

# Thermos Flask

## Apparatus

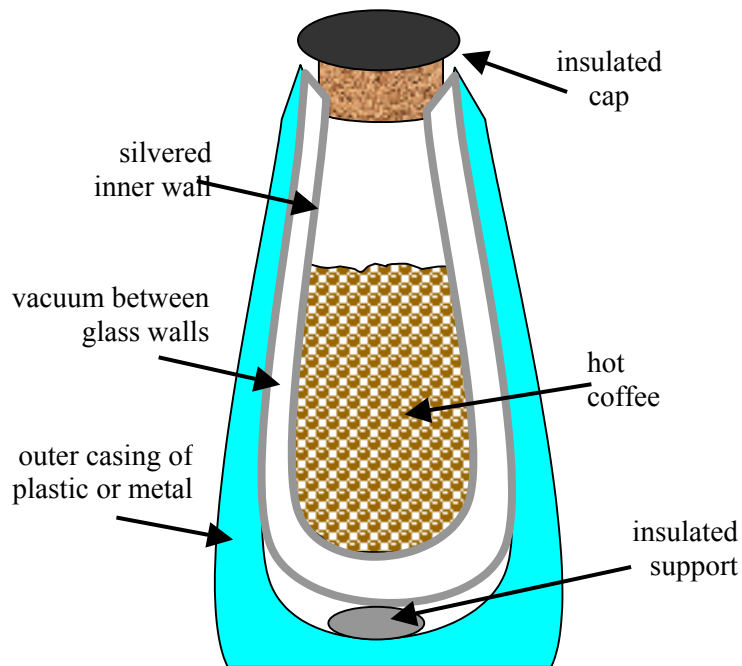
good quality thermos flask with silvered lining filled with hot water

## Action

The students examine the flask and explain how the three processes of heat transfer are affected by the flask. They should note that while the liquid inside is hot, and hence the inner wall is also hot, the outer wall is at approximately room temperature.

## The Physics

A thermos flask has double walls, which are evacuated and the vacuum bottle is silvered on the inside. The vacuum between the two walls prevents heat being transferred from the inside to the outside by conduction and convection. With very little air between the walls, there is almost no transfer of heat from the inner wall to the outer wall by convection. Conduction can only occur at the points where the two walls meet, at the top of the bottle and through an insulated support at the bottom. The silvered walls reflect radiated heat back to the inside, the same way a space blanket does. The diagram below shows a cross section through a thermos.



## Accompanying sheet

### Thermos Flask

Examine the thermos flask.  
It has a thick stopper, double walls which are evacuated,  
and the vacuum bottle is silvered on the inside.

Explain how this keeps drinks either hot or cold.  
What processes of heat transfer are affected?