UNITED ARAB EMIRATES
MINISTRY OF EDUCATION

الإمارات العربية المتحدة
وزارة التربية والتعليم

Khalifa City A School - Cycle 1

مدرسة مدينة خليفة أ / حلقة أولى

SCIENCE

CHAPTER 7- ENERGY

LESSON 6- MAGNETISM AND ELECTRICITY

PART-2

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WHAT IS AN ELECTROMAGNET?

An electromagnet is a coil of wire wrapped around a metal core such as iron.

WATCH VIDEO ABOUT ELECTROMAGNETISM

By adding a metal core, you can make the strongest magnetic field of all. An electromagnet is a coil of wire wrapped around a metal core, such as iron. Electric current flowing through the coil sets up a magnetic field. The particles inside the iron core line up, increasing the magnetic field around the coil.

An electromagnet can be turned on or off with a switch.

The Effect of Current

Electric current moving through a wire sets up a magnetic field around that wire. The more current, the stronger the magnetic field. Turn the current off and the field goes away.

The Effect of Coils

Suppose you wind the wire into a long coil. With current flowing, the magnetic field around the coil is even stronger. Each loop in the coil is like a little magnet. All the loops pull and push in the same direction.

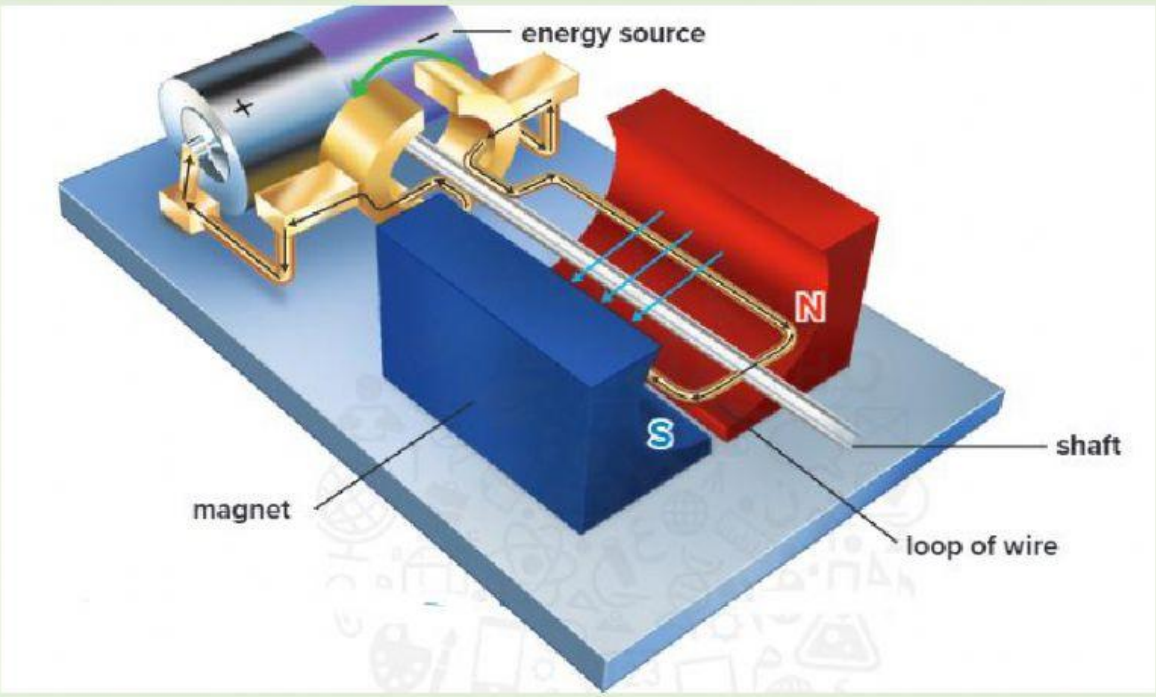
CLICK ON MAGNET ICON TO EXPLORE LAB ABOUT ELECTROMAGNETISM

HOW ELECTRIC MOTOR WORKS?

