

## D1.2 WORKSHEET B: INSULATION MATERIALS

1. 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.

A) CAN YOU EXPLAIN WHY THIS HAPPENS?

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B) DESCRIBE AN EXPERIMENT THAT WOULD DEMONSTRATE YOUR ANSWER.

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2. If we want to prevent ice cream or deep-frozen food from melting during the time taken to cover the distance between the shop and home, we have to use special containers that provide thermal insulation.

A) WHICH MATERIAL MAKES THE CONTAINER A GOOD INSULATOR?

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B) IS IT BETTER TO USE METAL, GLASS, OR PLASTIC?

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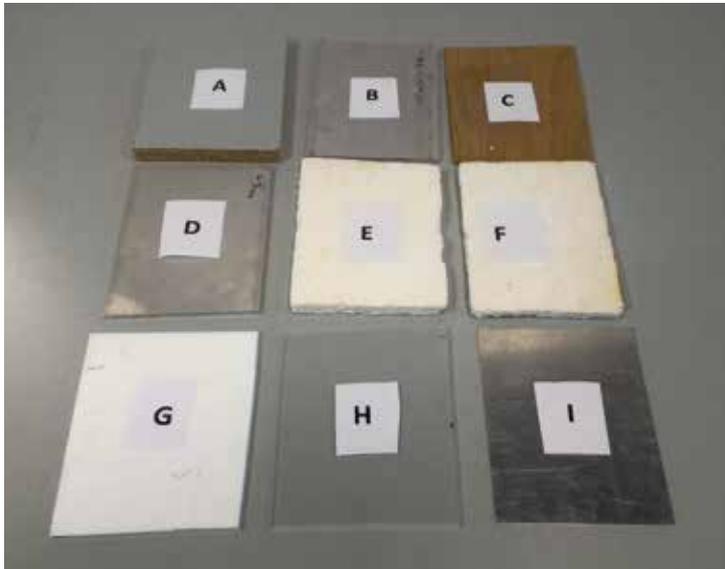
# STRAND D

## PROBLEM SOLVING IN THE REAL WORLD

### D1: RETAINING HEAT ENERGY



Use this simple experiment to provide an answer to these questions.



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

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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.

In the following table, make a note of the order in which the ice cubes melt. The first plate with a melted cube will be labelled '1', and the last one will be labelled '7'.

| A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|
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**Describe** what you have observed and make a comparison with your predictions.

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## D1.2 DISCUSSION POINTS: ICE CUBES

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?

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

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

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

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