

MODELLING CLIMATE CHANGE: ICE AND REFLECTIVITY

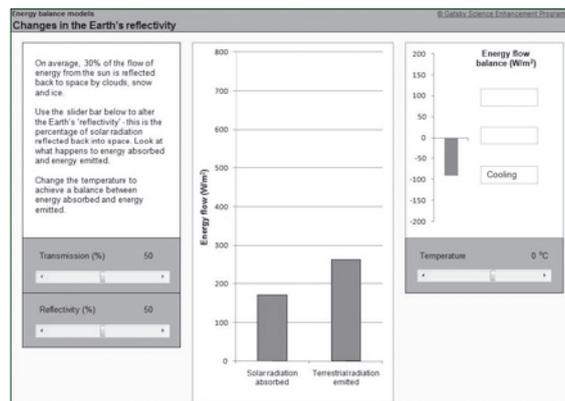
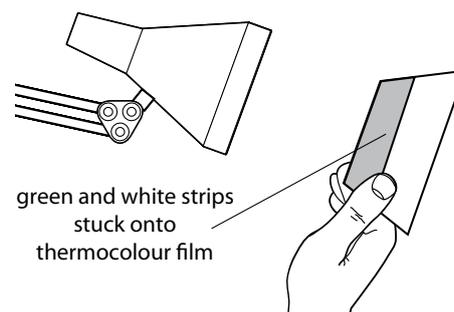
As the climate warms, snow and sea-ice are melting revealing a darker surface below. This will affect the amount of radiation that is reflected from the Earth's surface. In this activity you will explore how colour affects the reflectivity of a surface, and you will use a computer model to find out the effect that reflectivity has on the Earth's temperature.

Task A Temperature and colour

1. Stick a piece of white paper on one half of a sheet of thermocolour film and a piece of dark green paper on the other half. What do the white and green areas represent?
2. Shine a desk lamp on the paper for 30 seconds and observe the thermocolour film.
3. What do you observe? Why did the different areas of the thermocolour film warm differently?

Task B Changing the Earth's reflectivity

4. Open the Excel spreadsheet *MCC_EnergyBalance* and click on the tab 'Model 3'.
5. Set the reflectivity to 30%. Why is this value chosen? Move the temperature slider bar until the energy is in equilibrium. Record the size of the energy flow absorbed by the Earth and the temperature at equilibrium.
6. Set the reflectivity to 25%. What could cause the Earth's reflectivity to decrease from 30% to 25%? Move the temperature slider bar until the energy is in equilibrium. Record the size of the energy flow absorbed by the Earth and the temperature at equilibrium.
7. Scientists predict that as increasing greenhouse gases warm the Earth, the average reflectivity will decrease. What effect do you think this will have on our climate?



Reflectivity (%)	Energy flow absorbed (W/m ²)	Equilibrium temperature (°C)
30		
25		