

簡易英語科技叢書

空氣



中外出版社

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出版說明

《簡易英語科技叢書》是爲初學英語的中國青年學生提供一套閱讀英語科技書籍資料的參考讀物。

本叢書包括十六個科學課題，分爲十六冊出版。每一課題構成一個完整的知識讀物。這十六個課題把目前國外學校教學中的基礎科學內容都包括進去了。

爲提高讀者科學知識和閱讀興趣，每一分冊均附有生動的彩色插圖，英語文字力求淺顯，使一般初學英語的中國青年學生都能接受。

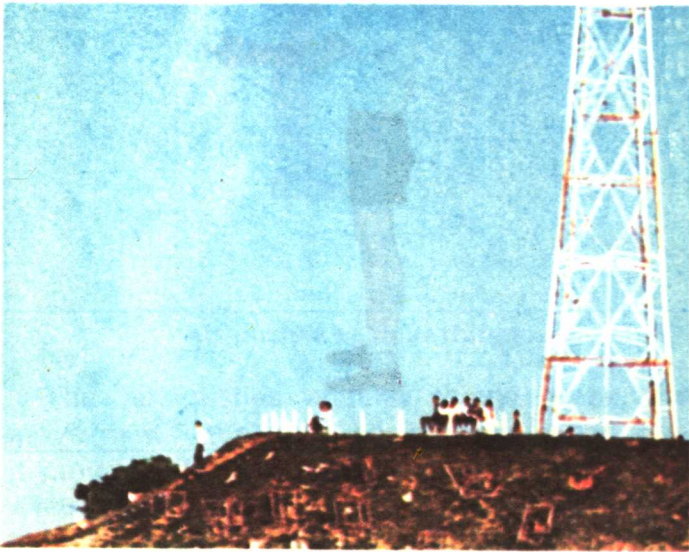
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THE ATMOSPHERE

Our Earth is surrounded by a layer of air called the **atmosphere**. The atmosphere surrounds the Earth completely and is about 900 kilometres thick. Without the atmosphere, we would not be able to live on the Earth. There would be no air for us to breathe. The Earth would be very, very hot in the day and very, very cold at night.

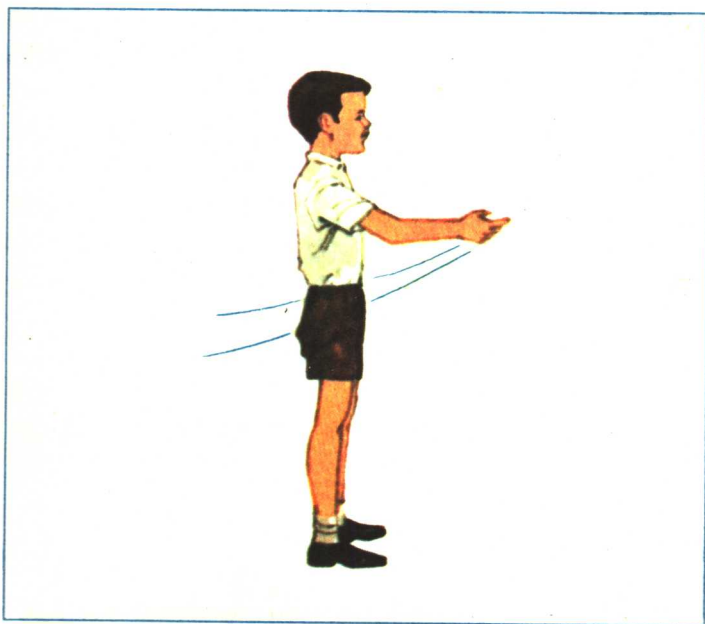
The atmosphere



Things to Do

- (i) Stretch out your hand in line with your shoulders. Swing it quickly round. What can you feel?

What you felt is the air. We cannot see the air but we can feel it. We feel it



Air is all around us.

when it is moving. We can also feel it when we move in it.

- (ii) Now take a piece of paper in your hand. Swing your hand round again. You can see that the piece of paper is bent when your hand is moving.



