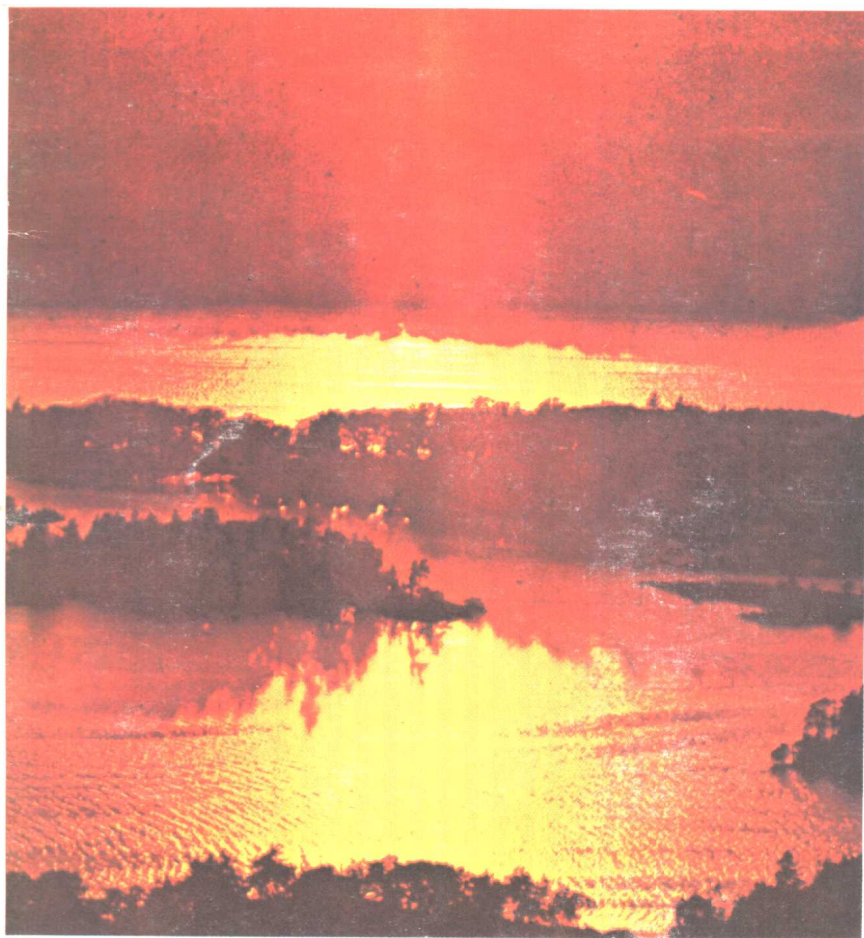


簡易英語科技叢書

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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。

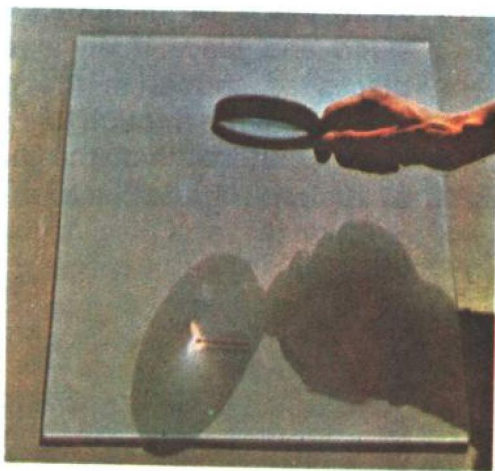
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INTRODUCTION

Blindfold yourself and try to move around in the classroom. Will you be able to do this? You will probably fall over a chair or walk into the wall. You feel helpless when you try to move about in the dark. Now do you see how important light is? Close your eyes and think about what it would be like to live in a world where there is no light.

With the help of a magnifying glass you can make use of light from the sun to light a match or burn a piece of paper. This shows that light is a form of **energy**.



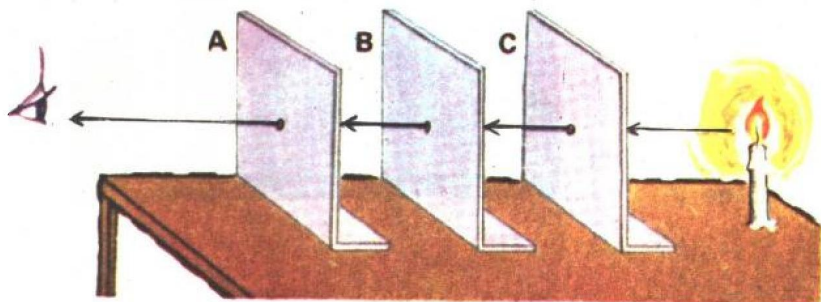
Light is a form of energy.

