13 ENERGY

13.1. Observe the picture and say

- Name the vehicles in the picture.
- What is needed to pull cycles, rikshaws, bullock carts etc.
- What is needed for operating cars, motorcycles, vans and autos?
- There are two trains in the picture. Which fuel does the first train use? Which fuel second train uses?

Some vehicles need fuels like petrol and diesel to run. Vehicles like bullock carts and rikshaws do not need fuel. We pull them with energy obtained from eating food. Vehicles and machines work with the help of fuels like petrol, diesel and also with electricity and gas. The food we take gives us energy. Fuels provide energy to vehicles or machines. Energy is needed for men and machines work and vehicles to move.

13.2. What do these need?








Think and say

- What are the things in the above picture?
- What is needed by a fan to rotate?
- What is needed by a torch to give light?
- What is the reason for chilli drying up?
- What are the different stoves used in the above picture? What is needed by them to burn?
- How does an iron box get hot?

Some gadgets need electricity, some others depend on solar energy, yet others need fuels to get the energy needed for their operation. Energy is the basis of all operations work and movements. Energy is used for many different purposes and it is used in different forms.

Group work

- Write about some activities that use energy.
- Name 4 different forms of energy resources.
- Which energy resources do not get depleted even after using them.
- Which energy resources get depleted when used continuously?

13.3. Energy resources

Energy is obtained from different sources like sun, wind, water, petrol, diesel, kerosene, gas and coal etc. Among these petrol diesel, kerosene, gas, coal, water etc get depleted when used in excess. Resources like sun wind never get exhausted. The world needs energy for many things. Energy is needed for any work and for survival. Mankinds need for energy has increased because of the increase in consumption.

13.3.1. Non - renewable resources.

Energy that comes from burning fossil fuels is called fuel energy. Coal, kerosene, gas, petrol, diesel etc are fuels. The energy obtained by burning these fuels is used to generate electricity and in transportation, operating the various machines in industries and cooking food in the houses etc. These fuels are extracted from the earth. Trees and animals which were burried for lakhs of years inside the earth ultimately were transformed into fules. We are using these fuels, petrol, coal and natural gas. In huge quantities and in couple of hundred years they will get exhausted

Group work

- What would happen if coal reserves are used heavily? How do they get depleted?
- What can we use in place of non-renewable fuels?
- What should we do to conserve non renewable energy resources?

We should use energy resources as carefully as possible. Instead of wood, natural gas must be used. Nowadays gobar gas is produced from dung. This is called 'Gobar gas'. We should save even this. We should save petrol and diesel as much as we can Electricity also must be saved. We should not use electricity unnecessarily. Electricity saved is electricity produced. Decrease the usage of fans, T.V.etc. Instead of using electricial appliances for household work we can do the work ourselves manually and save fuel resources. In our state, electricity is mostly produced in hydroelectric stations or thermal bower stations using coal and water as their basic resources. By saving electricity, you can save these resources. It is our duty to conserve the non renewable resources.

13.3.2. Renewable energy resources

Sunlight water and wind never get exhausted. These are called renewable resources. Let us know more about them.

13.4. Solar energy

We use solar energy to dry clothes, grains and fish. Do you know that electricity can also be made using solar energy?

Solar street light

Do you know

How do street lights light up with solar energy? When sunrays fall on the solar cells they and produce (current) electricity. We use the electricity in the battery when needed. Electricity produced during day time is stored in chargin the batteries. Which is use to light up the streets at night.

Following are the appliances that work with the help of solar energy.

Emergency lamp

Calculator

Solar heater

Solar car

Group work

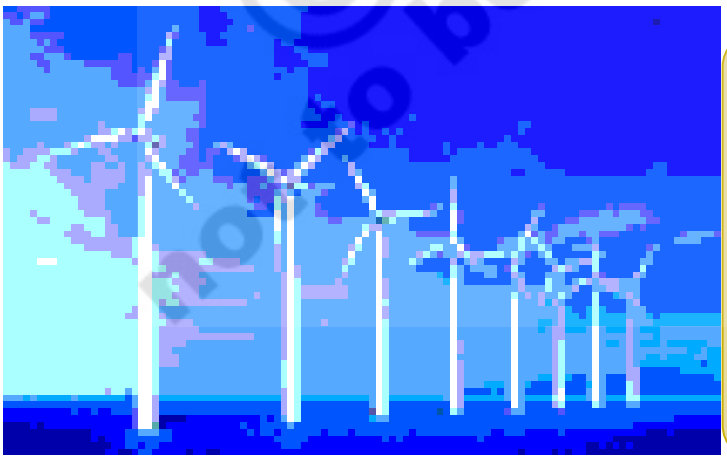
- How is solar energy used in daily life?
- Why should we use solar energy?
- Write about the abbliances that use solar energy

In our country Gujarat uses solar energy to the maximum extent. Schools and government offices in this state use electric appliances that use solar energy. Radio, television and computer etc can be operated using solar energy.