Air pushes against things.

The air pushes against things when they move in it. It pushed against the paper when it moved. That is why the paper became bent when you moved it. You can feel the air pushing against you when you are in a moving car. You can also feel it when you cycle or run.

When air moves, it is called a **wind** or **breeze**. Sometimes the air moves very fast and causes a very strong wind. A strong wind can destroy things. It can blow down trees and houses.

DO LIVING THINGS NEED AIR?

Air is all around us. It is around us as we walk and play. From the moment we are born, we are surrounded by air. When we sit down, it is around us. When we go to bed, air is also around us. Wherever we are on Earth, we are surrounded by air. We live in air.

All living things need air. Living things cannot live without air. We can go without food or water for a few days, but we cannot live for more than a few minutes without air. We breathe in air. When we are working or

Plants need air to live.





Animals also need air to live.

running, we need more air. So we breathe faster than usual. When we are asleep, we need less air.

AIR OCCUPIES SPACE

When you pack your bag with books, your books occupy some **space** in your bag. If you ask your friends to put their books in your bag, there will come a time when no more books will enter your bag. This is because all the books occupy space and the space in

your bag is not big enough for all the books to enter.

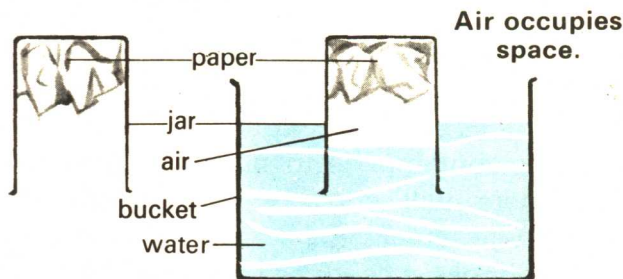
All things must occupy space. Air too occupies space. We cannot see air, so how do we know that it occupies space?

Things to Do

Let's find out if air occupies space. Crumple a piece of paper, and put it in a jar such that when you overturn the jar, the paper will not fall out.

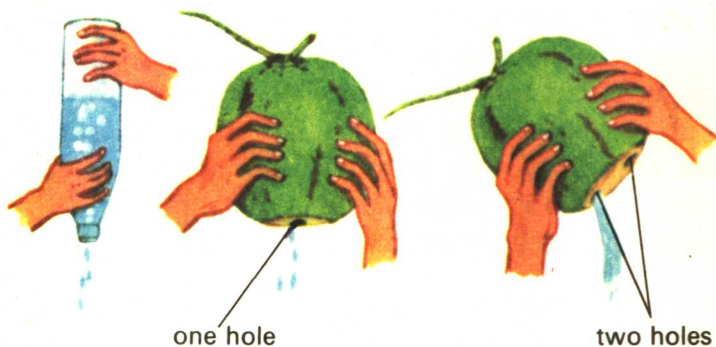
Fill a bucket with water and slowly push the jar upside down into the bucket of water. Make sure the jar is upright all the time it is being pushed down. Do not tilt it. Do you see water entering the jar?

Now remove the jar from the bucket of water and examine the piece of paper. Is it wet? The paper remains dry because water did not enter the whole jar. Air was in the jar and it prevented the water from entering the whole jar. This shows that air occupies space.



AIR CAN TAKE THE PLACE OF LIQUIDS

If you fill a bottle with water and turn it upside down quickly you will see that, as the water comes out of the mouth of the bottle, large bubbles of air rush in to take the place of the water. Does this happen with other liquids?



**Can air take the place of water and coconut 'water' ?
Why is it easier to pour the 'water' out of a coconut
with two holes ?**

Things to Do

Take a coconut. Make a hole in it. Try to pour the 'water' out of the coconut. Can you do it? Now make another hole not too close to the first. Pour the 'water' out of the coconut. Are two holes better than one for pouring 'water' out of a coconut? Yes. As the 'water' comes out of one hole of the coconut, air rushes in through the other hole to take the place of the 'water'.