HOW LIGHT TRAVELS

How does light travel? Does it travel in a straight line? Or does it travel like water, flowing around objects blocking its path? We can find this out very easily.

Things to Do

Cut three pieces of cardboard A, B and C. Each piece should be about 25 cm square. Draw diagonals on each of the square cardboards. At the point where the diagonals on each cardboard cut, make a very small hole with a pin. Now fix each piece of cardboard on a wooden stand and place it on a table. Place the pieces as shown in the picture. Pass a string straight through the holes. Pull the string taut so that the holes are all in a straight line. Place a lighted candle



To show that light travels in a straight line

near the hole in cardboard C. Look through the hole in cardboard A. Can you see the candle-light?

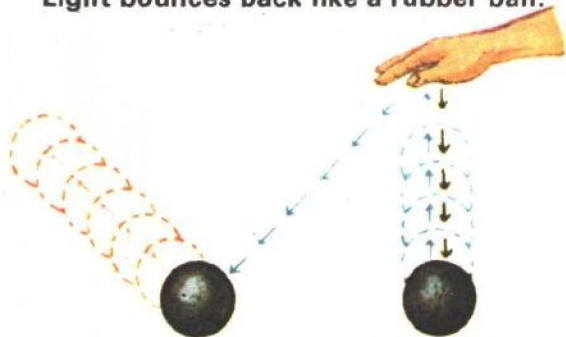
Move cardboard A so that its hole is not in line with those of B and C. Again, look through the hole at A. Can you see the light of the candle? Why? This shows that light travels in a straight line. When the three holes were in line, light passed through them to your eye. When the holes were not in line, light passing through the hole in C could go through the hole in B. But this light could not bend to go through the hole in A.

HOW LIGHT BEHAVES

Light travels in a straight line at 300,000,000 metres per second. It will go on travelling at this speed until something comes into its way. When this happens, part or all of the light may be **reflected**, **absorbed** or **transmitted** by the thing or **object** that comes into its way.

Throw a tennis ball on the floor. The ball

Light bounces back like a rubber ball.

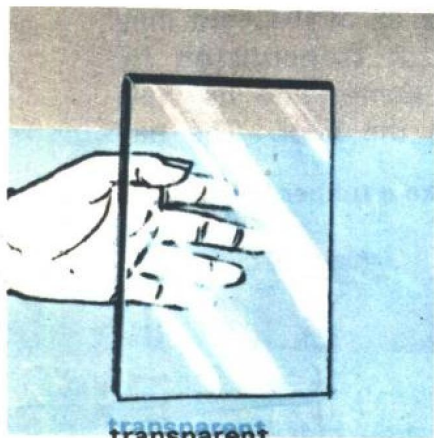


bounces back. In the same way, when light falls on certain things it bounces back. When this happens, the light is said to be **reflected**. This can be clearly shown when you shine a beam of light from a torch at a mirror in a dark room.

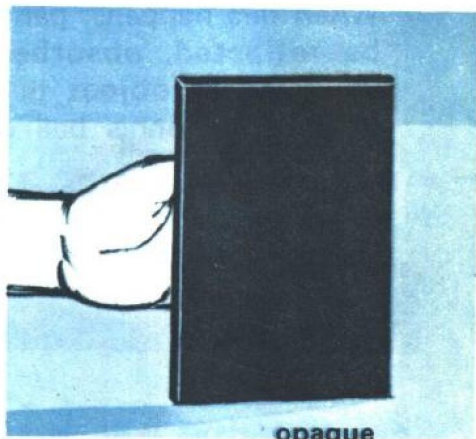
Some objects do not allow light to go through them. If light is not completely reflected by the object, some light is said to be **absorbed**. Things that do not allow light to pass through are said to be **opaque**.

If light goes right through an object, the light is said to be **transmitted**. Objects which transmit light are said to be **transparent**. Glass is transparent. Do you know of other transparent objects?

You have learned that light can travel through air. Now let us see whether it can travel through water.



transparent



opaque

Things to Do

You will need a piece of cardboard with a hole in the centre. The hole should be large enough for a pencil to go through. Next, with a mirror, reflect sunlight in such a way that the sunlight goes through the hole in the cardboard. Let the spot of sunlight fall on a book, on the wall, on the ground or on your clothes.

Look at the spot of sunlight. The sunlight first fell on the mirror. The mirror reflected the sunlight which passed through the hole in the cardboard. It fell on your book as a spot of sunlight.

