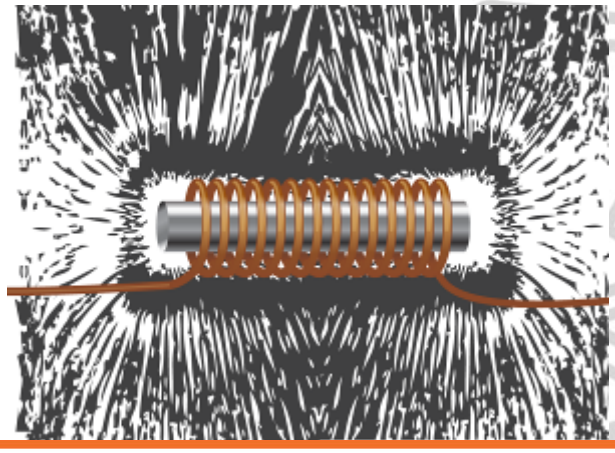
ELECTROMAGNETISM

Overview

The production of a magnetic field around an electrical current is called **electromagnetism**. This is shown in the diagram below.



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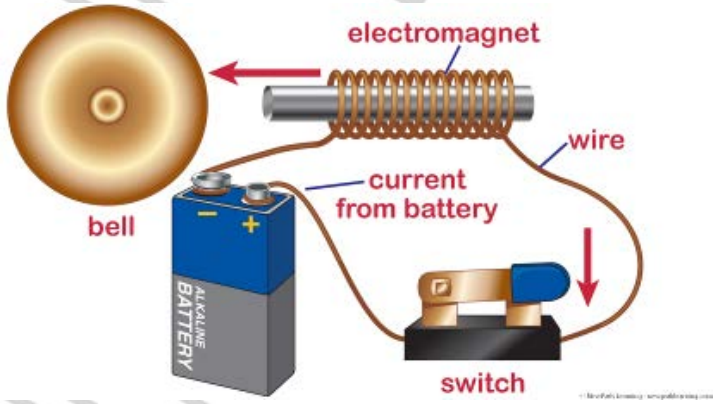
electromagnets to turn on and turn off strong magnetic fields. The diagram below shows an electromagnet being used to ring a doorbell.



The magnetic field produced here when the circuit is closed is a combination of the magnetic force from the electrical current and the metal bar. Opening the circuit reduces the strength of the magnetic field and stops the clapper from striking the bell.

In junkyards, large electromagnets held by cranes are used to lift heavy loads of metal. When current is flowing the metal is lifted and when current stops flowing, the metal drops off the magnet.

Magnets

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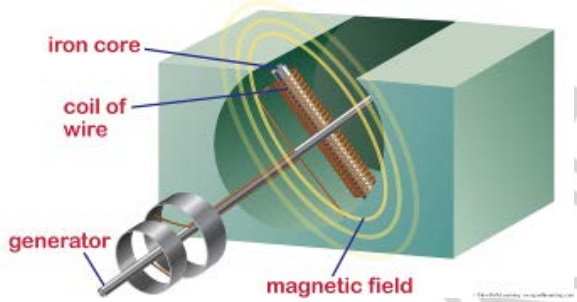
The use of the principle b tor, the polarity of an electromagnet is continuously reversed within an existing magnetic field. The result of this is a continuous rotation of the electromagnet which in turn is connected to some type of shaft in an appliance like an electric drill.

LESSON CHECKPOINT:
How does an electric motor work?

Induction

A **generator** works in an opposite manner from a motor. By moving a conductor through a magnetic field, induced electricity is produced by **induction**. In this activity, mechanical energy is converted to electrical energy. In the diagram below, we see induction occurring in two different ways:



Generators produce almost all of our electricity. By burning coal, oil or natural gas, large amounts of water are converted to steam which provides the mechanical energy needed to turn the generators. In some cases, falling water alone is enough to do this job.

LESSON CHECKPOINT:
How does a generator work?

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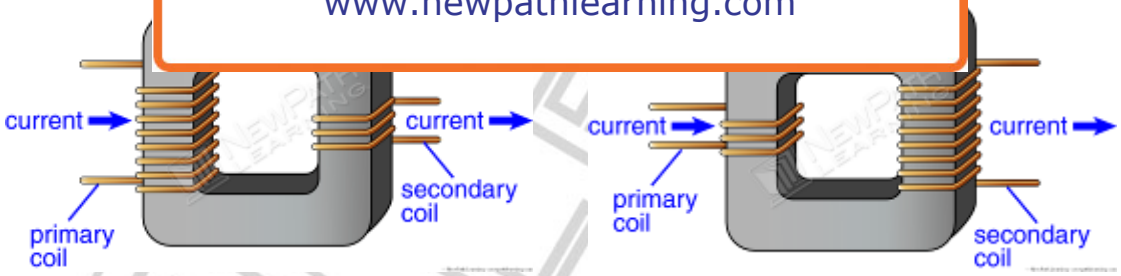

Without transformers, getting electricity from power plants to our homes would be impossible. Coming out of large generators, voltages first have to be increased to be carried over long distances. When it nears our homes, these high voltages have to be reduced to safely enter and then work our appliances.

LESSON CHECKPOINT:
What are the two types of transformers and what does each type do?