



13.1. Observe the pictures, think and say



- Name the vehicles in the picture. How do they run ?
- 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 run on? Which fuel does the second train run on?

Vehicles need fuels like petrol and diesel to run. Some 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 by humans and machines work and by vehicles to move.

13.2. What do these need?



Think and say

- ♦ What are the things in the picture above?
- ♦ What does a fan need to rotate?
- ♦ What does a torch need to light?
- ♦ How are chillies dried?
- ♦ What are the different stoves seen in the picture above? What is needed to light them?
- ♦ How does an iron box get heated?

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

Group work



- ♦ Write about some activities where you use energy?
- ♦ What are the forms of energy?
- ♦ Which energy resources do not deplete even after we use them?
- ♦ Which energy resources deplete when used continuously?

13.3. Energy Resources

Energy is obtained from different sources like the sun, wind, water, petrol, diesel, kerosene, gas and coal etc. Among these petrol, diesel, kerosene, gas, coal, water etc., deplete when used repeatedly. Resources like sun, wind will never get exhausted. The world needs energy for many things. It is needed for all kinds of work and for survival. The need for energy resources is increasing day by day with an increase in the energy consumption.

13.3.1. Non - Renewable Resources

Energy that comes from burning 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, in transportation, in operating the various machines in industries and cooking in the houses etc. These fuels are extracted from the earth. Trees and animals which remains buried for lakhs of years inside the earth ultimately transform into fossil fuels. We are using these fuels, (petrol, coal and natural gas) in such huge quantities that in a couple of hundred years they will get exhausted. It will take lakhs of years for these fuels to form.

Group work



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

We should use the energy resources as carefully as possible. Instead of wood, natural gas must be used. Nowadays, goar gas is produced from dung. We should save it also. 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. Reduce the use of fans, T.V.etc. Instead of using electrical 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 power stations using coal and water as their basic resources. You can save these resources by saving electricity. It is our duty to conserve the non-renewable resources.

13.3.2. Renewable Resources

Fuels like coal, diesel, petrol, kerosene, gas etc., that are extracted from earth get exhausted as we use them. 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?

Do you know?

When sunrays fall on the solar cells they produce (current) electricity. We save the electricity in the battery and use when needed. Electricity produced during day time is stored in the batteries. This is used to light up the streets at night.

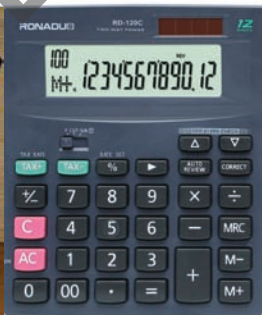


Solar street light

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



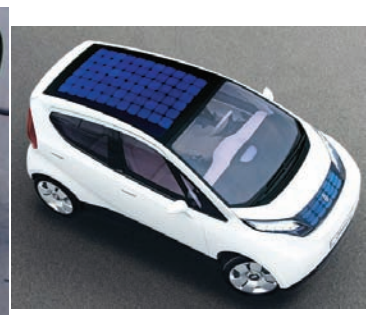
Emergency lamp



Calculator



Solar heater



Solar car

Group work



- ◆ How is solar energy used in daily life?
- ◆ Why should we use solar energy?
- ◆ Write about the appliances 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 also be operated using solar energy.

13.5. Wind Energy

Wind means air. Does wind 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 moves the bulb glows. This implies that the 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 they run? Where do you find them?
- ◆ What are the uses of these fans?

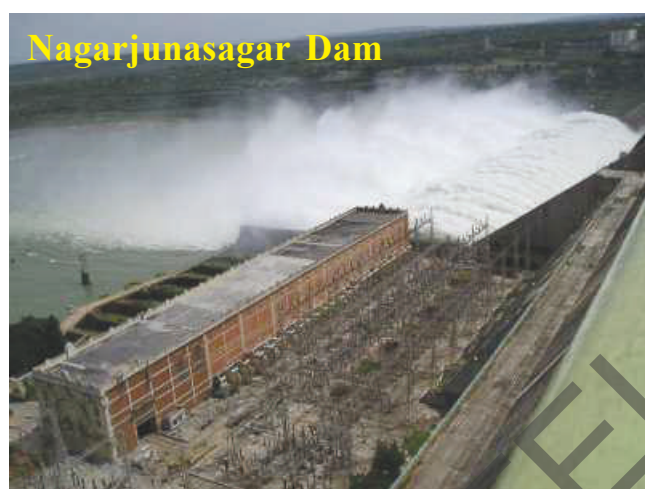
The large fans move when wind blows. When these fans move, electricity is generated due to the energy of the wind. These wind mills are arranged where the wind blows fairly well like on hills or on sea shores. The energy that is generated is called wind energy. Wind has the capacity to push things. Wind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

