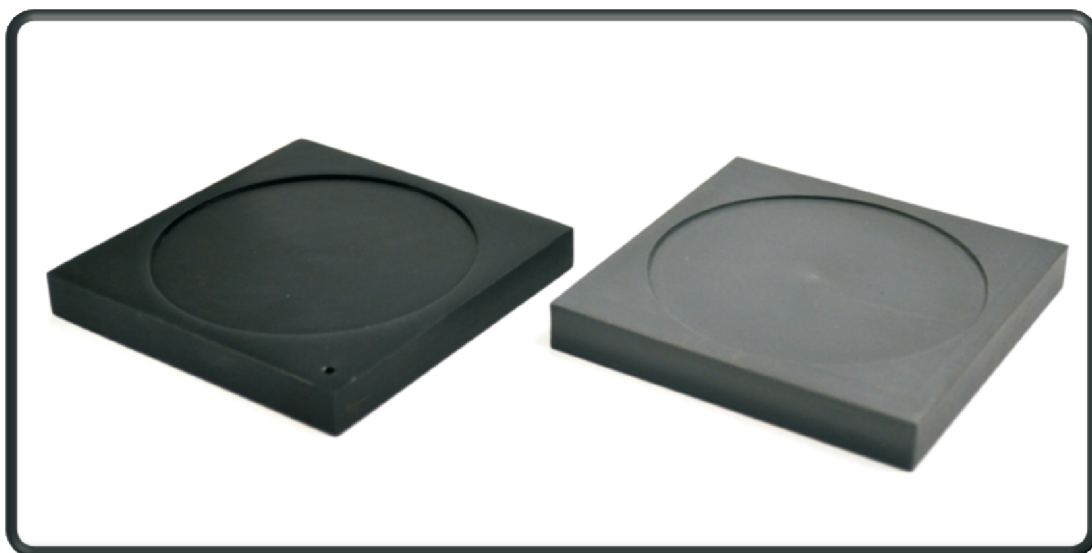




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ICE MELTING PLATES

CAT NO. PH1120149



Instruction Manual

INTRODUCTION

This elegantly simple kit challenges student's preconceived notions on concepts of heat and thermodynamics. The melting plates display quizzical properties when an ice cube melts on each plate. The aluminum plate that is cold to the touch melts the ice faster than the plastic plate, even though both have equivalent temperatures. A great demonstration for conductivity and heat transfer.

KIT CONTENTS

9x9cm Aluminum Plate

9x9cm Plastic Foam Plate

GENERAL BACKGROUND

The two identically shaped plates included in the kit are made of two different materials. One is constructed out of aluminum, while the other is made of a plastic foam. The two materials have different properties of heat conduction, the rate at which heat flows through an object, depending on the thermal conductivity of the material. Aluminum is an example of a very good conductor, heat readily flows through it, while the plastic foam is a very poor thermal conductor, so heat does not quickly flow through the plastic plate.

If we place an ice cube on each plate, the rate at which it melts is a property of the thermal conduction of the plate it is on (air is an extremely poor conductor due to its low mass, so it is the plates which are mostly responsible for the rate at which the ice melts). Heat energy flows more readily through the aluminum plate than the plastic foam plate, and thus the aluminum plate is able to melt the ice cube more rapidly.

The two plates display the curious nature that the plate which is colder to the touch is the plate which heats the ice faster. Even though the two plates are both at room temperature, when handled, the aluminum plate will feel colder than the plastic foam plate. This is due to its thermal conductivity properties.

As mentioned, heat readily flows through the aluminum plate, and so when held in one's hand, it will feel cool to the touch as body heat from the hand transfers away from the hand and into the aluminum plate. The plastic foam is closer to a thermal insulator, and though it will not feel warm, it will appear to have a higher temperature than the aluminum plate.

PROCEDURE

1. Holding one of each of the plates in each hand, compare how hot or cold each plate is. Make note of which plate 'feels' warmer, even though they both have the same temperature (room temperature). If performing the experiment as a demonstration, pass the plates around the room so each student has a chance to interact with the plates.
2. Make a prediction of which block will melt an identical ice cube faster. Explain why you think this will be the case.
3. Place an ice cube simultaneously on each plate. Watch as the ice cubes melt at different rates. Make note of which plate melts the ice cube faster.
4. Was your prediction correct? If it was not correct, why did the plates behave in a contrary manner to what you initially expected?

Manufactured by :



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