13.5. Wind energy

Wind means air. Does is have energy? How can you say? How is the energy generated by wind used in our daily life? Look at the adjacent picture. It is a dynamo. When the cycle is moving the bulb lights up due to this dynamo. This implies that fast moving cycle tyres generate energy. Do you know that wind has the capacity to move and rotate things.

Look at the picture below.



Think and say

- Can you see the very big fans in the picture?
- Do you know how do they run? Where do you find them?
- What are the uses of these fans?

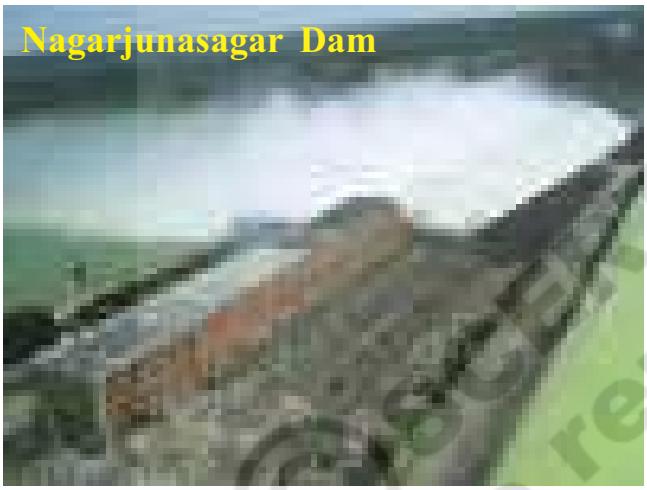
The large fans move when wind blows. When these fans move, electricity is generated due to the energy of the wind. These wind mills are arranged where the wind blows fairly well like on hills or on sea shores. Wind has the capacity to push things. Wind energy is used to rotate the fans, to pull out from water wells and to run vehicles and to make the boats move on surface of water.

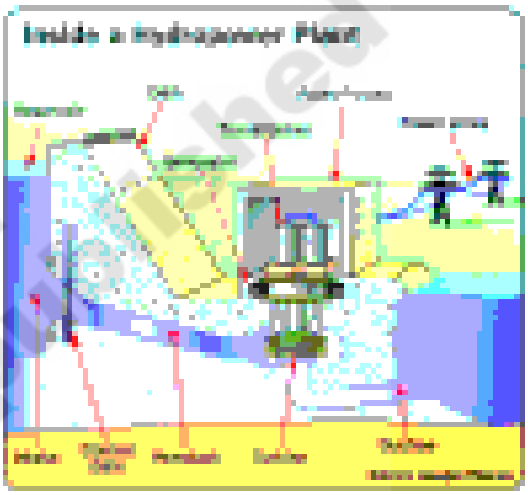
13.6. Water energy

Think and say

- Does water have energy? How can you say?
- How do we use water energy in our daily life? Give examples.

Water which is stored at a height and allowed to fall down. This energy water can be used in producing electricity. Electricity is generated in the hydro electric projects by the rotation of turbines by making water fall on them. Observe the picture of Nagarjuna sagar project given below.





Nagarjuna sagar project in Nalgonda district and Srisailam project in Kurnool district in Andhra pradesh use stored water to generate electricity. See the second picture, electricity generated using the water is called hydro electricity. Water is sent through pipes called penstock to run the turbines. When these turbines rotate electricity is generated. This electricity is supplied from power houses through transformers. The power stations where electricity is generated from water are called "Hydro electric power stations". Electricity is generated even with water vapour that is produced when water is heated with coal. This is called thermal electricity.

Think and say

- Where are the Hydro electric power stations located in our state?
- Is electricity in the power stations generated throughout the year?
- In which month is electricity generated more? Why.
- What are the differences between hydro electricity and thermal electricity. Which electricity must be used more?

