Unit 9

Sources of Energy

In std 6 you have studied about different sources of energy. List the different sources of energy and where those are used.

As shown in the figure, the fan works with two different sources of energy :
(1) Solar cell (2) Dry cell
Which device will you prefer for fan ? Why ?

Sources of energy is divided in two parts :

(1) Non-Renewable Energy Source :

When the energy of any source of energy is used then naturally if the energy of that source is not available for use in near future, that source of energy is called non-renewable energy source.

Characteristics :

- This source of energy decreases.
- The use of this energy source increases pollution.

- This energy source is under the ownership of an individual, a particular group or a country.

Near time interval means the average lifetime of human being e.g. 60 to 80 years.

(2) Renewable Energy Source :

When the energy of any source of energy used then naturally if the energy of that source is available for use in near future then, that sources of energy is called renewable energy source.

- Continuous energy is available from this energy source so it is not decreasing.
- Normally this type of energy source is non-polluted.
- These energy source is not under the ownership of any individual, a particular group or a country.
- The energy from this source of energy is free of cost.
- These energy source is easily available everywhere.

List out the energy sources in the surrounding of you. Distribute those into renewable and non-renewable energy source.

Renewable Energy Sources	Non-renewable Energy Sources

Let's take detail information about these two energy sources.

Non-renewable energy sources :

Mineral Coal :

Mineral coal is available from Earth. Mineral coal is made by naturally buried trees and vegetables. This coal is taken out by mining work.

Uses :

- Used as a fuel in the thermal power-stations.
- In early days it was used as a fuel in home, ships and railway engine.
- It is used as a fuel in industries.

Benefits :

- By obtaining coal gas, the gaseous fuel, from coal the present energy crisis can be reduced.
- Coal is in more amount compared to petroleum.

Limitations :

- Pollution spread due to use of this energy source.
- Sooner or later coal extracted from earth core will end up.

Petroleum products :

Petrol, diesel, liquefied petroleum gas (LPG), kerosene, fuel oil etc. are obtained from petroleum. Petroleum is produced from the dead bodies of living things buried in the core of the earth millions of years ago. You have learned about practical usage of petroleum products in standard 6. Make a list of it.

Benefits :

- The energy from this source is easily available for a day to day use.
- Transportation of this energy source is easy.

Limitations :

- A petroleum product produces pollution.
- There is limited stock of petroleum inside the earth.
- Mixing in such fuel is very harmful for environment.

Natural Gases :

Natural gas is independently available from the core of the Earth, which is used as a fuel. Which is known as CNG (Compressed natural gas).

Uses :

- This gas is used as fuel in the vehicle like car, rickshaw, bus etc.
- It is used as fuel in thermal power-station.
- The region in which this gas is available, from there it is given to the houses of near by cities by pipeline for use as fuel at home. (This pipeline is of yellow colour. In Gujarat, in Gandhinagar, Ahmedabad, Vadodara, Bharuch, Ankleshwar, Surat this facility is there.)

Benefits :

- Use of this energy source produce less pollution.
- This energy source is in more amount compare to the petroleum in the core of the Earth.

Limitations :

- The use of this fuel produce carbon dioxide, which cause the greenhouse effect.
- This energy source is not endless.

Atomic Energy :

Due to fission of heavy nuclei like uranium, large amount of energy is released. It is called atomic energy.

Uses :

- Using the heat produced from it electricity is produced.

Benefits :

- From every small amount of uranium large amount of energy is available.
- Use of this energy source does not produces the gases like carbon dioxide.

Limitations :

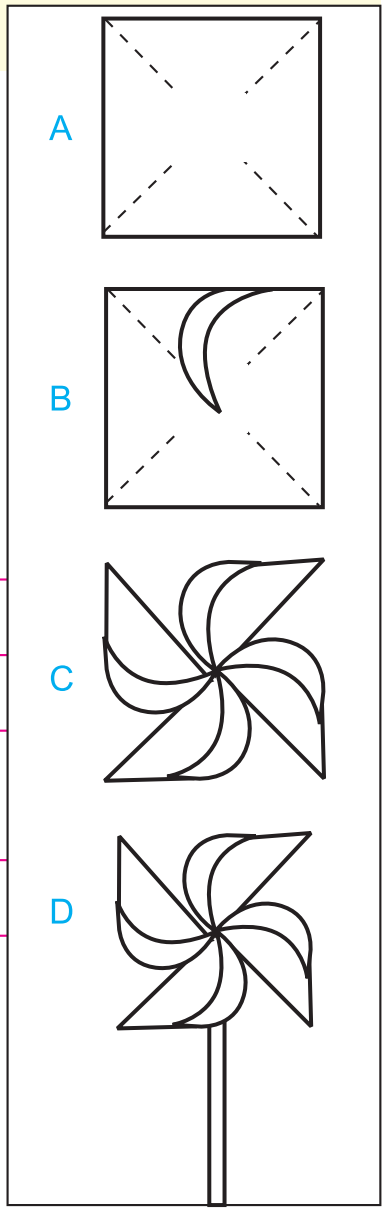
- The uranium required for the atomic energy is in very small amount in the core of the Earth.
- If radiation leakage takes place due to improper care or Earth quake, tsunami, like natural calamities, then it is very much harmful for environment and all living organisms.