Electric Motors

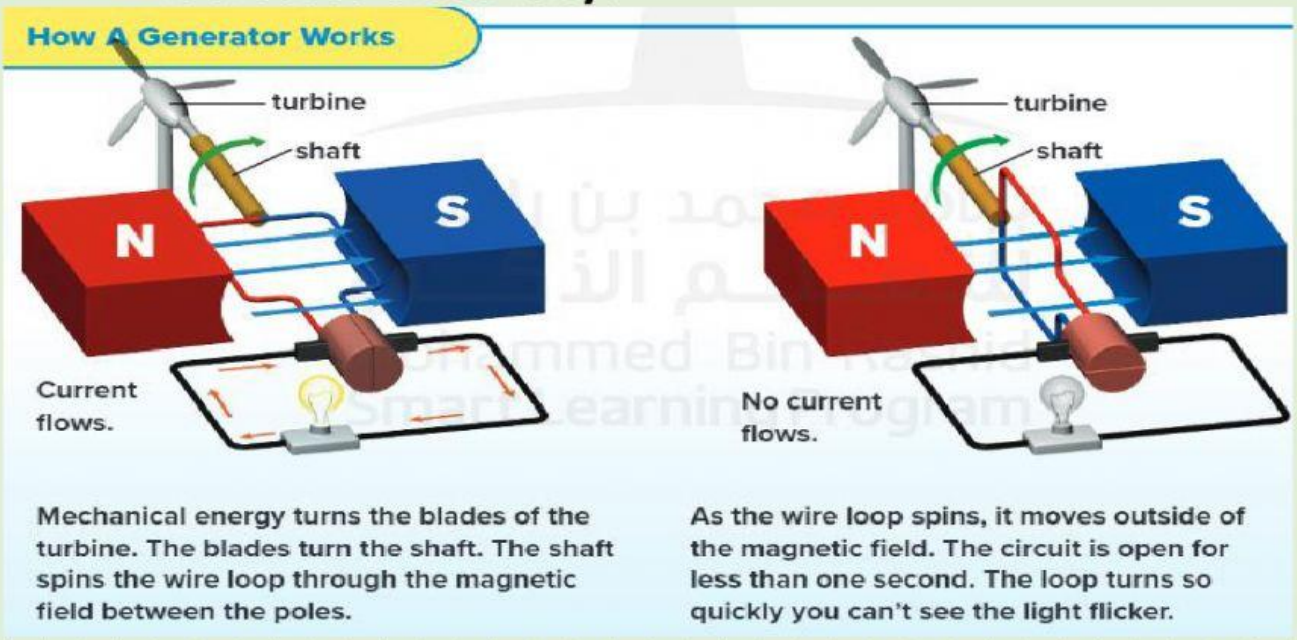
A simple electric motor has three parts. It has a power source, a magnet, and a wire loop attached to a shaft. The *shaft* is a rod that can spin.

The power source produces electric current. The current runs through the wire loop, making it an electromagnet. The magnet pushes and pulls on this electromagnet. The force then causes the loop and shaft to spin. The spinning shaft usually attaches to a wheel or a gear.

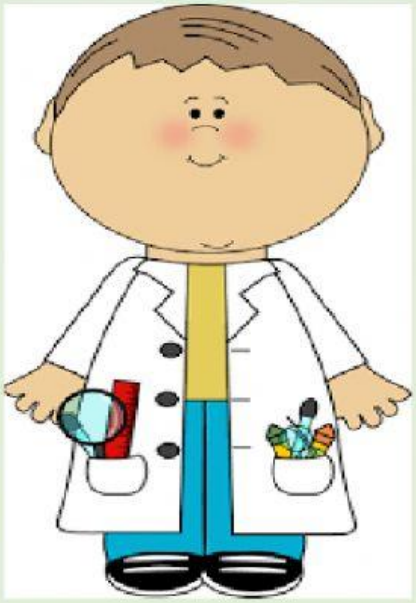


HOW ELECTRIC GENERATOR WORKS?

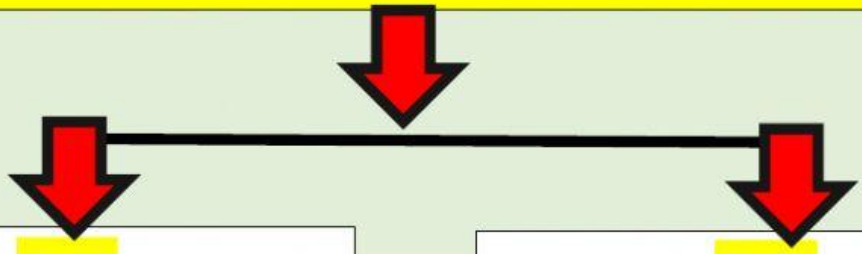
- A generator is the opposite of a motor.
- An electric generator changes mechanical energy into electrical energy.
- It has a power source, a magnet, and a wire loop attached to a shaft.
- A turbine is a set of angled blades attached to a shaft.
- A simple turbine looks like an electric fan. Steam, water, or air is used to turn the blades of the turbine.
- The turning blades spin the shaft. The shaft then spins the wire loop inside the generator.
- It creates electricity.



