes 43 seconds | |
| Milk | 1 hour 5 minutes 28 seconds | |

| Liquid | Time | Melted First |
|--------|-----------------------------|--------------|
| Sprite | 45 minutes 54 seconds | Water |
| Water | 42 minutes 31 seconds | |
| Milk | 1 hour 2 minutes 37 seconds | |

| Liquid | Time | Melted First |
|--------|-----------------------------|--------------|
| Sprite | 38 minutes 02 seconds | Sprite |
| Water | 48 minutes 56 seconds | |
| Milk | 1 hour 6 minutes 51 seconds | |

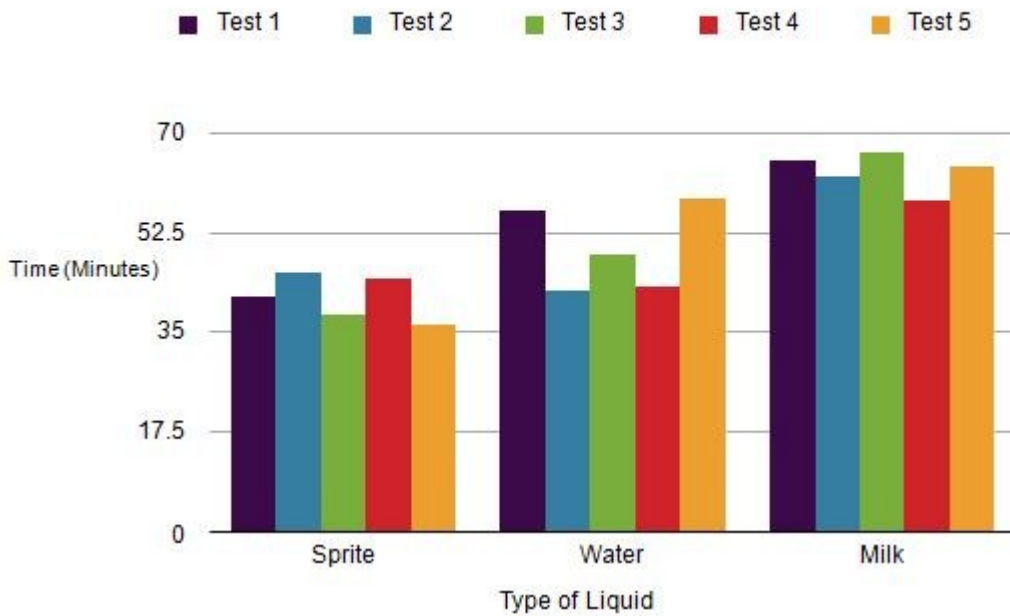
| Liquid | Time | Melted First |
|--------|-----------------------|--------------|
| Sprite | 44 minutes 45 seconds | Water |
| Water | 43 minutes 22 seconds | |
| Milk | 58 minutes 34 seconds | |

| Liquid | Time | Melted First |
|--------|-----------------------------|--------------|
| Sprite | 36 minutes 32 seconds | Sprite |
| Water | 58 minutes 46 seconds | |
| Milk | 1 hour 4 minutes 26 seconds | |

Consolidation of data into a single table and calculation of the average for each solid would have enhanced the report.

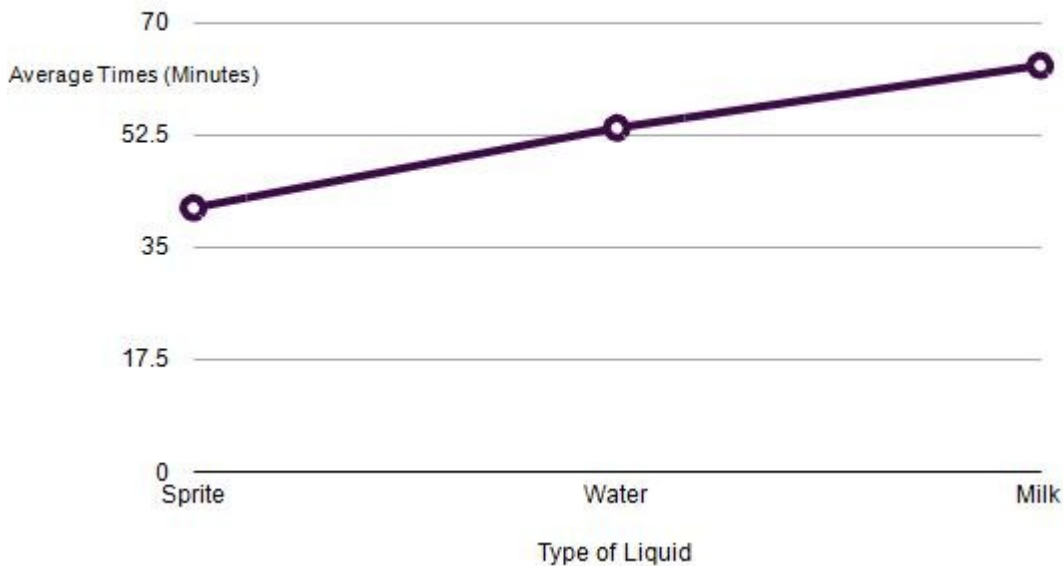
Some evidence that the procedure was repeated would help to validate the results.