Now place a jar of clear water between the cardboard and the spot of sunlight. Can the sunlight pass through the jar of water? Now place some chalk dust in the jar of water so that the water turns chalky. Can the sunlight pass through the chalky water?

SHADOWS

We can see many shadows of objects all around us. Do you know how shadows are formed? Let us find out.

Things to Do

You can do this in a dark room or you can do it at night. Place a lighted candle on a table and fix a white cardboard on

a wall about one metre away from the candle as shown in the picture. Now bring your fingers between the candle and the cardboard. Move your fingers about.



Making shadows with a candle

What do you see on the cardboard? Instead of using hands, use other opaque objects such as shapes cut out from cardboard pieces.

Hold the object in a fixed place. Move the candle nearer to and then further away from the cardboard. What happens to the shadows when you do this? Now leave the candle in a fixed position, but move the object nearer to and then further away from the cardboard. What happens?

Light from the candle falls on the cardboard. When an object is placed between the candle

and the cardboard, a black shape of the object appears on the cardboard. The light from the candle falls on the object but cannot pass through it. This means that no light will fall on the cardboard and therefore that part of the cardboard looks dark. This dark shape is called a **shadow**. When the candle or object is moved the shadow becomes bigger or smaller.

COLOURS OF LIGHT

Natural light or 'white' light is actually made up of many colours. Have you seen a **rainbow**?

Can you see the colours of the rainbow?



We can see rainbows after a rain. They are formed when sunlight passes through small drops of water in the sky. Next time you see a rainbow, try to make out the different colours. You should be able to name seven different colours.

Things to Do

We can find out how the colours in the rainbow are formed by doing this. Pour

To find out how the colours of the rainbow are formed



some water into a basin. Cut a piece of black paper so that it can cover the top of the basin completely. Fold the round piece of black paper into half and unfold it. On one half, cut a narrow slit. On the other half, cut a round hole and paste a piece of tracing paper on the black paper to cover this hole. Do not cover the slit.

Next, place a mirror at the bottom of the basin. The silver side (the reflecting side) of the mirror must face upwards. Cover the top of the basin with the piece of black paper you have made. Hold it in place with adhesive tape or glue. Now move the basin to a place near a window where sunlight is coming in. Place the basin so that the sunlight goes into the basin through the slit. Roll another piece of black paper into the shape of a cylinder. Place this over the circular piece of tracing paper. Look through it. What do you see? Are the colours the same as those found in a rainbow?

The band of coloured lights you saw is called the **spectrum**. The seven colours are red, orange, yellow, green, blue, indigo and violet. Where do the colours of the spectrum come from? The colours are from sunlight. Therefore white light is not really white but is actually made up of the colours of the spectrum.

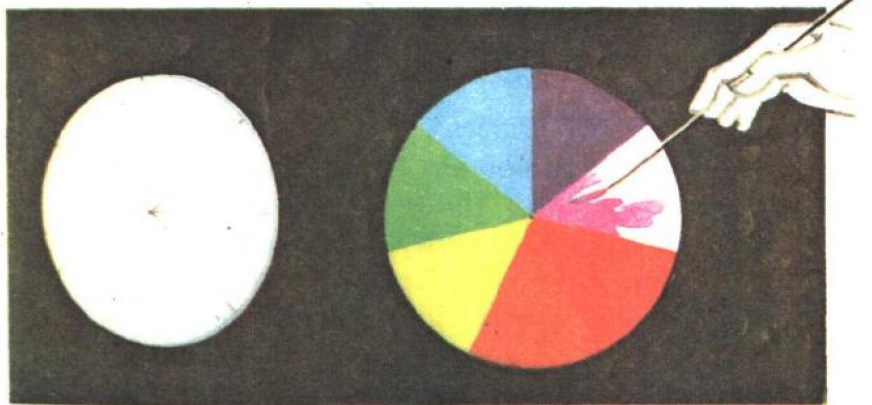
MAKING COLOURS WHITE

The colours of a rainbow can be obtained by breaking up white light. Is it possible to combine these colours into white light? We can find this out easily.

Things to Do

Get a round piece of cardboard. Cut a piece of white drawing paper of the same size. Carefully paste the piece of white drawing paper on the cardboard. Divide the circle into seven equal parts. Using water colours, paint each of the parts with one colour of the rainbow. Make sure that the colours are in the order that you see in a rainbow.

Now make a hole in the centre of the board and fit the point of one arm of a pair of dividers into it. Hold the board in a flat position with your dividers.



Spinning the cardboard

