

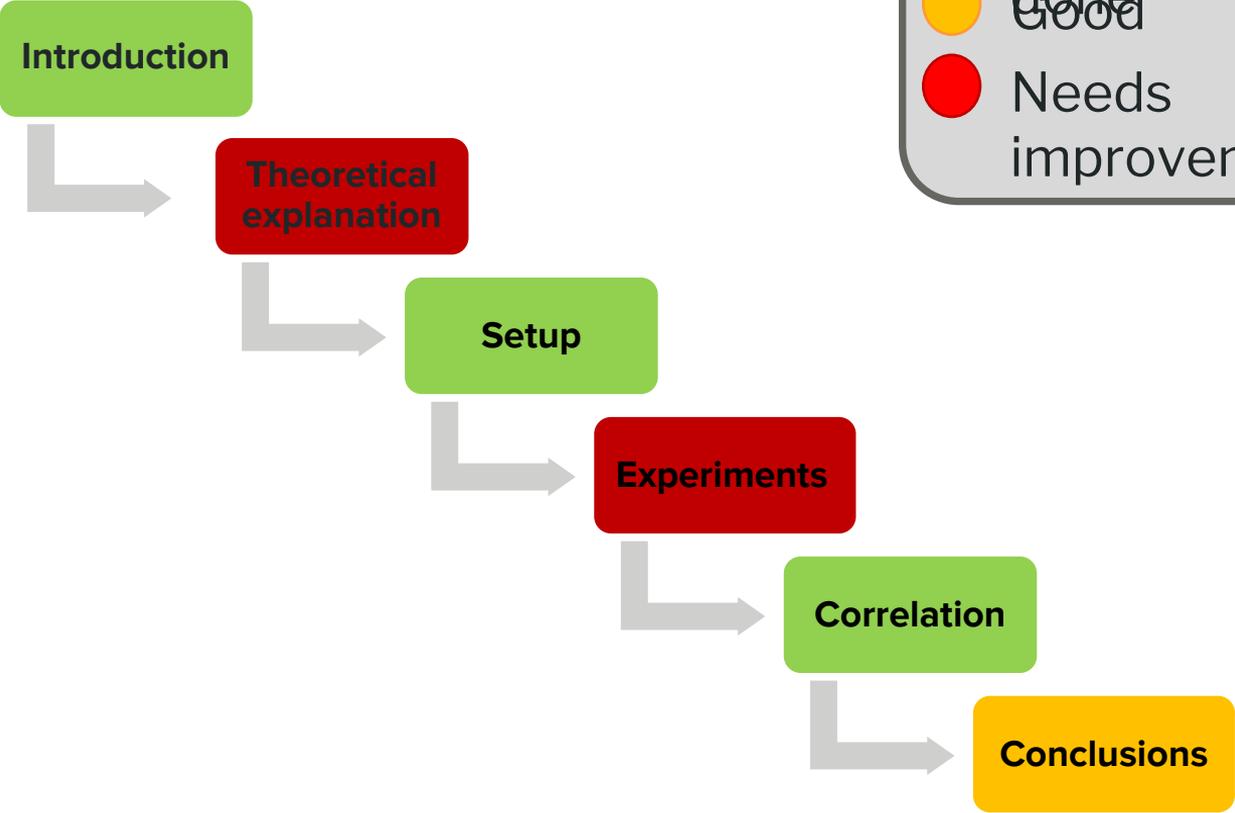
1.Chocolate and the speed of light

Reporter: Team Romania Starry Night
Opponent: Team Romania Starry Night

Problem's task

A ***visual method*** to measure the ***speed of light*** is to place a chocolate bar in a microwave oven until chocolate starts to melt and measure the ***distance*** between ***hotspots***. Study this effect and investigate the ***accuracy*** of the method.

Problem's task



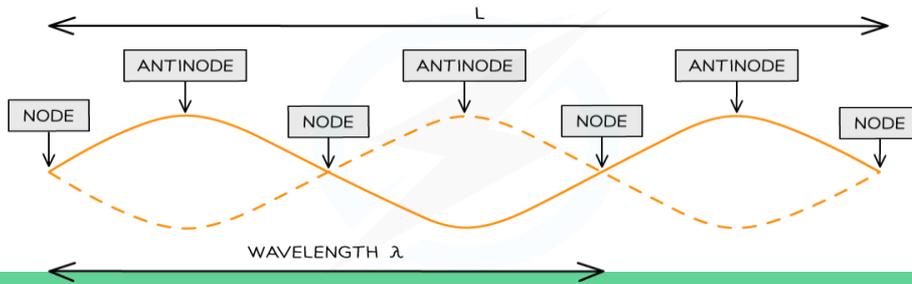
Legend:

- Well done (Green circle)
- Good (Yellow circle)
- Needs improvement (Red circle)

Theoretical Part

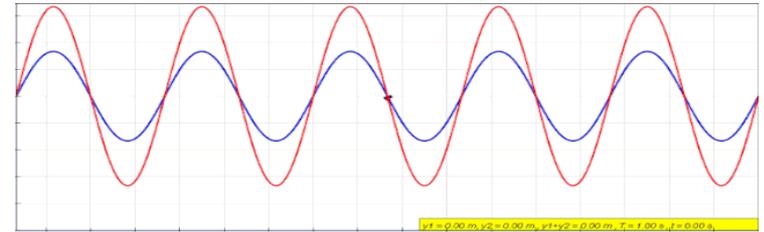
Strong points

- Good explanation of the physics formulas
- Good definition of terms (eg. crystallization)
- Well chosen relevant parameters



Weak points

- Did not explain how microwaves cook food
- Did not explain how the hot spots form
- Did not mention standing waves, and how they form
- Did not mention Nodes and Antinodes
- Did not illustrate the effect



Experimental Part

Strong points

- Used a thermal camera
- Great accuracy
- Varying the chocolate
- Illustrated the results

Weak points

- Low number of experiments(10)
- Did not mention how many experiments are required for an accurate result
- Did not vary the time
- Did not accurately measure hotspots

Discussion topics

- Antinodes form hotspots
- The microwaves cooks food using water molecules.
- Did you perform experiments one right after another? Microwave could be heated from previous trials.
- How could you measure the hotspots more precisely?
- Do you think it's possible to also vary the frequency of the microwave (hypothetically)? Idea of building your own microwave

Thank you for your attention!

Clarifying questions:

- Daca nu explica deloc standing waves - Why is the antinode fixed? Fixed nodes exist only for standing waves
- Why do microwaves cook food? The electric field oscillates continuously, keeping the water molecules oscillating and causing friction between them, and thus heating the food.
- Position of chocolate in the microwave - does it matter or not? NOT matter
- Different forms of chocolate (variables such as size, the type of the chocolate and its weight) - do they matter? Heating points of different types of chocolate may vary, requiring different exposure times, but producing in the end the same result (same wave)