13.7. Energy resources in future

Petrol and coal reserves are diminishing continuously, so we should learn to depend upon the energy resources that do not diminish even after use. Effective methods to use solar energy hydroenergy, wind energy must be found out by experimenting. You should try them in future.

Observe the following table.

S.No.	Diminishing, Depleting Non renewable reserves	Non diminishing, Non depleting Renewable reserves
1.	Petrol, diesel, kerosene, coal are the examples	Solar energy, wind energy, hydroenergy are the examples
2.	Cost High	Cost less
3.	Pollutants	Non Pollutants
4.	Will not be available for a long time	Available forever
5.	Alternatives to these must be prepared	Instead of preparing other alternatives it is best to use these in a proper way.

Think and say

- Which resources should be used more from the above table? Why?
- Suggest same resources / energies in place of non renewable resources.

13.8. Conservation of energy resources

Energy is needed for our surrival and prosperity. We should think of proper ways of utilising different energy resources in nature. We should try to conserve energy resources and to reduce pollution. We should not waste fuels but save them for future. We should decrease the use of non renewable resources and increase the use of renewable resoureces.

Think and say

- What should we do to save fuels?
- What do you do to save electricity?

How to save fuels?

- Walk short distances. Thus we can save fuel and enhance our health.
- Use bicycles instead of cars motorcycles and scooters. This is the practice in many European countries.
- Travel in public transport systems like RTC buses and trains as far as possible. Do not use car for short distances. This causes traffic and pollution on roads.
- Do not use electric lamps as far as possible in the daytime. Open windows and doors to keep the house well lit and ventilated.
- Switch off the current while going out of the house and at nights while sleeping. Do not keep the lights on in bathrooms and toilets when not required. Do not use geysers, electric cookers microwave ovens, electric iron boxes, washing machines, grinders etc except in case of emergency.
- We should use natural air for cooling our bodies. Use fans only when needed. Air Conditioners won't be necessary if you grow plants and trees around the house and in your surroundings.
- Do not burn coal or wood unnecessarily. Make compost of leaves and garbage. Do not pollute air by burning them.
- Do not waste water and keep on taking steps to conserve water.
- We get energy through food material. Do not waste food material. Do not over heat material because more fuel is used and the nutritive values are also lost.

Keywords

Energy
Current (electricity)
Solar energy
Wind energy
Natural gas
Hydro energy
Fuel
Hydro Electricity
Non renewable energy
Renewable energy
Fuel energy
Wind electricity
Energy resources

What have we learnt?

1. Conceptual understanding

a) What is fuel? Give examples.

b) Give examples of the appliances that work on solar energy.

c) What are the renewable and non renewable energy resources? Give examples.

d) What can you do to save electricity?

e) What are energy resources? Why should we conserve energy resources.

2. Questioning and hypothesis

a) Ask your parents how do they save electricity?

b) Powercuts are more now a days. Meet the electricity officer of your area. Ask him about the reasons for powercut.

3. Experiments - field observations

- How many units are spent in a month? Observe and write how many units of electricity is consumed in your house. How much money is paid in a month towards electricity bill?

4. Information skills, projects

a) Visit four of your friend's houses. How much money is paid in a month towards electricity bill. How many units are consumed. What are the reasons? Collect the details and write down in the table.

Name of the friend	How many units are consumed	Electricity bill	Reasons

b) Make a table of appliances in your house or village that work with different energy resources.

5. Communication through mapping skills, drawing pictures and making models

a) Draw a picture on production of hydro electricity and explain.

b) Draw wind mills that generate wind electricity.

c) Draw the picture of any one electric appliance used in your house. Write about it.

6. Appreciation, values and creating awareness towards bio-diversity

a) Wood is also a fuel. Wood is mostly used for cooking purposes. What can be used as an alternative? In case you must use wood what would you do?

b) Which is the best among wind energy, hydro energy, fuel energy, solar energy? Why? Which among the above should be saved? What can we do?

c) Display slogans to make everyone aware that water and eletricity must be saved.

Can I do this?

1.	I can explain the activities to save fuel.	Yes / No
2.	I can question about saving electricity and power cuts.	Yes / No
3.	I can observe the expenditure on electricity in my house.	Yes / No
4.	I can prepare a table with the reasons for over consumption of electricity.	Yes / No
5.	I can explain the generation of hydro electricity with the help of a diagram	Yes / No
6.	I can talk about saving fuels.	Yes / No