CLICK ON MAGNET ICON TO EXPLORE LAB ABOUT GENERATORS



TYPES OF ELECTRIC CURRENT



AC

Alternating current

- Alternating current flows in one direction and then flows in the opposite direction.
- The electrical charges flow back and forth continuously.
- Most electrical wall outlets, such as those in your home or school, use AC

DC

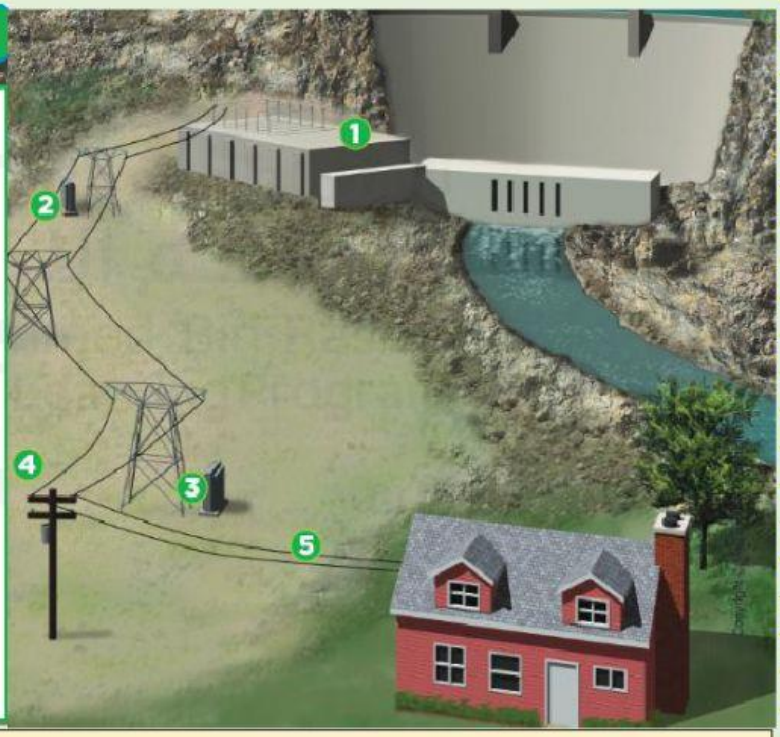
Direct current

- When electric current flows in only one direction, it is called direct current, or DC.
- A battery is an example of a DC power source. Some devices, like computers, change AC from wall outlets into DC.

HOW DOES ELECTRICITY GET TO YOUR HOME?

The Path of Electrical Energy

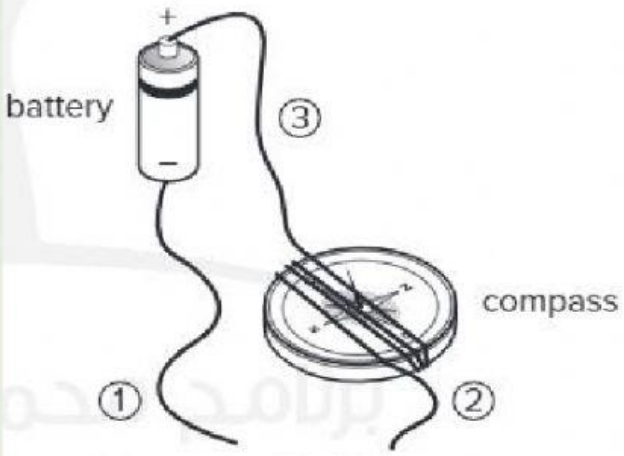
1. A power plant produces electrical energy.
2. A step-up transformer increases the voltage of the electric current.
3. The voltage decreases at a step-down transformer.
4. Another transformer makes the current safe for homes to use.
5. Power lines carry electric current to houses



QUESTIONS FROM BOOK

1.

Look at the diagram below.



How could you make the compass's needle move?

A replace the wires
B replace the battery
C connect wires 1 and 2
D connect wires 2 and 3

2. What do simple generators and simple electric motors have in common?

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TYPE YOUR ANSWER