Boom Nganthavee

**GENERAL LAYOUT FOR AN EXPERIMENTAL DESIGN DIAGRAM**

**TITLE**The Effect of electromagnetic waves on chocolate

**HYPOTHESIS**If Electromagnetic waves can travel through the vacuum of interstellar space, then their energy can be efficiently absorbed by molecules commonly found in food because waves with high frequency have short wavelengths.

**INDEPENDENT VARIABLE**light

**LEVELS OF INDEPENDENT VARIABLE AND NUMBERS OF REPEATED TRIALS**

|  |  |  |  |
| --- | --- | --- | --- |
|  Control Group | Variable 2 | Variable 3 | Variable 4 |
| Microwave oven  | Dark Chocolate  | Milk chocolate  | White chocolate |

**DEPENDENT VARIABLE AND HOW MEASURED**

**Speed of light (electromagnetic waves)**

**CONSTANTS/CONTROLS (Number of constants depends on experiment)**

 1. 3 chocolate

 2. Wavelength

 3. Ruler

 4. Calculator

**MATERIAL**

1. Microwave
2. Ruler
3. Plate
4. Chocolate
5. Calculator

**PROCEDURE:**

1. Find frequency on the back of the microwave (units used are MHz or megahertz)
2. Prepare plate to be put into microwave (put the three bars of chocolate onto plate)

3. Take out rotating tray in the microwave

1. Place plate with chocolate into the microwave
2. Put microwave on low heat and heat the chocolate for 25 seconds
3. Take plate out of microwave and make sure chocolate is slightly melted
4. Check to see if there is melted spots on the chocolate bars
5. Use a ruler and measure the distance between the melted spots on the chocolate bars (measure in centimetres)
6. The amount of centimetres found is half of the wavelength (double the centimetres found to find full wavelength)
7. To find speed of light convert the megahertz or MHz(frequency) to hertz and multiply the hertz by the full wavelength(centimetres)
8. Answer is in cm/s (centimetres per second)

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**OBSERVATIONS:**

 During I do this experiment. Two chocolate that different flavour but same brand used a Swiss classic flavour White and Crunchy . During do both chocolate. I put this two chocolate into a microwave and take out a tray. And put in 30 minutes by low heat. But first it does not melt. And do another 30 minutes and waited it until it melt

 **RESULTS:**

The result is distance between a chocolate is 9cm and I double it will get wavelength of the waves emitted by the microwave is 18 cm.And plug the frequency and the wavelength into the formula is 2,450,000,000Hz x 18 cm =44,100,000,000 cm/s or 441 million per second

**CONCLUSION/DISCUSSION:**

 My hypothesis was correct. This experiment investigated that you don't need to be a scientist but you be able to find a speed of light. You can find a speed of light with food from your fridge. This experiment help me to find a speed of light. The result showed that what is a speed of light that can measure with microwave that is similar with a speed of light. To extend this experiment. In this experiment I have done a measure speed of light with a microwave. It easy to find a speed of light.In this experiment it have a problem that when I need to melt chocolates. It is not melt I try to out another thirty minutes and it melted. The result show that measure the distance between them in centimetres that's half the wavelength of the microwave that the oven produces double the distance and you will have the wavelength of the emitted by the microwave. This proved that the hypothesis that if the distance between two chocolate than we will get a wavelength of the emitted by the microwave plug the frequency and wavelength into the formula and calculated this number should be pretty close the speed of light. This project can be used in the real world because in the real life. This is very incredible experience. If you want to know the speed of light but you don't have a specific calculation. You will be able to find the amount by use a microwave to find it. Questions about the experiment. While I try to do measure a speed of light by microwave I want to know that the wavelength that I get will same as the speed of light?. Finally, if the experiment was repeated, some changes to improve the experimental design could be improved if the distance more clearly between two chocolate that I used it in this experiment

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