

BOOK

**I**

# SCIENCE BASICS

*Essential*



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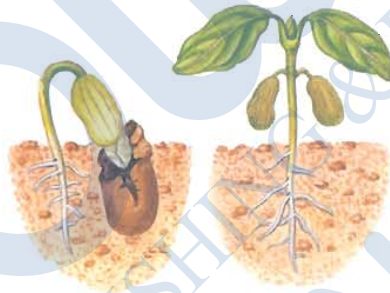
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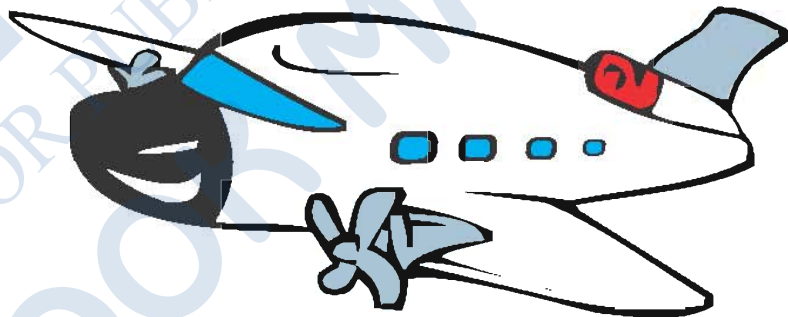
# Understanding energy

A lot of matter around us is moving. The air is moving, and leaves of plants are moving in the air. Animals, cars, aeroplanes, people, all are moving. We know that whenever matter moves, work is being done.



## INVESTIGATE

- How many kinds of fuels are vehicles using nowadays?
- Can you make a list of things that work by solar energy?



We need energy to move. Energy is required to make matter move. Energy is the ability to do work. Energy is also required to change matter. Energy is required to change ice to water, or water to steam. Energy is required to change wood to smoke and ash. Running, walking, reading, all things we do, need energy. We need energy even when we breathe.





## Forms of energy

There are many forms of energy. Some of these are as follows.

**Heat energy:** It is used to cook food, and to change water to steam. It is also used to make steam engines work. It is used to keep us warm in cold weather. Sun is a source of heat energy.



**Electrical energy:** It helps us to see things. It runs the washing machine, refrigerator and so many other things in our house. It is produced in power stations from where it is supplied to our houses.



**Light energy:** It is used to heat and light our homes. Plants use light energy to make food. The energy of the Sun is called Solar energy. Scientists have made many things that work by solar energy like calculators, cars, and lights.



**Kinetic energy:** Moving things have kinetic energy. Moving wind makes wind mills work. Moving water is used to make electricity in dams.

**Sound energy:** Sound is also a form of energy. Loud thunder can make the window panes in your house rattle.

- Energy can be stored

Energy can be stored for later use, in various ways. Energy is stored in food. Your body stores energy in the form of body fat. A battery has stored energy. The chemicals inside it have stored energy which can be changed to electrical energy. Energy is stored in wood. When it is burnt, this energy is given out as light and heat. LPG (liquid petroleum gas) is used at home to cook food. Petrol and LPG have stored energy too. Things which can be burnt to produce energy, such as wood, petrol, coal or LPG are called fuels. They are important sources of energy for us.



### Remember

1. Energy is required to do work or to change matter.
2. There are various forms of energy: heat energy, light energy, electrical energy, kinetic energy and sound energy.
3. Energy can be stored for later use.
4. Things which can be burnt to produce energy are called fuels.





1. Put a  for true and a  for false.

Can you give any reason why you said it was true or false?

a) You can do work even if you do not have energy.

Reason \_\_\_\_\_

b) Energy is available in various forms.

Reason \_\_\_\_\_

c) Fuels have stored energy in them.

Reason \_\_\_\_\_

d) Sun is an important source of energy.

Reason \_\_\_\_\_

e) Light energy is the most important form of energy.

Reason \_\_\_\_\_

2. Name these :

a) It is required to do work.

b) This form of energy is used by plants to make food.

c) This form of energy is required to make electricity in dams.

d) Our body stores energy in the form of it.

e) Things are burnt to produce energy.

3. What do you understand by fuels?

Name some common fuels.

