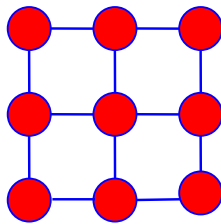


HEAT CONDUCTION

All matter is made of molecules which are continually moving. When an object is heated, the molecules gain more kinetic energy and move faster.

In conduction, the kinetic energy of the molecules is passed on from one to another.

SOLIDS are very good conductors because the molecules are close together and the forces between them are very strong.



When one molecule of the solid vibrates about a fixed position it causes the neighbouring molecules to vibrate and this passes on the energy through the solid.

Metals are better conductors than non-metals because metals have electrons which have become free from the atoms. These electrons can wander freely between the molecules, also carrying kinetic energy.

After solids, LIQUIDS are the next best conductors because the molecules are quite close but the forces between them are weaker.

GASES are the worst conductors because the molecules are a large distance apart, the forces are very weak and the molecules only come near each other occasionally. When they collide a fast moving molecule may speed up a slower moving one. Poor conductors are also called insulators. Air, which is a mixture of gases, is a very good insulator. Anything containing trapped air, e.g. wool, fur, feathers, polystyrene and fibre glass, is also a good insulator.

Good and Bad Conductors

Good conductors are used whenever heat is required to travel quickly through something. Kettles, saucepans, boilers and radiators are therefore made of metals such as aluminium, iron and copper.

The handles of teapots, kettles and saucepans are made of wood or plastic. Cork is used for table mats. Lagging around hot water tanks and loft insulation is often made of fibre glass.

Questions on Heat conduction

1. What happens to the molecules when a substance is heated?
2. Of the three states of matter, solids, liquids and gases, which are the best conductors and why?
3. In solids, why are metals better conductors than non-metals?
4. Why are gases the worst conductors of all?
5. Explain why wrapping something in layers of newspaper keeps fish and chips hot and ice-cream cold?
6. Why do you keep warmer by wearing several layers of clothing rather than one thick garment?
7. List SIX materials which are good heat conductors and SIX materials which are bad heat conductors.
8. Why is fibreglass a good substance to lay between the rafters of the loft?
9. Why is a thatched cottage warm in winter and cool in summer?
10. How does a tea cosy keep tea warm?