Bar Fridge

Apparatus

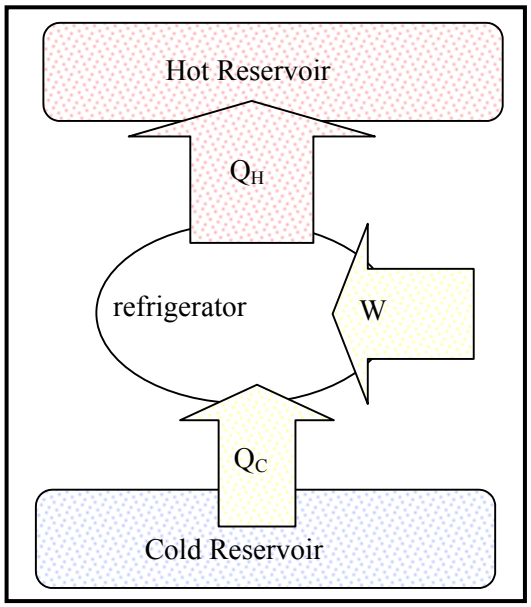
small bar fridge, or normal size fridge pulled away from a wall that groups of students can go and look at in small groups

Action

The students examine the fridge. They should identify the hot and cold reservoir and the location of the working substance. They then draw an energy flow diagram for the fridge. A small fridge brought in to the room on a trolley is excellent for large groups, small groups of students can be taken to a fridge if no small movable fridge is available.

The Physics

The cold reservoir of a fridge is the inside of the fridge. The hot reservoir is the outside air at the back of the fridge. An energy flow diagram is shown opposite.
You could not cool a room by leaving the fridge door open, even if the fridge were 100% efficient, the temperature would be unchanged. The second law of thermodynamics says that it is impossible to transfer heat from a cold reservoir to a hot reservoir with no other effect. The other effect is that work must be done, and some of this work is invariably dissipated as heat. The nett effect of leaving the fridge door open is to make the room hotter, although it may be slightly cooler directly in front of the fridge door.



Accompanying sheet

Bar Fridge

Inspect the back of the bar fridge.
Identify the heat reservoirs.

Draw an energy flow diagram for fridge.

Could you cool a room by leaving the fridge door open?