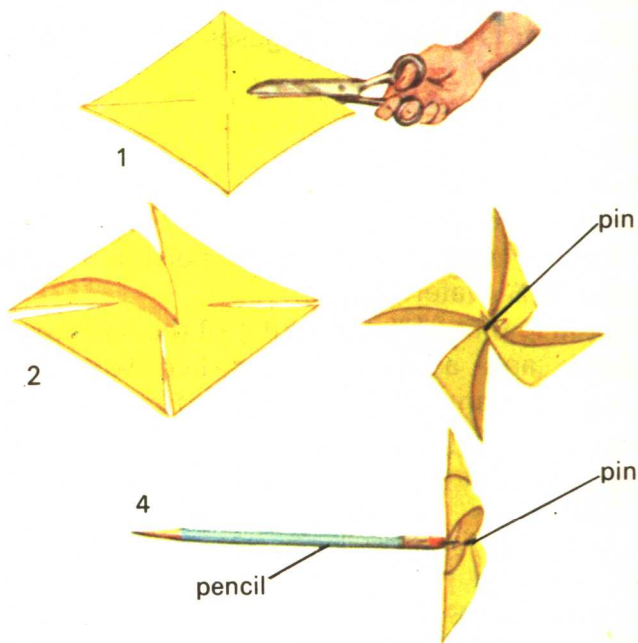
MOVING AIR

Moving air is called wind or breeze. How can you make air move? Here is one way. Hold an open book in your hands so that it faces you. Close it quickly. Do you feel the wind?

Sometimes the air moves very fast and causes a very strong wind. A strong wind can blow down trees and damage houses. The wind can do many useful things too. It works windmills and moves sailing boats. It helps to scatter the seeds of many plants. The wind helps to keep us cool. The wind produced by fans cools the engines of many machines.

Moving air works windmills.





Making a pinwheel

Things to Do

Make a pinwheel by marking a piece of paper as shown above. Then cut along each line. Bend over the corners. Push a pin through the centre. Push the pin into a pencil. Can you make the pinwheel turn? In how many different ways can you make it turn? One way is to blow air from your mouth. Another way is to fan it. A third way is to hold it in your hand and move your hand very quickly around you.

WHAT IS AIR MADE OF ?

Dry air is a mixture of gases. Dry air contains by volume:

78% nitrogen

21% oxygen

about 0.7% argon

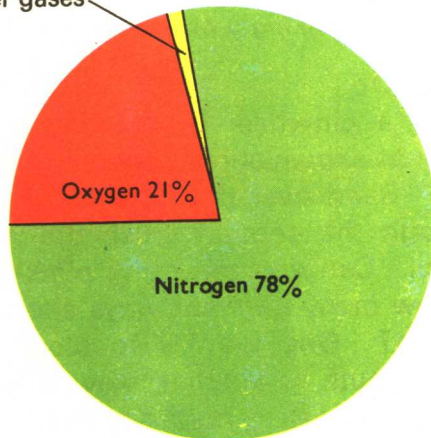
about 0.3% carbon dioxide and other gases.

In tropical countries, the air is moist and contains about 3% water vapour.

Notice that 21% or about $\frac{1}{5}$ of the air is oxygen. Plants and animals cannot live without this oxygen. Plants also make use of carbon dioxide gas in their green leaves to make food when the sun is shining.

The composition of air

1% argon, carbon dioxide
and other gases





Air is necessary for burning.

IS AIR NECESSARY FOR BURNING?

You have learned that we cannot live without air. We need air in order to live. Do you know that fires too need air in order to burn? If there is no air you would not be able to make a fire.

Things to Do

- (i) Place a lighted candle in a dish of water and cover it with a glass jar. The candle will continue burning for a short while and then die out. Do you know why?

The water in the dish will prevent air outside the jar from entering the jar. The candle continues to burn for a short while because there is air inside the jar. But when this air is used up the candle flame dies.

This shows that air is necessary for burning. We can also show that the more air there is, the longer a candle will burn.

To show that air is necessary for burning

