UNIT 6. ENERGY

PRIMARY 4 / Natural Science

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FORMS AND SOURCES OF ENERGY

ENERGY produces changes in our bodies. There are many forms of energy :

1. Thermal /Heat energy

This is the energy transferred by hot bodies, like lava, to colder bodies.

2. Light energy

This is the energy of bodies that emit light, as a fire.

3. Chemical energy

This is the energy stored in some materials, like batteries and fuel and in living things and foods.

4. Electrical energy

This is the energy in a lightning bolt and the energy electrical devices use.

5. Kinetic energy

This is the energy in moving bodies, like rocks shooting out of a volcano.

6. Sound energy

This is a type of kinetic energy. It is produced by the vibration of bodies or the air.

SOURCES OF ENERGY

WIND and **PETROL** supply energy and are known as **ENERGY SOURCES**. There are two types:

Renewable energy sources

THE SUN, WIND AND WATER supply renewable energy because they are constantly being renewed.

Wind

Wind turbines transform wind energy into electricity.

Moving water

Hydroelectric power stations transform falling water into electricity

The Sun´s rays

Solar panels transform solar energy into heat or electricity

Non-Renewable energy sources

We may run out with **FOSSIL FUELS** because we are using them faster than we can produce them.

Coal

It is mined from the ground.
We burn it to produce heat and electrical energy.

Gas

It is extracted by drilling into the ground.
We use it primarily for heating.

Petrol

It is extracted by digging wells in the ground.
We use it to produce fuel and plastics.

HEAT

Temperature and heat

All bodies have a temperature. When we say that something is hot or cold, we want to say that its temperature is high or low.

This property is measured with a **THERMOMETER.**

When we reach the same temperature, we say that they are the **THERMAL EQUILIBRIUM.**

How heat affects bodies

When a body receives energy in the form of heat, three phenomena can occur:

Change of temperature

When hot bodies get colder or when cold bodies get hotter.

For example:

When hot chocolate and cold milk are mixed, the temperature of each one change.

Change of volume

CONTRACTION

When a body gets colder, its **volume decreases.**

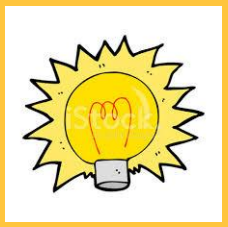
EXPANSION

When a body gets hotter, its **volume increases.**

Change of state

- **Condensation:** The change from gas to liquid.
- **Solidification:** The change from liquid to solid.
- **Evaporation:** The change from liquid to gas.
- **Fusion:** The change from solid to liquid.

LIGHT



Sources of light

Light us a form of energy that <u>illuminates the world.</u>

They can be classified into two groups:

Natural light sources

<u>They are found is nature.</u> <u>They emit their own light.</u>

For example: The Sun, stars, flashes or fireflies.

Artificial light sources

<u>They are man-made.</u> <u>They transform energy into light.</u>

Propagation of light

It moves from one place to another until it comes into contact with a body.

- It travels **at high speed.**
- It moves in **a straight line.**
- It propagates in **all directions.**

Bodies and light

We can classify bodies based on how they respond to light.

- **Transparent:** <u>They allow light to pass through</u>, like glass.
- **Opaque:** <u>They prevent light from passing through,</u> like a book.
- **Translucent:** <u>They allow light to pass through, but it is diverted,</u> like some plastics.

Properties of light

Reflection

<u>This is the change of direction that occurs **when light hits an object.**</u>

We can see objects that don´t emit their own light.

MIRRORS

They are opaque bodies with a polished Surface that reflect light.
They can be: flat, concave or convex mirror.

Refraction

<u>This is the change of direction that occurs when **light passes from one medium to another.**</u>

A RAINBOW

The light pass through drops of water.

SOUND

It is a form of energy. It is produced by the vibration of bodies. We perceive it through our sense of hearing.

Propagation of sound

- It travels much more slowly than light.
- It moves in **a straight line.**
- It propagates in **all directions.**

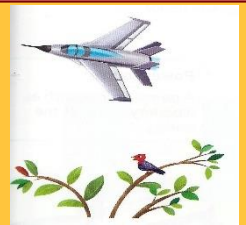
It propagates through a **NATURAL MEDIUM** , as air or the ground.

