



Lesson Aims:

All learners:

1. Heat transfer in solids and fluids

Most learners:

1. Temperature
2. Conduction and convection explained using particle ideas.

Some learners:

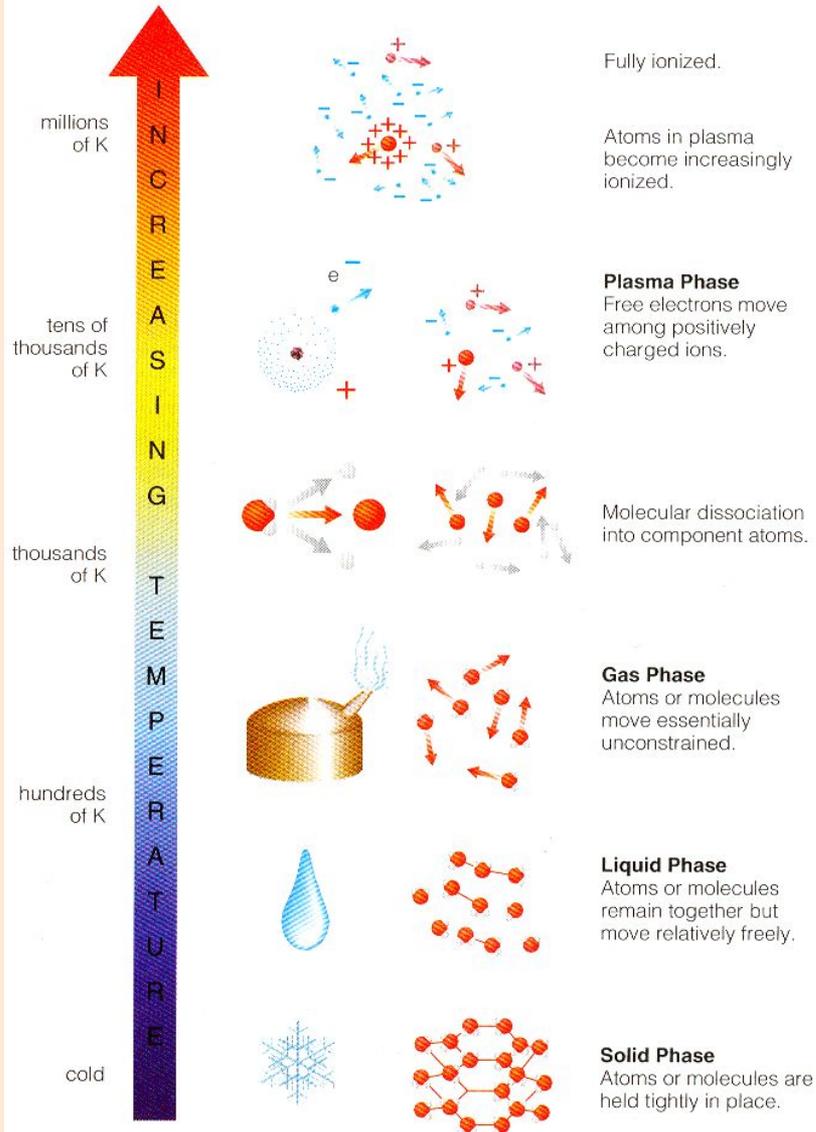
1. Complete all tasks.



Starter !!

1. Sketch the arrangement of particles in a solid, liquid and gas.
2. Why do we need a temperature scale?
3. Why do we get Earthquakes ?
4. Why does a metal bar feel cold?
5. Why is the heating element of a kettle at the bottom?

The general progression of phase changes.



States of Matter

https://phet.colorado.edu/sims/html/states-of-matter/latest/states-of-matter_en.html

Phase change:

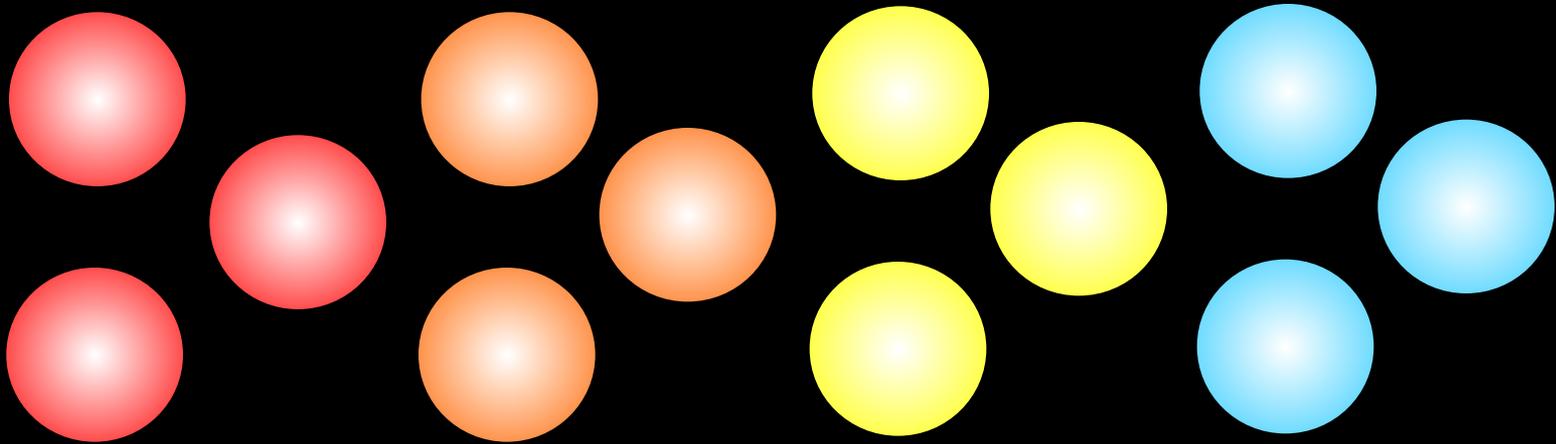
https://phet.colorado.edu/sims/html/states-of-matter/latest/states-of-matter_en.html

