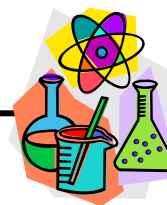


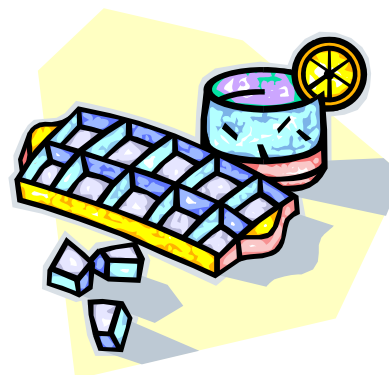
# Science 10-4 Unit B: Understanding Energy Transfer Technologies



## Controlling Thermal Energy Transfer

1. Design and conduct an experiment to explore how insulation can be used to reduce heat transfer, e.g., make a container that holds ice cubes.

Measure the temperature and amount of liquid after a specific period of time, and compare your results to those of classmates. Before you begin, make sure you understand the process of [Scientific Inquiry](#).



Analyze how the results are related to the amount of insulation in the container.



Use Tools [Planning an Experiment](#), [Experiment/Investigation Template II](#) and [Analyzing and Interpreting Experiment Results](#).

2. Find out what RSI value means and write your own definition to share with classmates. Give examples where RSI values are used, e.g., building construction.
3. Investigate a variety of types of building insulation used today. Compare RSI values, costs, accessibility and other factors in a chart to determine the best value.

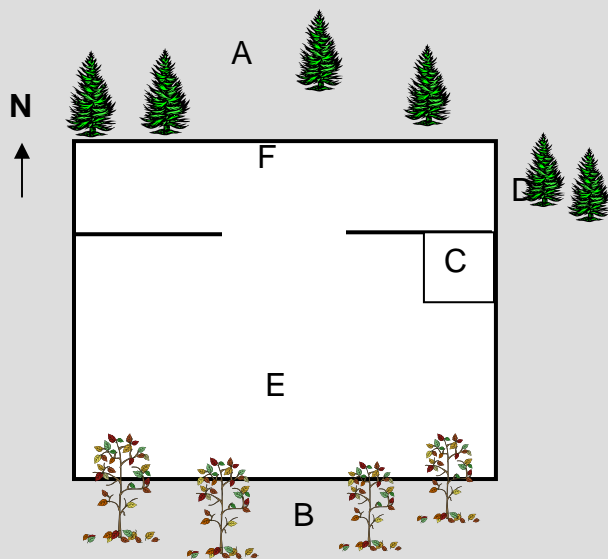


## Passive Solar Homes

Passive solar homes are built to maximize use of the sun's energy through strategies such as:

- position of the house on the site
- location of rooms and windows
- insulation (RSI value)
- materials and colours
- size and number of windows and window panes
- location of garage (a north location helps insulate the house from north winds)
- landscaping.

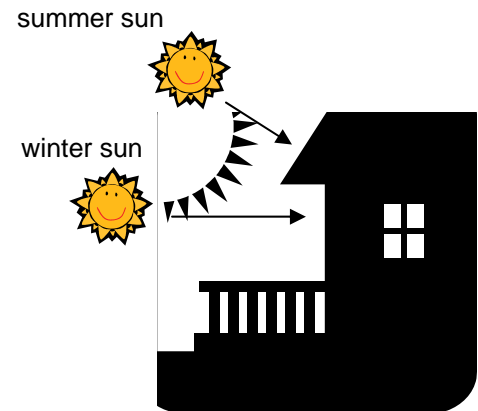
### Features of a passive solar home



- A. Evergreens protect from winter winds.
- B. Deciduous trees and shrubs lose their leaves, allowing light and radiant energy to enter the home in winter.
- C. Entryway is lower than main floor (or enclosed) to reduce flow of cold air.
- D. Trees/shrubs protect entryway.
- E. Living areas (kitchen, living/family room) face south.
- F. Bedrooms face north and have smaller windows.

## Windows and Overhangs

- Large windows facing south maximize the amount of radiant energy entering the home in winter.
- Small windows facing north reduce heat loss.
- Triple-paned windows reduce loss of thermal energy.
- Shutters reduce loss of heat during winter and absorption of heat in summer.
- Overhangs reduce the amount of radiant energy in summer and allow radiant energy to enter the home in winter.



4. Investigate various ways solar energy can be used in homes or the workplace, e.g., passive or active solar homes, solar energy sources.

5. Investigate and describe various devices and methods that protect against dangerous thermal energy transfer; e.g.,
  - fire fighting equipment and clothing
  - oven mitts and oven insulation
  - insulation in an internal combustion engine.

Include information on the materials used in their construction and how they work to protect against heat.



6. Design and conduct an experiment to explore variations in the absorption or loss of heat in a substance being heated or cooled. Create a chart to collect your information, for example:

**Heating Substances to 20°C and Letting Cool for Five Minutes  
or  
Heating Substances for Two Minutes at 100°C**

substance	amount #1	amount #2	amount #3
motor oil			
cooking oil			
water			

Before you begin, make sure you understand the process of [Scientific Inquiry](#).

Create a graph to display your results and draw conclusions based on your findings.



Use Tools [Planning an Experiment](#), [Experiment/Investigation Template II](#) and [Analyzing and Interpreting Experiment Results](#).