13.6. Water Energy

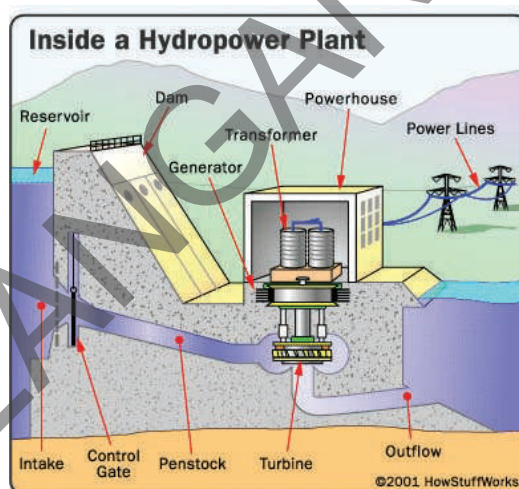
Think and say

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

Similar to sunlight and wind, water also has energy. Water is used in producing electricity (hydro electricity). Electricity is generated in the hydro electric projects by the rotation of turbines due to the water falling on them. Observe the picture of the Nagarjuna Sagar project given below.



Nagarjuna Sagar Dam



The Nagarjuna Sagar Project in the Nalgonda district in Telangana and Srisailem project in the Kurnool district in Andhra Pradesh use stored water to generate electricity. Look at the second picture showing the generation of electricity using water. This 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?
- ◆ Which month is the generation of electricity more? Why?
- ◆ What are the differences between hydro-electricity and thermal electricity? Which electricity is 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 repeated use. Effective methods to use solar energy, hydro energy, wind energy must be found out by experimenting. We should try and use them in future.

Observe the following table.

S.No.	Non- renewable reserves	Renewable reserves
1.	Petrol, diesel, kerosene, coal are the examples	Solar energy, wind energy, hydro energy are the examples
2.	Expensive	Cheap
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 answer

- ♦ From those given in the table above which resources should be used more? Why?
- ♦ Suggest some resources / energies in place of non Renewable resources.

13.8. Conservation of Energy Resources

Energy is needed for all activities. We should think of proper ways of utilising different energy resources in nature. We should try to conserve the 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 resources.

Think and answer

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

How to save fuels?

- Walk short distances on foot. It saves fuel and it is good for health.
- Use bicycles instead of cars, motorcycles and scooters. This is in practice in many of the European countries.
- Travel in public transport systems like buses and trains as far as possible. Do not use cars for one or two persons. This causes traffic congestion and pollution on roads.
- Avoid using electric lamps in the daytime. Open windows and doors to keep the house well lit and ventilated.
- Switch off all electrical appliances while going out of the house and at nights before 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 when required.
- Try natural methods for cooling. Use fans only when needed. There will not be any necessity of air conditioners, 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 from food. Do not waste food. Do not over heat food because it requires more fuel and the nutritive values are also lost.

Keywords

energy

electricity

solar energy

wind energy

natural gas

hydro energy

fuel

hydro electricity

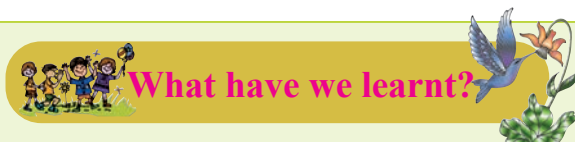
non renewable energy

renewable energy

fuel energy

wind electricity

energy resources



1. Conceptual Understanding

- What is fuel? Give examples.
- Give examples of the appliances that work using solar energy.
- What are renewable and non-renewable resources of Energy? Give examples.
- What do you do to save electricity?
- What are energy resources? Why should we conserve energy resources.

2. Questioning and Hypothesis

- Ask your parents how they save electricity?
- Power cuts 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 of electricity are spent in a month? Observe and write the number of units of electricity are consumed in your house. How much money is paid in a month towards electricity bill? Observe.

4. Information skills, Projects

- Visit four of your friends' houses. Find out, 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	Units of Electricity consumed	Bill Amount	Reasons

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

5. Communication through Mapping Skills, Drawing Pictures and Making Models

- a) Draw a picture showing the production of hydro electricity and explain the process.
- 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 used mostly for the purposes of cooking. What else 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 and solar energy? Why? Which among the above should be saved? What can we do?
- c) Display slogans to create awareness about saving water and electricity.

I can do this

- | | |
|---|----------|
| 1. I can explain the steps to save fuel. | Yes / No |
| 2. I can ask questions about power cuts and saving electricity. | 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 and saving electricity. | Yes / No |

