

A dark red mug with a cartoon character on it, sitting in front of a fireplace with a fire. The cartoon character has a green head, large round glasses, and a purple necklace. The background is a warm, glowing fire in a fireplace.

# HEAT TRANSFER CONVECTION

S2 Physics

## REVIEW

- Heat can be transferred in 3 ways



CONDUCTION



CONVECTION



RADIATION

- Usually heat is transferred in all 3 ways at once.

- Heat **ALWAYS** travels from Hot places to cold places



# CONDUCTION REVIEW



Conduction occurs in solids.



Metals are good conductors.



Non-metals, liquids and gases are bad conductors.



Bad conductors are called good insulators.



*book is like heat energy*

2. **CONVECTION** – book taken by a student to the back of the room. The particles carry the energy to a different place.

<https://youtu.be/N7kID9E-5BU>

Play the first 95 s only!

# CONVECTION



- **CONVECTION** this occurs in liquids and gases.

The molecules carry the energy with them. The particles spread out and the fluid becomes less dense.

This is why hot fluids rise. (NB don't say it is the heat rising, it is the particles that transfer the energy)

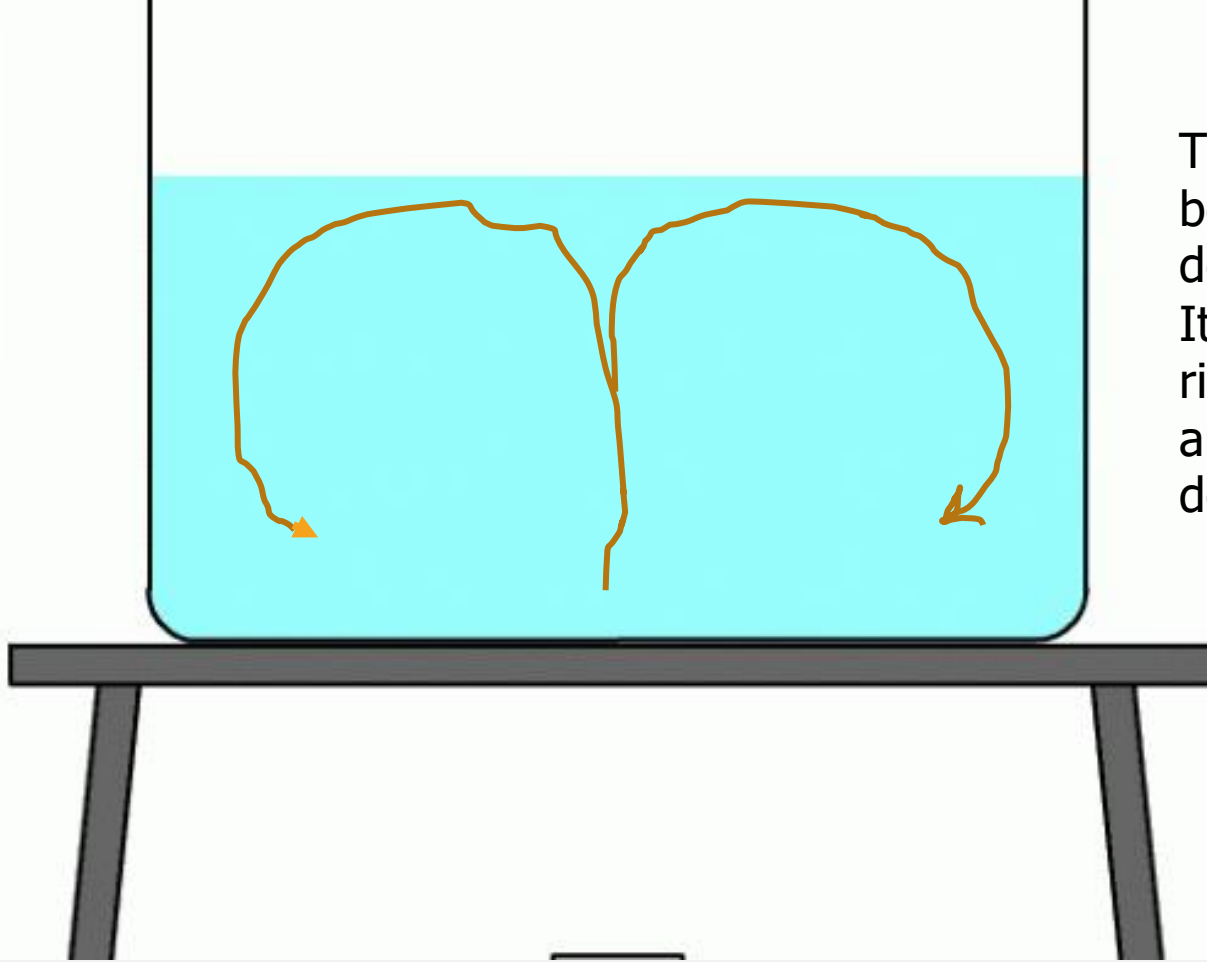
BEWARE



Convection Currents

T Davies 2010

Heat

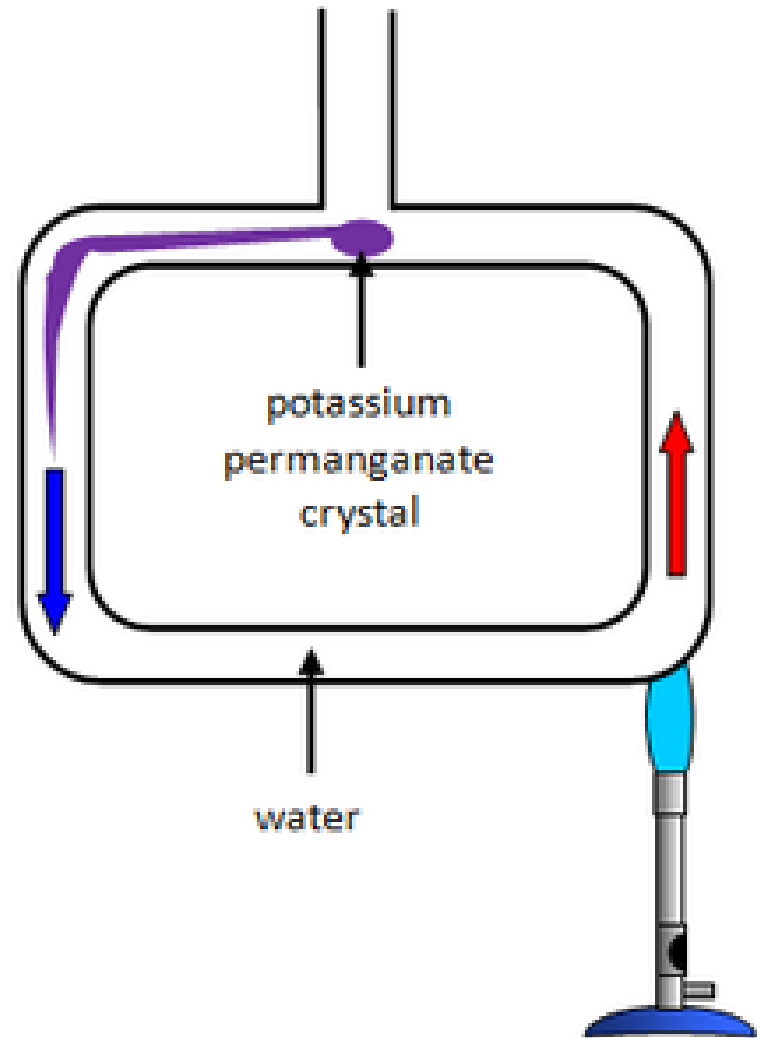


The hot water becomes less dense. It rises. As it rises it cools and sinks back down.

