


Insulation

Objectives

- Understand how thermal energy transfer can be reduced
- Know some examples of insulation methods in the home

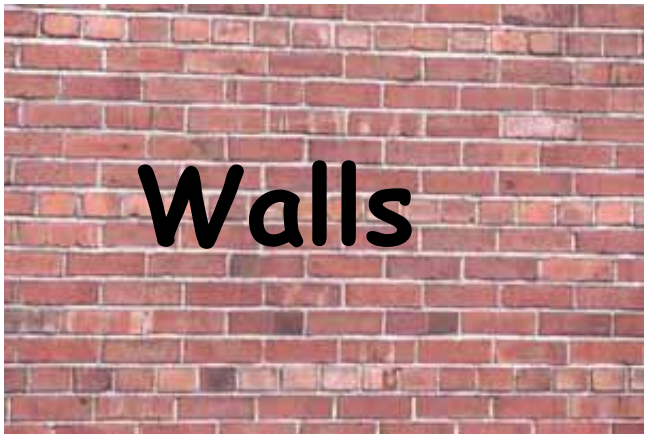

Name the three ways in which energy is lost from the home.

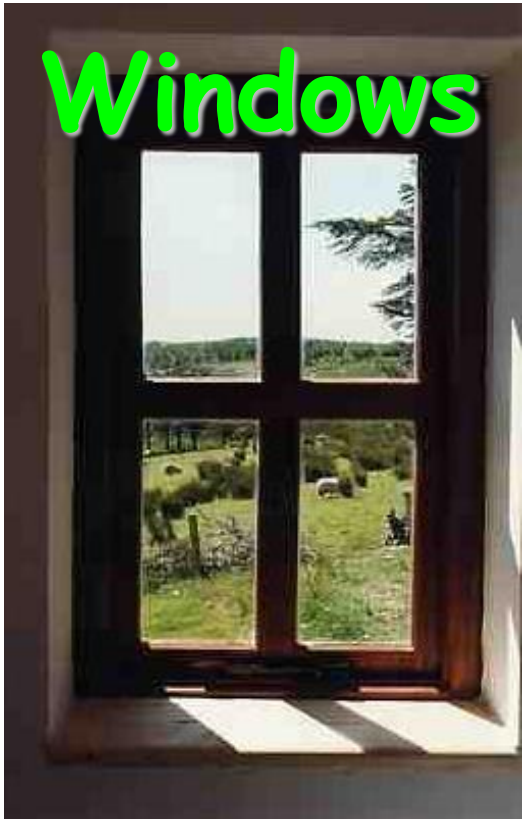

Insulation

To keep things warm we need to stop CONVECTION, CONDUCTION & RADIATION.

The methods we use are types of INSULATION.


CONDUCTION → THROUGH SOLIDS





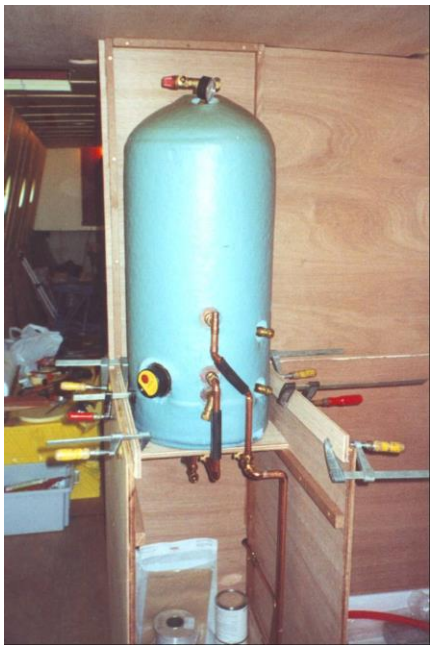
CONVECTION → THROUGH GASES

Air gaps between bricks

Draughts

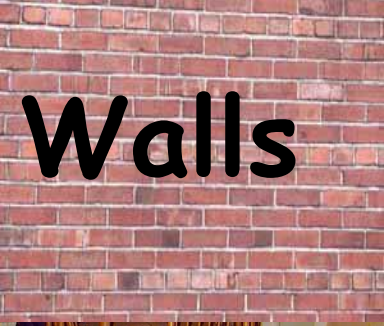
RADIATION → FROM HOT SURFACES

Hot water tank



Between radiators and walls

What can we do to prevent this energy loss?



