

P1 Cooking and Communicating using Waves

Electromagnetic Radiation

The amount of radiation (such as infrared) that is absorbed or emitted from a surface depends on:

- surface temperature
- colour – black is good, white and silver are poor
- texture – dull is good, shiny is poor.

Uses of Electromagnetic Radiation

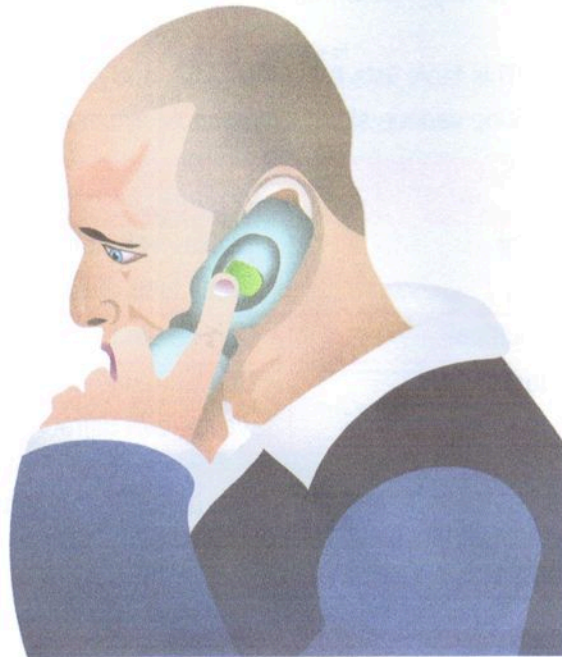
Electromagnetic radiations have many uses.

Microwaves are used to heat materials, as well as for satellite communication, mobile phones and radar. They:

- are **absorbed** by water and fat molecules, which causes them to heat up
- can **penetrate** about 1cm into food
- can cause burns when absorbed by body tissue
- can **travel** through glass and plastics
- are **reflected** by shiny metal surfaces.

Infrared rays are used to heat materials (in cooking), and in remote controls. They are:

- used to **heat** the surface of the food in cooking
- **reflected** off shiny surfaces
- **absorbed** by black objects.



HT Transferring Energy

Microwaves and infrared energy are transferred to materials in different ways.

Microwaves are absorbed by water and fat molecules in the outside layers of the food, increasing the kinetic energy of the particles. Energy is then transferred to the centre of the food by **conduction** or **convection**.

Infrared is absorbed by all of the particles on the surface of the food, increasing the kinetic energy of the particles. Energy is then transferred to the centre of the food by **conduction** or **convection**.

The amount of energy a microwave or an infrared wave has depends on its frequency, and this determines how potentially dangerous it could be.

Microwaves

Microwaves are used to **transmit information** over large distances that are in **line of sight**. Some areas aren't in line of sight so they have **poor signals**, which is why your mobile phone may cut out or fail to get a connection in certain areas.

The microwave signals that mobile phones use aren't the same wavelength as the microwaves used in microwave ovens.