## CONVECTION CURRENTS

# ANOTHER EXAMPLE OF CONVECTION

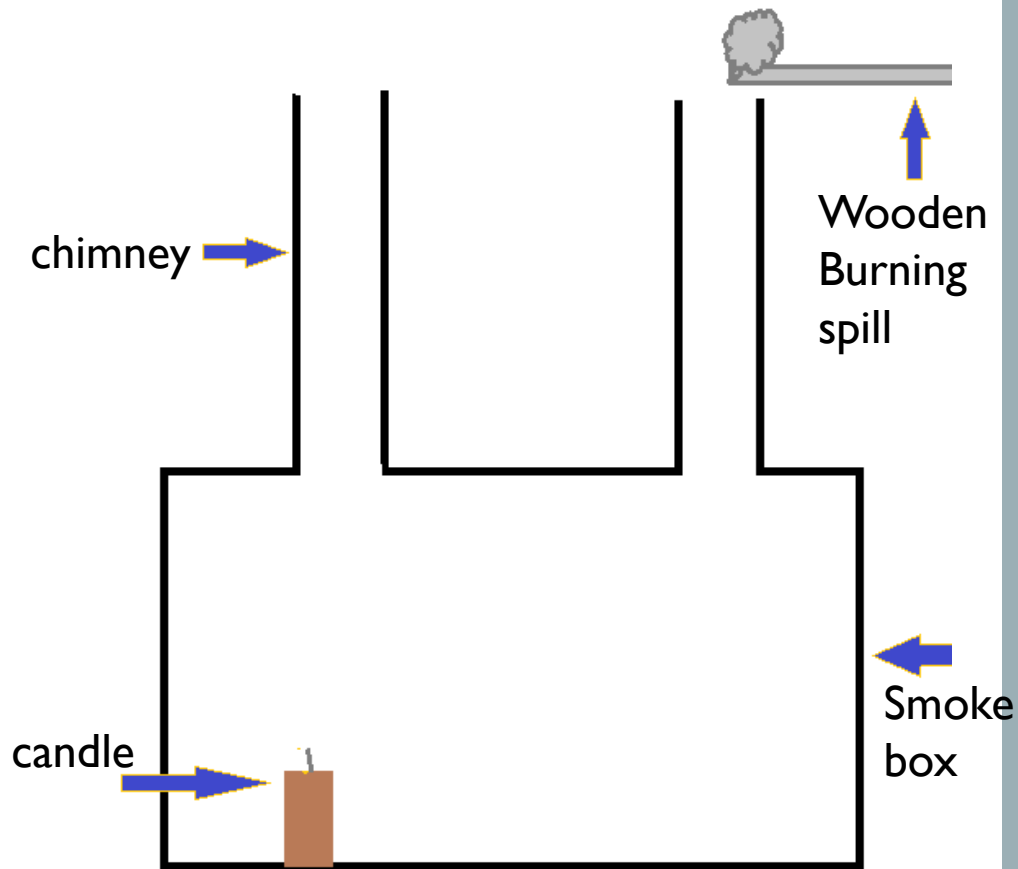
BEWARE





A glass container, possibly a beaker or test tube, is shown. It contains a liquid that has separated into two distinct layers. The top layer is dark, almost black, and contains many small, white, crystalline or particulate matter. The bottom layer is a bright, translucent yellow. The interface between the two layers is visible. The container is tilted slightly to the left. The background is dark and out of focus.

