



Introduction

Windows let in natural light, let us see out and allow the flow of air. We can control the amount of heat coming in or going out of windows by shading them. This is most often done with curtains, awnings, shutters or blinds.

Sometimes we put blinds on the inside of windows and at other times we put them on the outside. Structures like eaves and natural shade provided by trees and bushes can also be very effective in providing cooling shade.

Exploring design ideas

To explore how sunlight enters windows at different times of the year.

Equipment

You will need: a model building/box, a desk lamp with a flexible arm or torch and materials to make model blinds, shutters, awnings and eaves.

Process

Cut a window in the side of the box.

With the teacher, discuss the passage of the sun across the sky in winter and in summer for the school site. Charts can be obtained to show this.

Cut a window in each side of the building/box. Place the model building/box in a location where you can slowly pass the lamp/torch over the building in a similar path to the sun in a) summer and, b) winter.

Observe where the windows allow the light to reach inside as it passes over the building in winter and in summer.

Record your observations in the tables below. A digital camera can be used to record these observations.

Summer	
Windows	Light reaches...
Front	
Side	
Back	
Other	

Winter	
Windows	Light reaches...
Front	
Side	
Back	
Other	

Sometimes it is good to have sunlight entering a space because it warms it up but at other times it can make it too hot. Sometimes the heat in a room can also escape through windows.

Modelling design solutions

After considering possible shading options, design and model a variety of them to test with your building/box. With each option, pass the light over your building/box to follow the path of the sun in both summer and winter. Observe the effectiveness of the window covering solution you have chosen to model.

Which type of shading was most effective in keeping summer sun out?

Which type of shading was most effective in letting sunlight in during winter?

Which windows in a building might let heat out in winter but not let in any warming sunlight? How might these windows be treated to keep heat in?

Reflect

The process you used to explore design options with a model was different to the process of a scientific inquiry. In what ways was the process different? What did the process enable you to find out?