Foam in wall cavity to stop *CONDUCTION & CONVECTION*

Carpets trap air to stop *CONDUCTION & CONVECTION*

Layer of roof insulation stops *CONDUCTION & CONVECTION*

Double glazing – air gap stops *CONDUCTION & CONVECTION*

Reducing loft space reduces *CONVECTION & CONDUCTION*

Air gaps between bricks

Using foam in the cavity reduces *CONVECTION & CONDUCTION*

Draughts

Using draught excluders reduces *CONVECTION & CONDUCTION*

Blocking unused chimneys reduces *CONVECTION*

Jackets lined with silvery material stop *RADIATION*

Silver foil at the back of the radiator stops *RADIATION*

Silvery pipe lagging stops *RADIATION*


STOPPING Conduction, Convection & Radiation

Convection and conduction – take away the particles (a vacuum).

Conduction – use insulating materials



Radiation - use shiny surfaces to **REFLECT** the heat back into the substance.

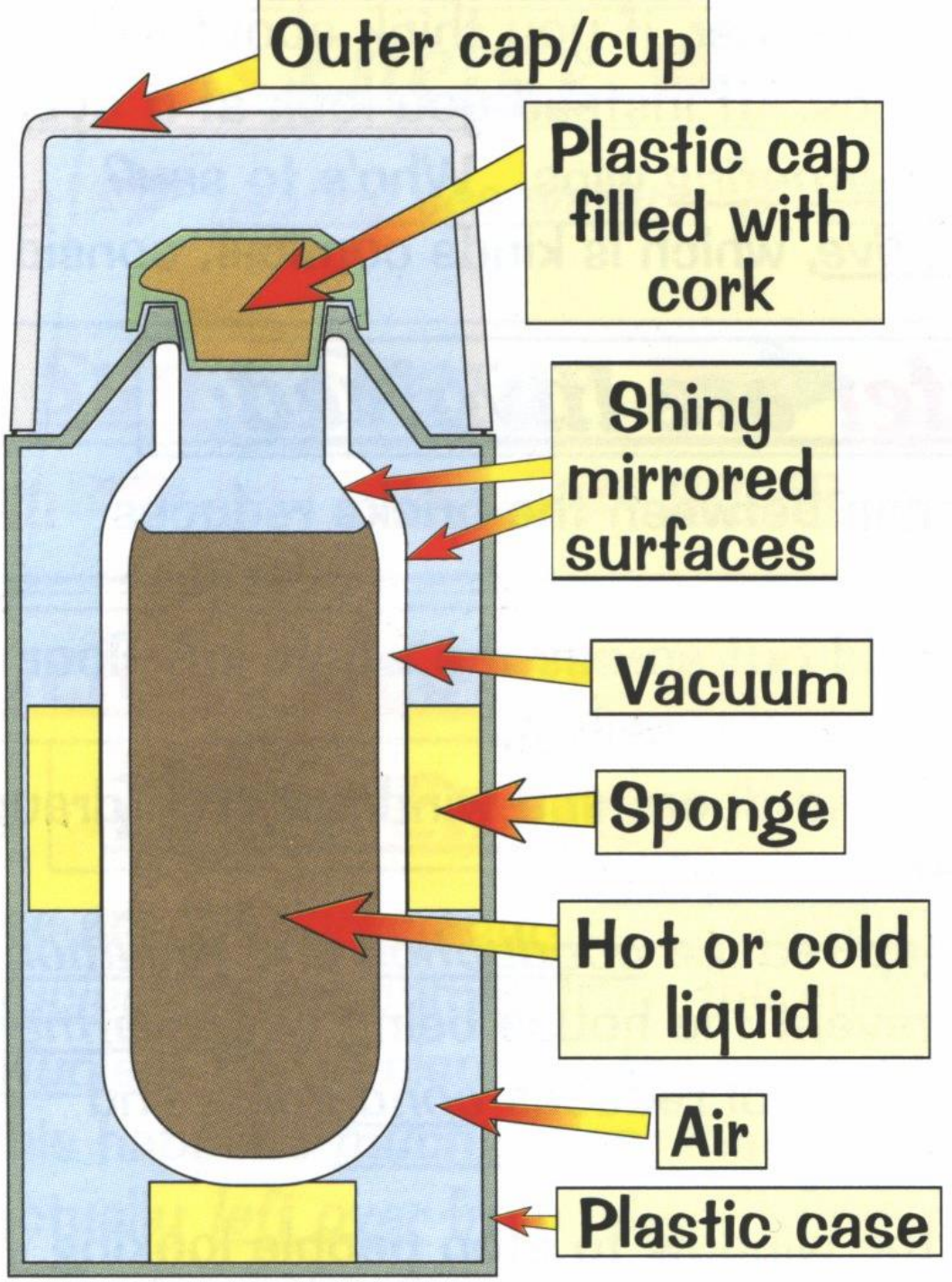
- use black surfaces to **ABSORB** the heat into the cooler material.