ANOTHER EXAMPLE OF CONVECTION  
CURRENTS

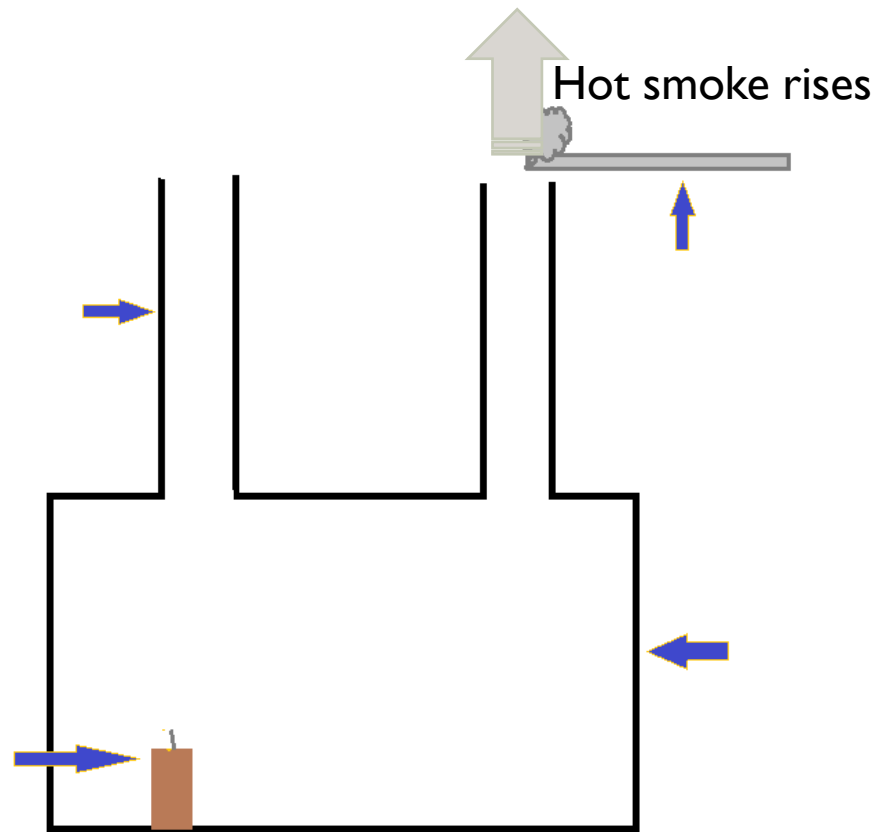


## THE SMOKE BOX

Draw out the smoke  
box twice and label it  
once.

