

Name _____

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NATURAL SCIENCE

ENERGY

SAMPLE

ENERGY

In this unit we are going to learn about:

1. What is energy?
2. Properties of energy
3. Energy transformations.
4. Types of energy.
5. Energy sources.
 - Non-renewable sources
 - Renewable sources.
6. We need energy
7. Energy and environmental problems.
8. Energy and our future.

Science Investigators

What's energy?

What's the "greenhouse effect"?

What type of energy do you need to make a toast?

Can energy be stored?

What's a solar panel?

What's inside a battery?

Can I use the wind to produce electricity?

What are fossil fuels?

What's acid rain?

What's uranium?



Do you have any other questions? Write them down and let's find the answer

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1. WHAT IS ENERGY?

If you look around you, you will see that plants are growing, animals are moving from one place to another, and people are turning on lights in their houses. These changes and movements can only occur because of **energy**.

Energy is the **ability to do work** or **cause changes**. It is present everywhere and in everything. When energy is not at work, it is stored as the potential to do work. For example, food has stored energy. When living things eat, they get energy from food so their bodies can work.

Energy is anything that is capable of causing objects to change.

2. THE PROPERTIES OF ENERGY

Energy has certain properties that make it very useful.

Energy can be transferred

- It can pass from **one object to another**.
- For example, a moving tennis racket has mechanical energy. When it hits the ball, it transfers energy. As a result, the ball acquires mechanical energy.

Energy can be stored

- **Batteries**, for example, store energy.

Energy can be transported

- It can be taken from one **place to another**.
- Electrical energy is transported through cables. Combustible fuel energy can be transported in lorries or pipelines.

Energy can be transformed

- Energy can be **transformed from one type to another**.
- Chemical energy in petrol is transformed into mechanical energy in a car. Electrical energy is easily transformed into mechanical, light and sound energy. This easy transformation makes electrical energy very useful.

3. ENERGY TRANSFORMATIONS

Energy transformation is the process of changing energy from one type to another. This process is happening all the time. **Energy doesn't disappear; it just changes its form.** That means the total amount of energy stays the same.

HOW IS ENERGY TRANSFORMED?

POTENTIAL ENERGY

- **Potential energy** is stored and can be used when we need it. For example, energy is stored in a battery and released when we switch on and use a device like a mobile phone. Potential energy is also stored in our muscles and used when we move.

KINETIC ENERGY

- **Kinetic energy** is energy in movement. Every time something moves, it uses energy. A person running or water flowing in a river are both examples of kinetic energy.
- Energy is **transformed** from potential energy to kinetic energy. Potential energy stored in a battery becomes kinetic energy when the mobile phone vibrates. Potential energy stored in our body becomes kinetic energy when we run.

DEVICES THAT TRANSFORM ENERGY

Humans have invented many devices that transform one type of energy into another:

- **Alternators** are mechanisms that transform the kinetic energy contained in wind or water into electrical energy. They are used in electrical power stations to produce electricity.
- **Batteries** convert into electricity the chemical energy contained in the substances that mix together (react) inside them.
- **Electric motors** transform electricity into kinetic energy and thermal energy.

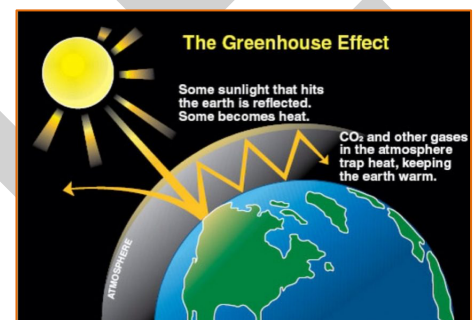
SAMPLE

7. ENERGY AND ENVIRONMENTAL PROBLEMS

GLOBAR WARMING

The energy of the sun warms the Earth. The Earth then emits most of warmth back into space. The **atmosphere** is a blanket of air that protects the Earth from Sun's harmful radiation and keeps the Earth at an even temperature. This blanket is made up of a perfect balance of gases that is destroyed by pollution: **carbon dioxide** in the Earth's atmosphere keeps the warmth from escaping and **heats the surface of the Earth because thermal energy gets trapped**.

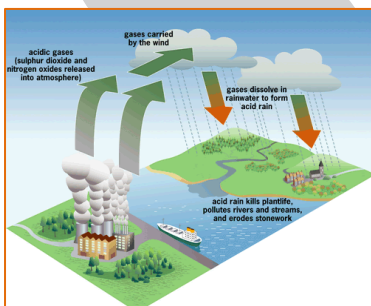
We call this phenomenon the **greenhouse effect** because the atmosphere behaves like the glass in a greenhouse, warming the inside.



Recently, the amount of carbon dioxide in the atmosphere has increased due to the consumption of combustible fossil fuels. Too much carbon dioxide in the atmosphere warms the Earth too much and causes **global warming**.

There is already evidence of this happening. **Glaciers are melting** and causing sea levels to rise. The **rise in sea levels** causes flooding. Scientists predict that global warming will have serious consequences.

ACID RAIN



When coal and petroleum-based fuels are **burned**, **toxic substances are released** into the atmosphere. These substances dissolve in rain to make **acid rain**. Acid rain destroys crops and forests, kills fish in lakes and rivers, and damages buildings and monuments.

Acid rain can be avoided. If we use less energy, fewer toxic substances are released. We can also filter gasses from factories or automobiles, or use cleaner energy sources.

SAMPLE

UNIT VOCABULARY

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In this unit I have learned:

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3.- _____

I would like to learn more about:

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