What Melts First?



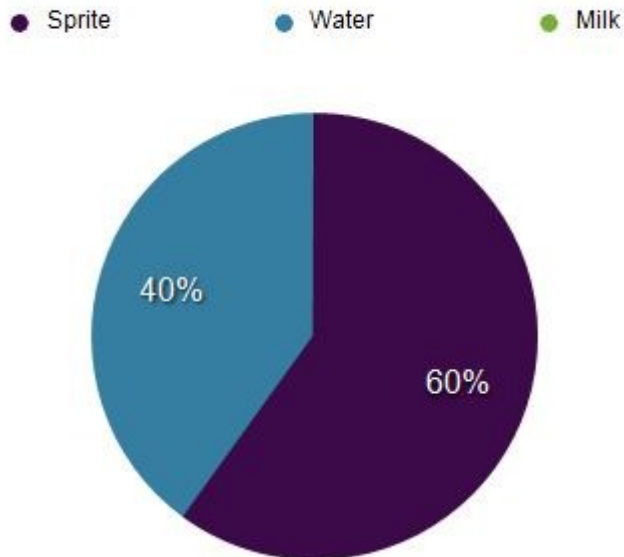
This is the most appropriate graph for this data because it separates the tests and demonstrates the trends/differences between the three liquids.

Average Time For Cube To Melt



Line graphs are used for continuous data, not discrete data as collected in this investigation.

What Melted The First The Most Amount of Times



Sector graphs are used for displaying fractions of an entity which is not the type of data collected in this investigation.

Discussion:

In this experiment my hypothesis (The water cube will melt first as it is the least dense of the three solids giving less products with in the cube to melt) was correct but only in two of the experiments. This could have been because maybe because there was a slight amount of liquid left from the previous experiments which could have altered the results. The end result was mixed but in majority of the test Sprite melted first. When Sprite was taken out of the freezer it seemed to have the most air bubbles within the cube which could have let more air in it allowing it to melt faster.

Water is a compound made of two hydrogen and one oxygen atom physically join together to create a liquid. Sprite has may contents such as carbonated water, sugar and lemon and lime flavors, being a mixture of compounds I believed that this would take the longest to melt.

To improve the experiment I could have held the experiment in a room where there would have been a more constant temperature. This would have allowed for more steady melting times and may have changed results. I did not have and troubles or interruptions through out the experiments.

This is an appropriate way to improve the investigation because it is identifying another variable.

In the research part of the experiment I discovered the reason water freezes or and liquid, is that the energy from the water leaves, so the molecules slow to the state of eventually where molecules don't move at all. When the molecules don't move at all it forms a solid (ice). This is how all of the frozen cubes were made for the sprite, milk and water.

Conclusion:

This experiment was a complete successes as my hypothesis was proven correct and I did not have any problems. I believe I could have improved the experiment but I did not have any funds or facilities to power the experiment. I did achieve the aim of the experiment and discovered results. It has been clear that the results have not only been directed at one type of liquid but two. The water melted twice in the results but the Sprite still did melt the fastest majority of the times.

Bibliography:

Yahoo Answers. Category Science - Help with a science lab report conclusion. 2008 -
answers.yahoo.com/question/index?qid=20081013174956AAg7tni

Ask A Scientist, General Science Archive - Why Does Water Freeze?
www.newton.dep.anl.gov/askasci/gen01/gen01359.htm

A conclusion should be a clear statement that reflects the purpose of the investigation based on the evidence collected and demonstrated by the data.

Grade Commentary

Casey has demonstrated a sound understanding of the processes and skills required to plan and conduct a scientific investigation. There is evidence that Casey has adequately gathered and recorded quantitative data in an appropriate format and has made some attempt to reach a conclusion based on the results. However, to be awarded a higher grade Casey needs to link the results to background research and use an appropriate graph to demonstrate trends in the data. This work sample demonstrates characteristics of work typically produced by a student performing at grade C standard.