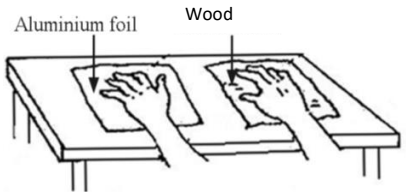
student worksheet

Activity: Observing ice liquefying in plates of different materials

Warm Up Exercise

Whenever we touch objects, we receive feelings of warmth or cold. This depends partially on what the objects are made from. Consider the different feelings we have when walking barefoot upon a woollen carpet or upon a marble floor. In the same way, when we touch a metal object, we have a feeling of cold quite different from the feeling of touching a piece of wood.



1. Can you explain why this happens?

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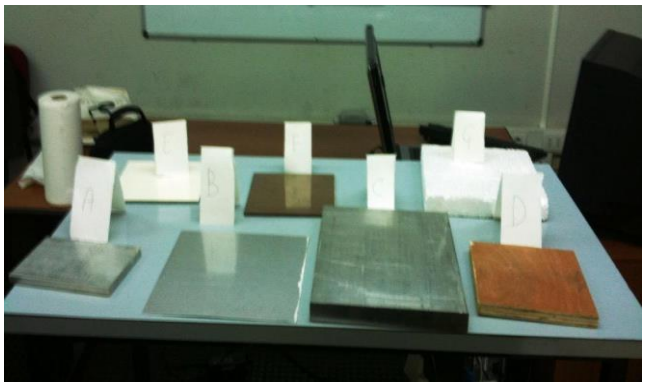
_____
_____
_____

Experiment

Introduction: In this activity, you will visualise heat transfer by conduction. On the desk we see seven different plates. Each plate is identified by a letter (from A to G). The first three plates (A, B and C) are of aluminium and differ in area and thickness. D is a wooden plate, E is Plexiglas, F is marble, and G is Styrofoam.

The setup should look something like this:



1. Touch the plates and describe the thermal feelings you receive.

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_____
_____
_____

2. What is a temperature gradient?

_____
_____
_____

Now your teacher will place an identical ice cube on each plate. Before observing what happens, try to predict the melting order of ice cubes, starting with the quickest one.

1. In the following table, make a note of the order in which the ice cubes melt (1st, 2nd 3rd etc…)

A	B	C	D	E	F	G

Conclusion:

1. Describe what you have observed and make a comparison with your predictions?

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_____
_____
_____
_____
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_____

Discussion Questions

1. Why do the ice cubes melt when they are placed on the plates?

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_____
_____

2. Which properties of the plates do you think may affect the melting rates of the ice cubes?

_____
_____
_____

3. Do you think that the melting rates may depend on the initial temperature of the plates?

_____
_____
_____

4. Which plate is, in your opinion, the best insulator and which is the best conductor

_____
_____
_____

5. Is the heat absorbed by each ice cube the same for all the cubes?

_____
_____
_____

3. Which materials make the best containers to transport ice-cream from the supermarket to your home? Why?

_____
_____
_____
_____

4. If you were building a window frame what material would you use? Why?

_____
_____
_____