Heat transfer animation:

<https://www.wisc-online.com/learn/natural-science/physics/sce304/heat-transfer-conduction-convection-radiation>

Conduction (only occurs in solids)

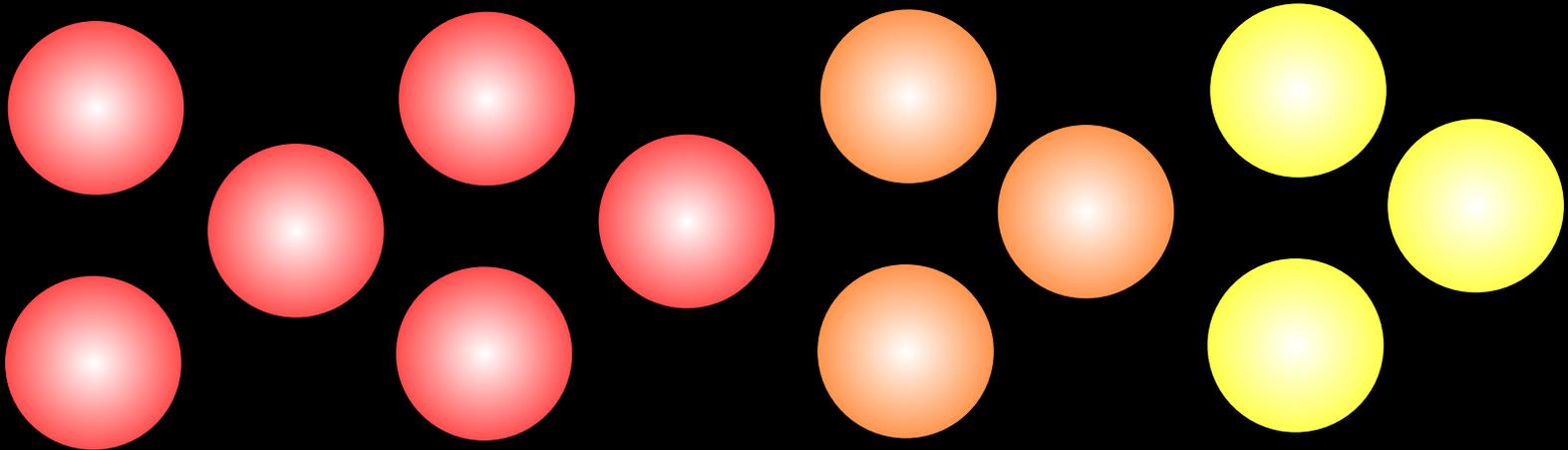
- Hot particles vibrate a lot



- Cool particles vibrate a little

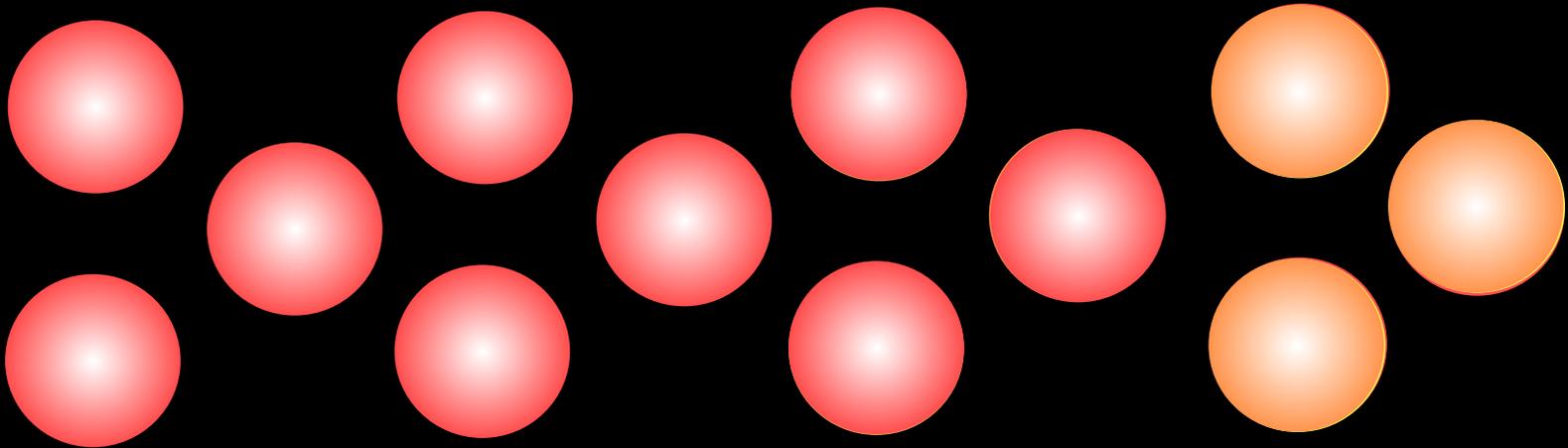
Conduction

- Fast-moving particle (lots of energy) collide with neighbouring particles
- This gives them more energy, making them vibrate faster



Conduction

- This continues along the length of the solid until all the particles are vibrating with lots of energy

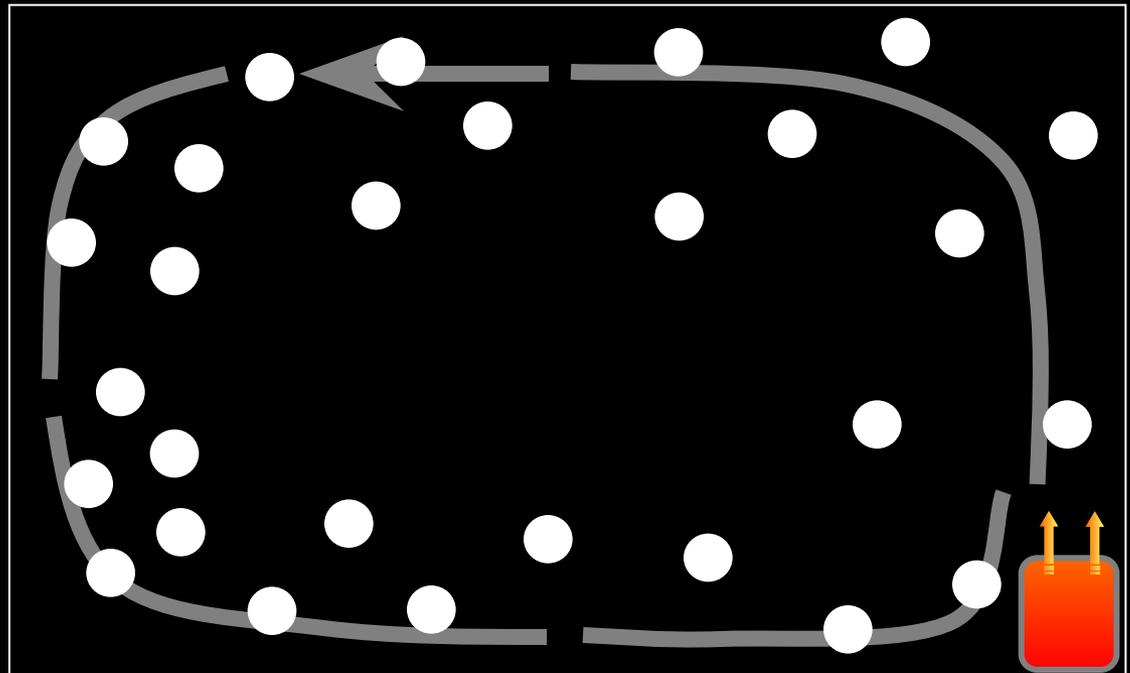


Convection (only occurs in fluids)

- A fluid is a liquid or a gas
- One part of the fluid gets heated – the particles move around with more energy

- “Hot” particles are more spaced out so they are less dense, and rise

- “Cool” particles are closer together so they are more dense, and fall



Convection Currents Explained

A fluid is a liquid or gas. When a part of a fluid becomes hot, the particles gain more energy and move apart. This reduces the density, so the hotter particles rise to the top, while the colder particles at the top sink. This way a convection current is set up.

Practical Uses of Convection Currents

Sea breezes

https://www.youtube.com/watch?v=5-mXe68W_cA

Plate tectonics

https://www.youtube.com/watch?v=Kpoko_l34ZE

True/False

1. Metals have free 'protons', so they are good conductors.
2. Temperature depends on the person who 'feels' it.
3. In a liquid, convection currents lift the heat to the top.
4. Saucepan handles should be made of copper.
5. Solids pass heat on heat energy by molecules colliding with their neighbours.
6. In a gas the particles move much slower than in a solid.
7. Most insulators contain lots of 'free' electrons.
8. A fluid is a liquid or a gas.
9. During the hot day, sea breezes come from the sea to land.