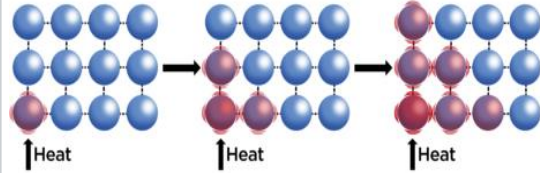


Conduction is the way that heat travels through a solid. Conduction occurs slightly differently in metals compared to non-metals.

In non-metals, when the object is heated, energy is transferred. This energy causes the atoms in the solid to vibrate more than they were doing beforehand. These vibrations pass on to the neighbouring atoms and the vibrations spread throughout the material. This is quite slow, which is why non-metals do not heat up very quickly.



In metals, conduction occurs quickly. Metals have free electrons which move randomly throughout the metal. When the metal is heated up, energy transfers to the free electrons which move around the metal faster. These collide with the ions in the metal and transfer that energy. Some metals conduct heat better than other metals.

Conductivity of different materials can be investigated by monitoring how efficiently heat transfers along them.

Alternative energy sources usually refer to energy sources that are not based on traditional methods of burning fossil fuels. A lot of research is going in to alternative energy sources that can reduce and even eliminate our dependence on fossil fuels. Most alternative energy is renewable, meaning we will not run out of the energy source. Some alternative energy sources are: Wind, Solar, Hydroelectric, Geothermal, Wave, Tidal.

Nuclear energy is where we use the power of the atomic nucleus to generate electricity. Nuclear fission is where unstable elements such as uranium are split. This generates heat which can be used to make electricity. The problem with nuclear fission is that it produces radioactive waste. Recently, scientists have been trying to find out if nuclear fusion will also work. This is where hydrogen is fused in to helium and energy is produced. At the moment, this is not sustainable as the conditions needed to make it work are very hard to create.

Y8 Physics T1 - Energy

The Law of conservation of energy states energy can not be created or destroyed. Energy is simply transferred from one place to another.

Energy transformations can be tracked through systems. For example, a battery in a torch transfers chemical potential energy in to light and heat energy. Energy is measured in Joules (J).

Energy may be categorised in to different forms. "Potential" energies are stores of energy. These are:

- Chemical potential energy**
- Gravitational potential energy**
- Elastic potential energy**
- Nuclear potential energy**

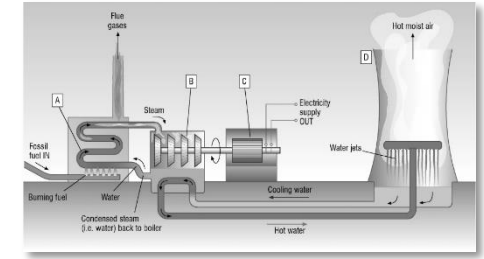
When energy is stored as a "potential" energy, it has the capacity to transfer energy elsewhere.

For example, the more you stretch an elastic band, the greater the store of elastic potential energy.

When it is released, its elastic potential energy is transferred in to kinetic energy. The more it is stretched, the more kinetic energy is transferred.

The thermal conductivity of a substance refers to the ease with which heat will pass through it. Generally speaking, metals have high thermal conductivities (good conductors of heat) and non-metals have poor thermal conductivities (good insulators of heat). To test the thermal conductivities of materials, hot water can be placed in beakers and wrapped in different materials. The greater the temperature decrease over time, the better the thermal conductor because more heat has passed through it.

A coal power station works on the basis of burning coal in order to heat water and produce steam. When steam is generated, it is fired through a steam line and is directed at a turbine. The turbine spins round as a result of the force of the steam colliding with it. Since the generator is connected to the turbine, the generator then spins as well. The generator generates electricity when it spins.



When fossil fuels are burnt they produce greenhouse gases such as carbon dioxide and sulphur dioxide. Fossil fuels are also non-renewable, meaning that we are using them faster than they are being replaced. There are environmental risks associated with the over use of fossil fuels, including climate change, acid rain, melting of ice caps due to global warming.

Convection is the transfer of heat through fluids. Fluids are either liquids or gases. When a liquid or gas is heated, energy is transferred to the molecules. The energy of the molecules increases and causes them to move around faster. This causes the density of the heated fluid to decrease and, as a consequence, the more dense fluid above sinks down. The less dense, heated fluid rises.

When the heated fluid is away from the energy source it cools down. This causes it to become more dense and so it sinks again. This motion is called a convection current.