Qualities of sound

Volume

This makes it possible to differentiate between:

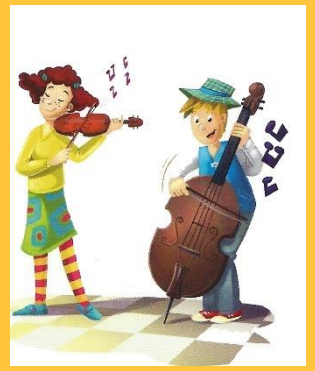
- **LOUD SOUND,** like an engine.
- **QUIET SOUND**, like the tweeting of a bird.



Pitch

It can be:

- **HIGH,** like the sound of violin.
- **LOW,** like the sound of a double bass.



Timbre

This makes is possible to differentiate between sounds with the same pitch and volume, based on the body that emits them.

Noise pollution

Noises are unpleasant sounds to the ear because they are very loud or very high.

Noise pollution is the excessive noise that may harm our health. They can cause anxiety, bad temper and insomnia.

We can reduce noise pollution if we limit the amount of vehicle traffic, listen to music at an appropriate volume and avoid shouting and unnecessary noise.

ELECTRICITY

Electrical charge

It is a property of matter that causes forces of **attraction or repulsion** between bodies.

Normally, bodies are neutral but when we rub them, we are adding more positive charge or more negative charge.

Static electricity

It is the type of electricity which causes certain bodies to be attracted or repelled.

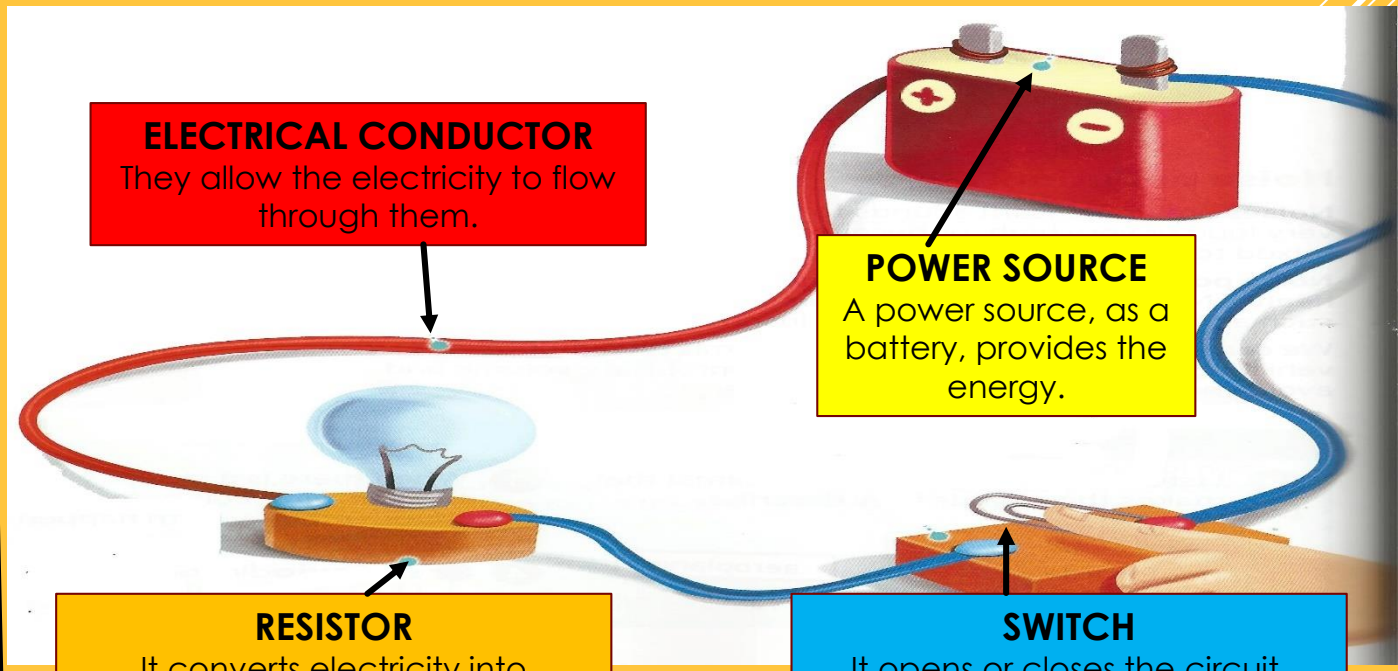
When two bodies with different charge are close, **they attract each other.**

When two bodies have the same charge, **they repel each other.**

Electric current and electric circuits

When an electric charge moves, it forms **an electric current.**

In order for the current to flow, it requires **an electric circuit** made up of different components:



THE EFFECTS OF ELECTRICITY