Renewable source of energy :

Wind-energy :

Air in motion is called wind. The energy associated with this wind is called wind-energy.

What is required ? Paper, scissor, pins and bamboo-stick



What to do ?

- ☞ First of all cut the paper as shown in figure A.
- ☞ Then fold the paper as shown in figure B and C.
- ☞ Now as shown in figure D attach this paper with bamboo-stick using pin.
- ☞ Place this one where the wind is blowing and see what happens.

From where does it obtain the energy for rotation ?

Uses :

- Sailing boats are sailed using wind-energy.
- By placing large number of windmills at the places where continuous wind is blowing, large amount of electric energy can be produced.

- This place is called wind farm. Using windmill following work can be done by wind energy.
- (1) To lift water from well.
- (2) To produced electrical energy.
- (3) To operate flour mill.
- For trashing in farming wind energy is used.

Benefits :

- This energy source is pollutionfree.
- After initial establishment expense for windmill this energy is free of cost.
- This energy source is endless.

Limitations :

- To operate windmill minimum speed of wind should be 16 km/hr.
- Initial expense to establish windmill is more.
- Continuous wind required for wind energy is not available in all regions.

Hydral Energy :

The energy associate with flowing water is called the hydral energy.

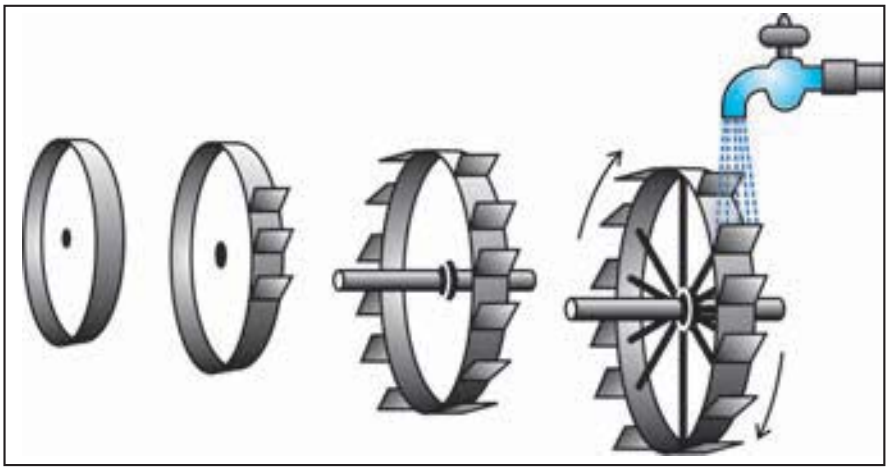
What is required ? Circular plastic cap, straw, knife, rod, measure-tap, nail and hammer.

What to do ?

- ☞ Mark at definite distance on the plastic cap.
- ☞ Make cuts as shown in figure.
- ☞ Band the cut part so that it remains outside and prepare saws.

At the center of the cap make a hole of the size of straw and insert a rod in it.

Adjust it in such a way that the water coming out of the tap fall on the saws.



- See, what happens?

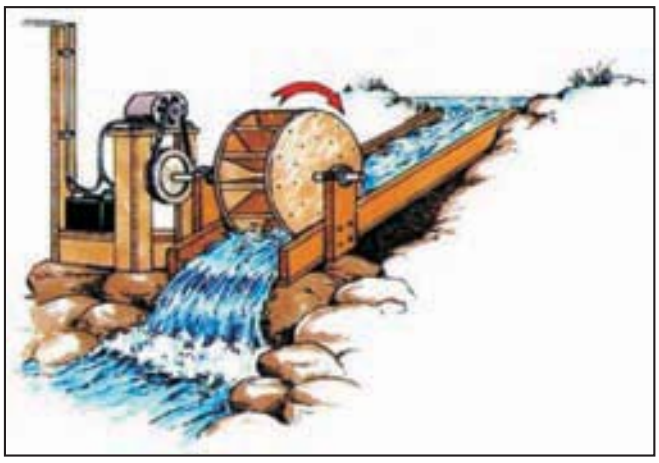
- From where the wheel get energy to rotate ?