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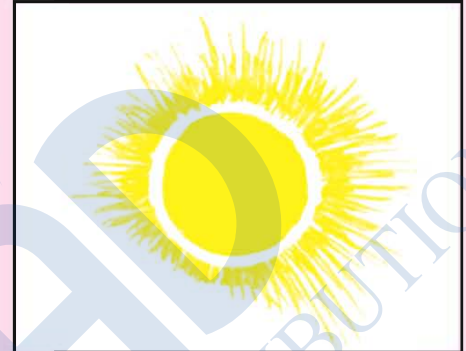
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**AWARENESS BEYOND THE CLASSROOM****Sources of energy that will disappear one day**

Coal is dug out from below the Earth's surface. Petrol is made from crude oil, which is also dug out from below the Earth's surface. There are limited amounts of coal and petrol. They will end one day probably about 100 years from now. This situation is very alarming. We should therefore not waste energy. At the same time, we have to find other sources of energy that will not finish soon. Can you think of any such sources?

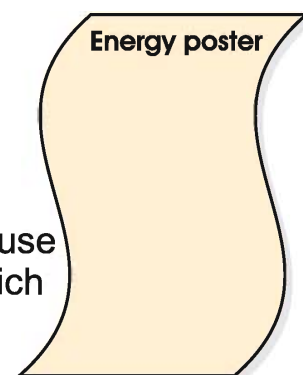
The Sun, wind and water give us energy that will not end soon. Scientists are therefore trying to find better methods of using these kinds of energy. Solar heaters are used to heat water and to cook food. Solar cells convert the Sun's energy into electricity. Wind mills are used to convert the energy of wind to electricity. Of course, water energy has been used to make electricity for a long time.

**PROJECT**

- **Energy poster**

There are many forms of energy. We use everyday some of these forms. All forms of energy are very useful for us.

Make an "energy poster" in which you show the ways we use energy everyday. There are some things that we use, which have more than one form of energy. Also draw such things and mention which forms of energy are used.



# How sound works

Sounds are around us everywhere. There are everyday sounds we pay no attention to. There are warning sounds, we should listen to.

There are pleasant sounds we enjoy.  
There are noisy sounds that disturb us.

## • How is sound produced?

Sounds are made by a movement of something backwards and forwards very fast, called a vibration. These vibrations travel through air to our ears, and we hear them as sounds. When objects vibrate, they make different sounds.



## Do you know?

- It takes three seconds for sound to travel one kilometer.
- Sounds travel in the form of waves.
- The inside parts of your ears are behind and slightly below your eyes.
- People living in quiet places have a better sense of hearing than people living in noisy cities.
- Whales in the ocean sing to each other and their sound can travel a distance of 800 km.

## Awareness inside classroom.

Hold down one end of a plastic ruler at the edge of your desk. Press down the free end and let it go quickly. What do you hear?

Slap the free end of the ruler again. Before the sound stops, stop the ruler with your hand. Does the sound stop or not? Can you make a sound with the ruler without moving it? The ruler makes sounds by moving backwards and forwards again. This movement is called vibration.



- **Natural and artificial sounds**

Some sounds are natural sounds. Natural sounds are those which are produced by man or by animals. A boy shouting or a dog barking are natural sounds. Some sounds are artificial sounds. Artificial sounds are produced by the things which are made by man. Sounds of musical instruments are artificial sounds.

- **Sounds can travel through different things**

Sounds can travel through different things to reach our ears. They can travel through air, water and some solid materials. They can travel faster through some liquid and solid things than through air. It depends on how easily the substance vibrates. The picture shows a boy scratching sound. Because his ear is against the trunk he can hear the scratching sound. The boy standing in the middle is closer to the sound, but sounds travel faster through a trunk (a solid thing) than through air.

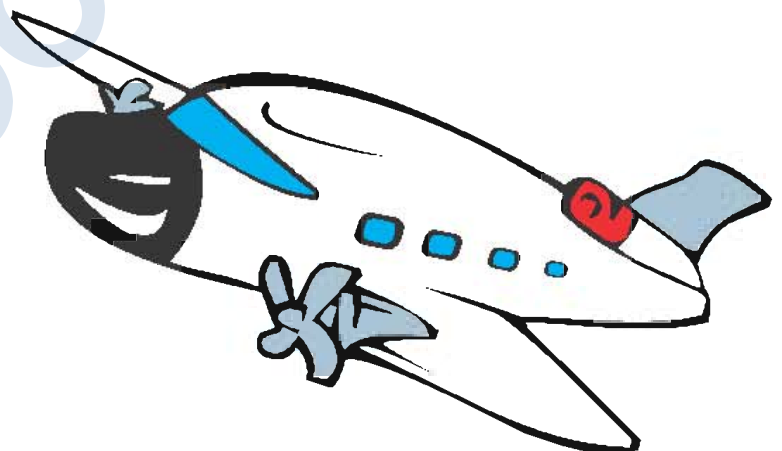


### INVESTIGATE

- Can you find out through which thing sound travels fastest, through air, water, brick or steel?
- Which travels faster, light or sound?
- Do fish, insects and plants listen?

