

How reflective is that surface?

Learn about albedo

The albedo is a measure of the proportion of electromagnetic radiation that is reflected by a surface. The rest is absorbed and then reradiated, usually at a different wavelength depending on the temperature of the surface. So, for example, if a surface has an albedo of 0.3, then 30% of the light that hits it will be reflected. The rest will be absorbed.

Equipment

- ◇ 2 ice cream tubs or similar, one painted black inside
- ◇ 2 thermometers
- ◇ Thick polystyrene to encase the tubs
- ◇ Clingfilm
- ◇ One large lamp or two identical small ones, with low energy light bulbs



Method

- 1 Cover the sides and base of the ice cream tubs with polystyrene.
- 2 Place a thermometer in each tub and cover the tubs with cling film to stop convection (warm air rising and escaping from the tub).
- 3 Put the tub under the lamp, or lamps.

You should see the temperature in the black tub rise faster than in the white tub. The black tub will absorb the light and warm up, which will in turn warm the air inside it. The white tub on the other hand will mainly reflect the visible light from the lamp. Beware, if you do this experiment with a 'normal', high energy light bulb that emits heat (infrared radiation), you may find that the air in the white tub gets warmer as well.

So how does this relate to atmosphere?

As the albedo of the Earth changes due to changing climate (e.g. ice melting, changes in the amount of level of cloud cover) this will have a positive or negative feedback on the temperature of the atmosphere. Typical values of the albedo are 0.15-0.8 for clouds, depending on thickness and height, 0.8-0.9 for snow and ice, 0.35 for desert, 0.1-0.2 for forests and cities, 0.05-0.5 for water.

Where can I find more information?

Watch this experiment at

<http://uk.youtube.com/watch?v=zzVtbvVS2IQ>

Find out more about pressure and boiling at

<http://www.iapws.org/faq1/boil.htm>