ACTIVITY

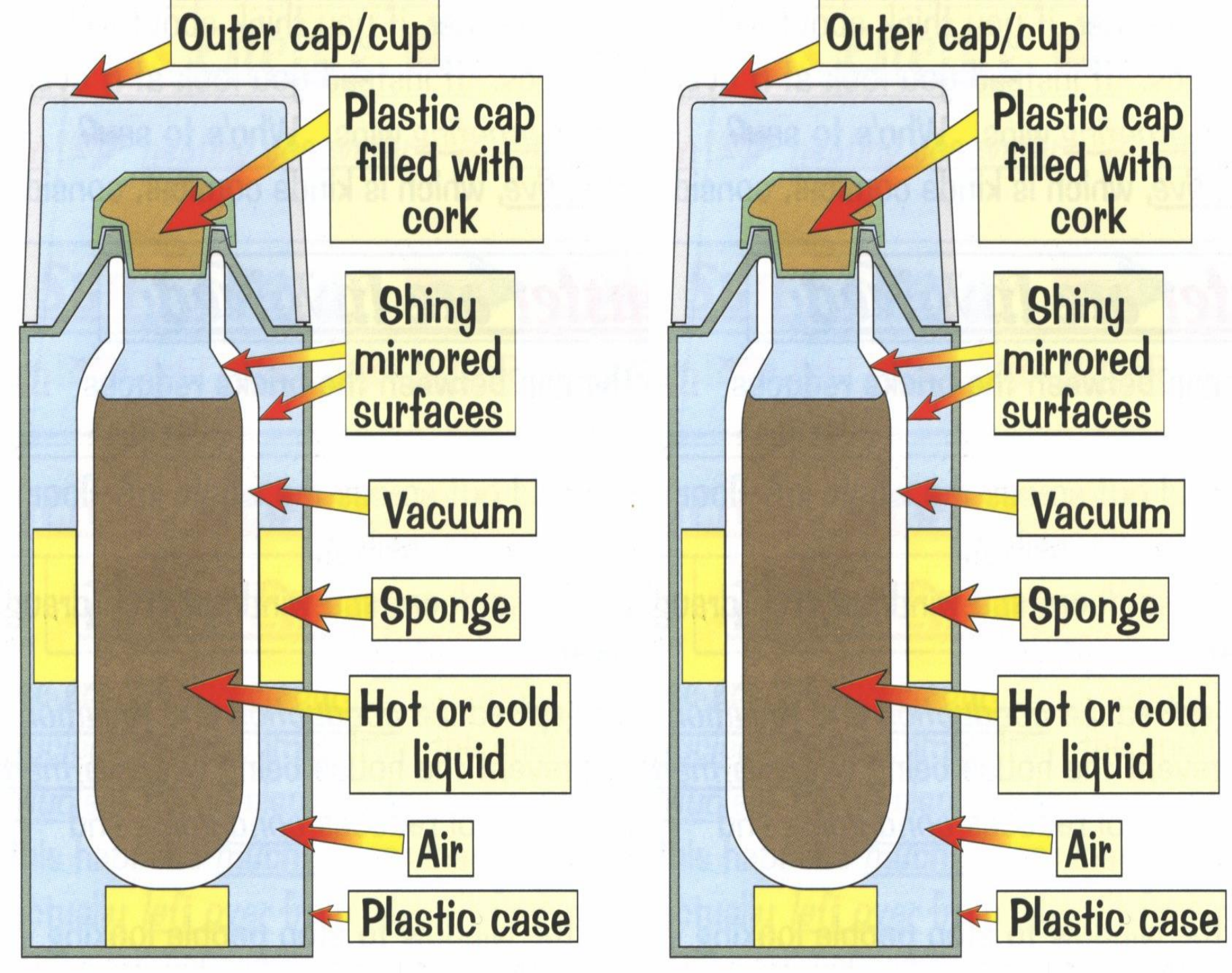
Produce a leaflet for B&Q explaining how customers can reduce their fuel bills this winter by using INSULATION around their home.


The Thermos Flask



- The glass bottle is double walled with a thin vacuum between the two walls. This stops all CONDUCTION and CONVECTION through the sides.
- The walls on either side of the vacuum are silvered to keep heat loss by RADIATION to a minimum.

- The bottle is supported using insulating foam. This reduces CONDUCTION to the outer glass bottle.
- The stopper is made of plastic and filled with cork or foam to reduce any heat CONDUCTION through it.


Outer cap/cup
Plastic cap filled with cork
Shiny mirrored surfaces
Vacuum
Sponge
Hot or cold liquid
Air
Plastic case
Outer cap/cup
Plastic cap filled with cork
Shiny mirrored surfaces
Vacuum
Sponge
Hot or cold liquid
Air
Plastic case