- **How fast sound travels**

We always see the flash of lightning before we hear the crack of thunder. This tells us that it takes some time for the sound of thunder to travel and reach us. When you hear a plane in the sky, it is not always easy to spot it. The sound of a plane may take a minute to reach you. By the time you look up at the plane, it may have travelled another 10 or 15 kilometers.



## How sound works

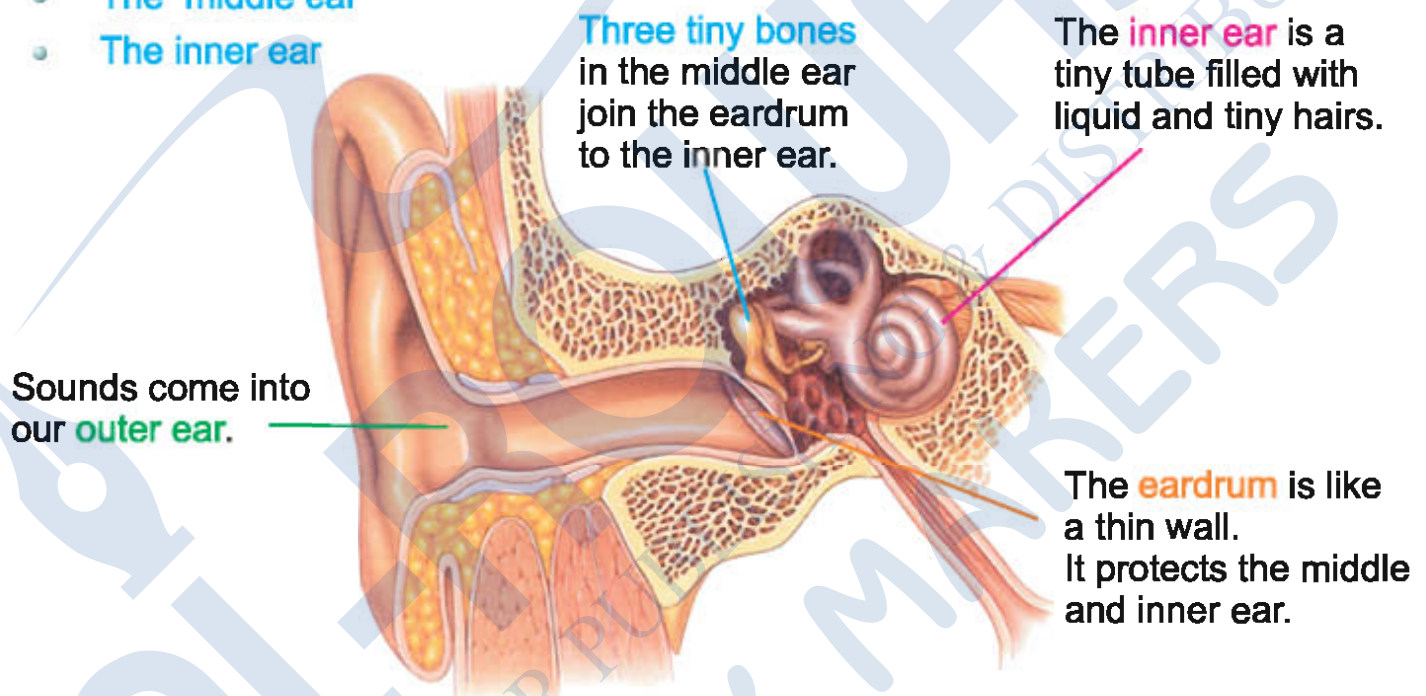
- **Sounds medium**

A substance through which sound can travel is called a sound medium. Air is usually the medium through which sounds travel. There is no air on the Moon, so if you shout on the Moon nobody can hear you.

- **How do we hear?**

Our ears are very important because we hear sounds through our ears. Each ear has three sections:

- The outer ear
- The middle ear
- The inner ear



The outer ear consists of flaps on each side of our head. Each flap acts like a funnel, taking in moving sounds into the ear. The rest of the outer ear is a tube. Sounds travel along this tube to reach the inner portions of ear. A sound is a very little movement in the air. To hear a sound it has to travel through our outer, middle and inner ear. Having two ears helps us to tell the direction of sound.

### Remember

1. Sounds are produced when something vibrates.
2. Natural sounds are those which are produced by Man or an animal.
3. Artificial sounds are those which are produced by Man-made things.
4. Sounds can travel faster through some solid things than through air.
5. Sounds take three seconds to travel one kilometer.
6. A substance through which sound can travel is called a sound medium.
7. To hear a sound, it has to travel through our outer, middle and inner ear.