Uses :

- The turbine convert hydral energy into mechanical energy. Which is used to produce electrical energy by rotating generator.

Benefits :

- This energy sources is pollution-free.
- After the establishment expense of hydropower-station the energy is costfree.



Limitations :

- Construction of hydropower station is very expensive.

Solar Energy :

For earth main energy source is sun. The light energy and heat energy in the form of radiation from the sun is called solar-energy.

Uses :

- The solar-energy is naturally used by plants to prepare food during the process of photosynthesis.
- Using solar cooker, solar water heater, solar furnace, the solar-energy is converted into heat-energy.
- With the help of solar cells, solar-energy is converted into electrical energy which is used to run water pumps.
- The electrical energy obtained by solar cells is stored in storage cells and used at night to get light.
- The electrical energy obtained from solar cells is used in calculator, wrist watch, toys etc.
- In the remote areas and artificial satellites for which conventional electrical energy is not available, the electrical energy is obtained from the solar energy using solar cells.

Benefits :

- Solar-energy is endless and available in almost all the regions.
- Solar-energy is non-polluted.

Limitations :

- Efficiency of solar devices is less and solar cells are costly.

Geo-thermal Energy :

Below the surface of the earth, different minerals and rocks are in molten form, which is called molten lava. In some region this molten lava is close to the surface to earth. In this region when underground water reaches at depth it is converted in vapour. The energy obtained by this compressed vapour is called geo-thermal energy. In this region at some places hot water springs are obtained.

Uses :

- By the compressed vapour in geo-thermal energy region, the turbine is rotated and electrical energy is obtained.
- Geo-thermal energy is used to maintain the temperature of houses in cold regions.

Benefits :

- This energy source is pollution-free.

Limitations :

- On the earth there are few regions from where geo-thermal energy is obtained.

Bio-mass Energy :

The matters form of solar energy is called bio-mass. Fossils of living elements, stool-wine, by products of farming, parts of plants are bio-mass. The solar energy is stored in this bio-mass.

Uses :

- Bio-mass is used as a fuel in rural areas.
- The gaseous fuel - bio-gas is obtained from Bio-mass. Which is used to get light and electricity and in kitchen.

Benefits :

- Bio-mass is continuously available in earth so it is renewable.
- If bio-gas is produced from biomass than dirtiness of rural area is removed and as a by-product organic composed is obtained.

Limitations :

- Air pollution is produced due to use of bio-mass.
- In addition to this methanol, ethanol, bio-diesel and hydrogen is also used as a sources of energy. Get the information about these energy sources.

Get the book 'Energy' from library and collect more information.
Which energy keeps our future safe ? Discuss.

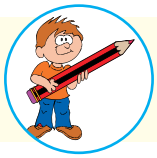
Measures of energy savings :

Energy is our important necessity, so we have to use energy rationally.

For conservation of energy source some points are as follows :

- For the cooking of food take the water as per requirement.
- During the cooking close the container and if possible use the pressure-cooker.
- Gas burner and stove should be regularly cleaned.
- Solar cooker should be used.
- Don't open the door of fridge frequently.
- Switch off electrical appliances when are not in use.
- The public transportation should be used for travelling.

How energy can be saved ?



Q.1 From the following information decide the energy should used is renewable or non-renewable :

(1) Wood burning in fire place.
(2) You are travelling in bus.
(3) Rohan is riding scooter.
(4) Bhakti is riding scooter.
(5) Solar cooker is at Imaran's home.
(6) Vaishnavi uses gas stove.
(7) Bio-gas plant is at Naman's home.
(8) Electricity is produced by turbine using waterfall.
(9) Rabia uses tube-light, which use solar energy.
(10) You are taking food.
(11) Traffic signal light with solar panel.

Q.2 Give answer of following questions :

(1) Explain the difference between renewable and non-renewable energy sources.
(2) 'Mineral coal and petroleum products should be used rationally.' Explain this statement
(3) Woods are which type of energy sources ? Renewable of non-renewable ?
(4) What you will do at school to save energy ?