

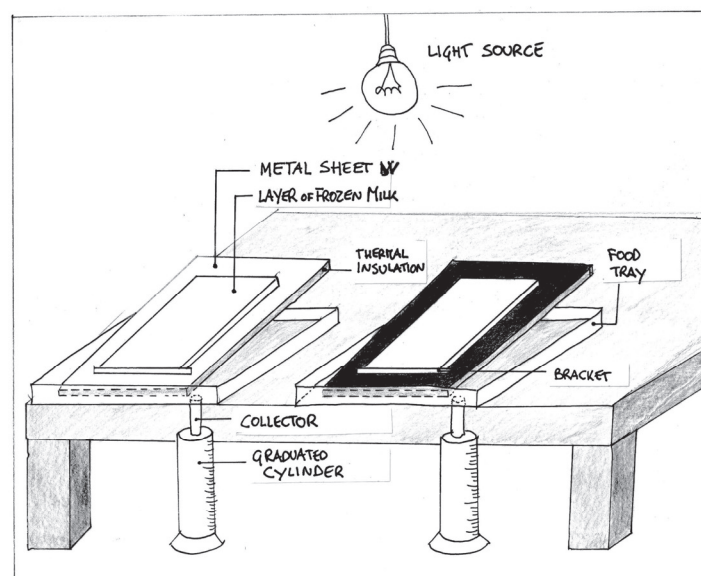
Albedo and ice: positive feedback in action

Worksheet 1: Albedo and ice

Albedo is the measure of how well a surface reflects solar radiation. Natural surfaces with a high albedo, such as snow and ice, reflect a high percentage of incoming solar radiation. In contrast, surfaces with a low albedo, such as the ocean, absorb more solar radiation. The colour of a surface impacts its albedo and its ability to convert solar energy into heat. Darker surfaces absorb more solar energy and warm faster than lighter surfaces.

The setup of this experiment aims to simulate the natural system of the polar ocean, where vast areas of sea ice interact with the ocean underneath.

Two identical containers, one with a white surface and one with a black surface (emulating the ocean), are placed under a heat lamp (emulating the Sun). Two identical layers of frozen milk (emulating sea ice) are placed on top of each surface located inside the containers – disposable baking pans. These pans act as collectors, and underneath each one, there is a graduated cylinder placed on a portable digital scale.



The experimental setup (diagram). The portable scales beneath the measuring cylinders are not shown.

Image courtesy of the author



Key questions

Form hypotheses and write an answer for each of the following key questions:

1. What's going to happen when we turn on the lamp?

2. What are you expecting to happen to the two frozen surfaces?

3. Are you expecting to observe the same speed of melting on both reflecting sheets? Why?