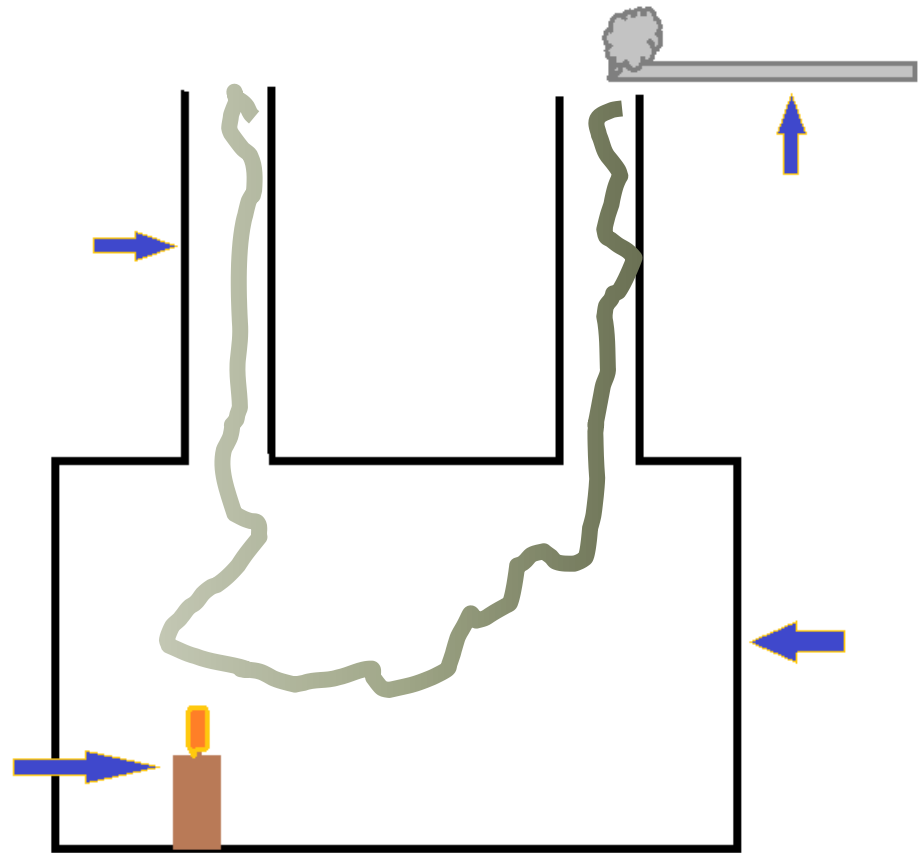
# THE SMOKE BOX

Candle unlit



# THE SMOKE BOX

Candle lit

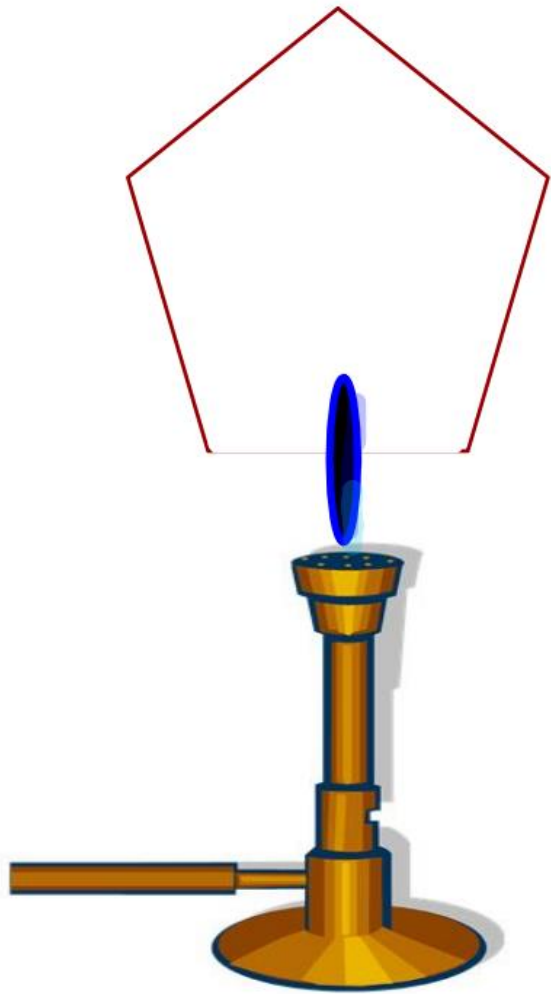




# THE HOT AIR BALLOON

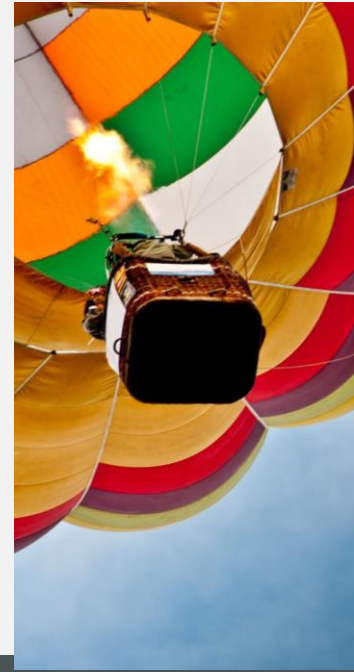
<https://youtu.be/ugsgmFcnszk>





**Ask your teacher to demonstrate making a hot air balloon.**

- **Describe what happens and why.**



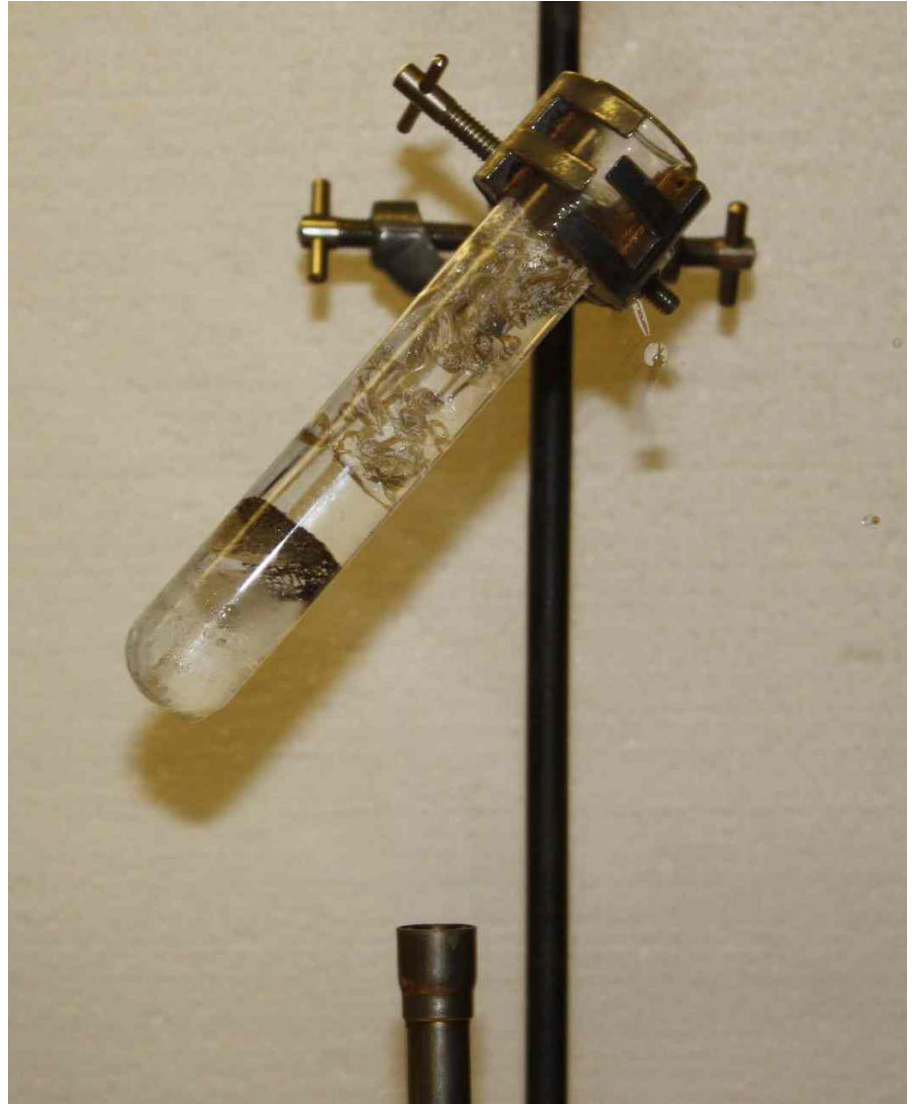
THE HOT AIR BALLOON



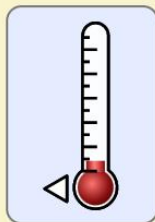
## TURNING SPIRALS- HOW YOUR FAKE FIRE WORKS!



ALL 3  
STATES AT  
ONCE!  
HOW?

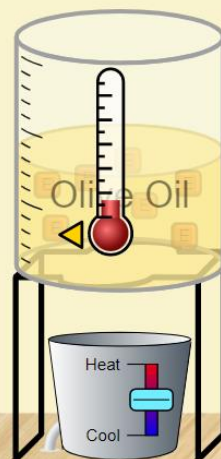
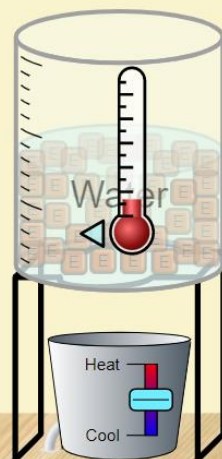
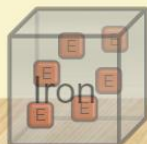
<https://vimeo.com/384229447#>







- ☒ Energy Symbols 
- ☒ Link Heaters 



Energy Forms and Changes



Intro



Systems

PHET

[HTTPS://PHET.COLORADO.EDU/SIMS/HTML/ENERGY-FORMS-AND-CHANGES/LATEST/ENERGY-FORMS-AND-CHANGES\\_EN.HTML](https://phet.colorado.edu/sims/html/energy-forms-and-changes/latest/energy-forms-and-changes_en.html)

# HEAT LOSS FROM HOUSES

Have you thought about what you can test?

Have you thought how you can test this in the lab?

What will be your variable?

What will you keep the same?

How long will you run your experiment?



## CONVECTION SUMMARY

- CONVECTION occurs in fluids (liquids and gases).
- The particles with more energy (heat) vibrate more and need more space to move around (like pupils in the PE hall rather than a maths room). As the fluid becomes less dense it rises.
- As the fluid rises it cools and so becomes more dense and falls.
- This movement is called a convection current.

