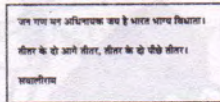


# FUN-N-GAMES

1

Look at the pictures below. Are you able to clearly see what is shown and read what is written?



Take a hand lens (magnifying glass) from the kit. Look at the pictures through it. Move the lens up and down until the images are clear and in focus.

**What can you see when you look through the lens? Can you spot any mistakes in the drawings?**

**What's written in the box?**

Let's now look at some tiny things with the lens. First catch an insect (an ant, mosquito, louse, fly or whatever). Examine it carefully through your lens.

**Can you discover any new parts of the insect on looking through the lens? Draw a picture of whatever you see. Examine a few more insects with the lens and draw their pictures also.**

Now take a piece of cotton thread. Draw a picture of it. Then examine it through the lens.

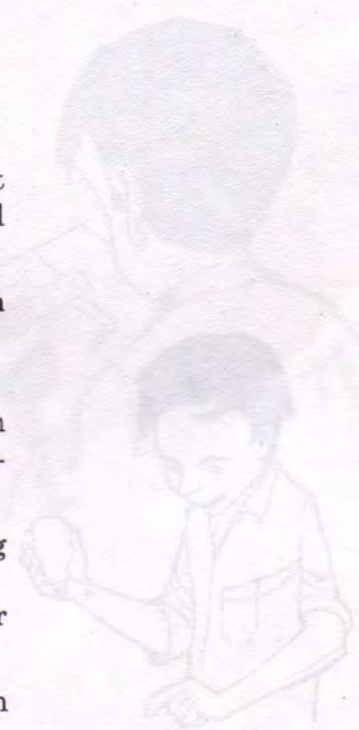
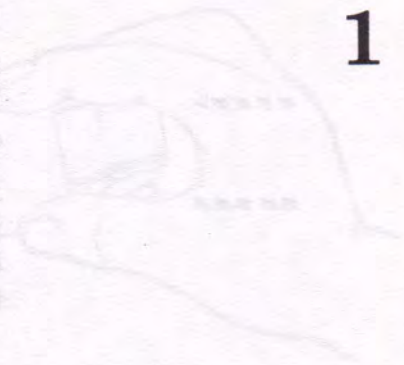
**Draw another picture of what you see now.**

In the same way, you can use the lens to examine different things like the torn edge of a piece of paper, cotton, grass or a slice of some vegetable.

## A PUZZLE (SPOT THE DIFFERENCE)

These two pictures look alike, but they aren't. Examine them closely with the help of the lens.

Can you spot the differences between the two pictures?

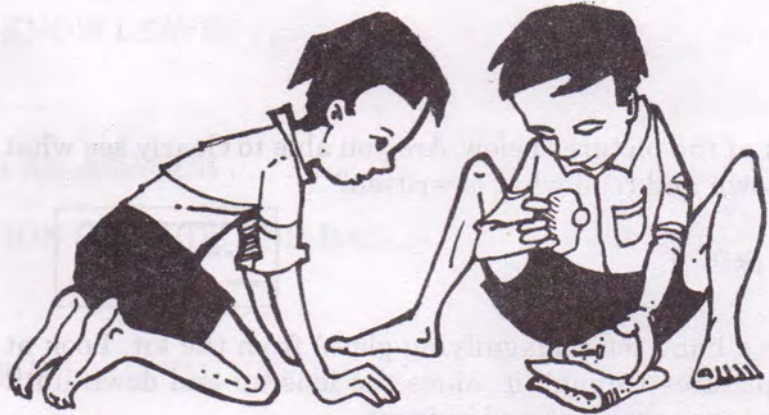




## MAKE YOUR OWN LENS

So far you have been using a hand lens to see small things. We can also use an old fused bulb to view small things more clearly. Let us see how this can be done.

Find an old transparent electric light bulb that is fused. Place it on the floor and remove the black part (*chapadi*) at the bottom by gently knocking it off with a stone. Be careful not to break the bulb. You could place the bulb on a piece of



cloth or an exercise book to cushion it so that it does not break.

You will see a glass tube on which wires are fixed. Insert a long iron nail or wooden stick to break this tube.

Shake the bulb so that the broken pieces of glass and wire fall on a piece of paper. Carefully throw these broken pieces of glass and wire in a dustbin.

You now have a hollow glass bulb with a metal cap. Fill the bulb one third full of water. Your bulb lens is ready.

Use it to look at the writing in your book.

**Do the letters look bigger?**

Now use your bulb lens to take another look at the pictures at the beginning of this chapter.

**What can you see now?**

Carefully examine the cycle drawn in the picture (Page 1) with both the hand lens and the bulb lens.

In comparison to the hand lens, does the picture seen through the bulb lens appear bigger or smaller?

Look at other tiny things with your bulb lens - a grain of sugar or salt, different kinds of seeds etc.

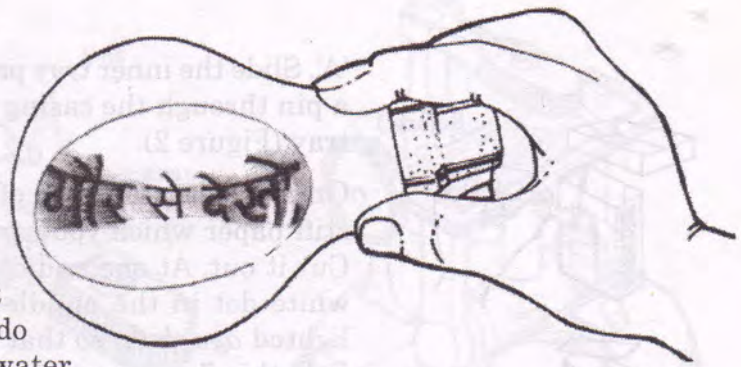




Draw pictures of whatever you find interesting among these.

### A WATER-DROP LENS

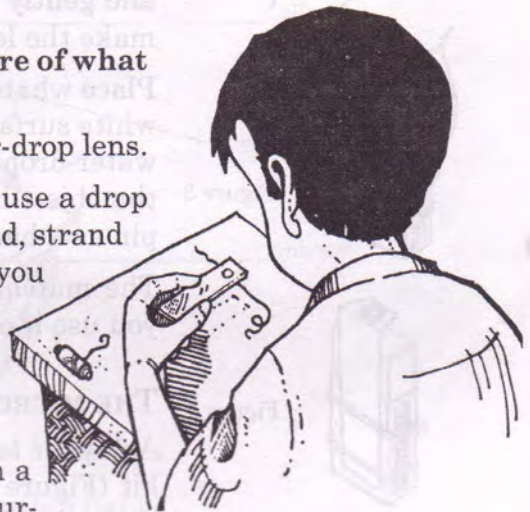
Take a glass slide or a piece of glass with smooth edges. Clean it thoroughly and look at a piece of cotton thread through it. Now put a drop of water on the glass. To do this, take a matchstick, dip it in water and gently let one drop drip onto the glass. The drop shouldn't spread. If it does, then rub the slide a few times on your hair to spread the oil from your hair over the glass. Put another water drop on it. Then take another look at the piece of cotton thread through your water-drop lens.



**Does the thread appear thicker? Draw a picture of what you see.**

Look at a strand of your hair through your water-drop lens.

Now clean the glass slide and, instead of water, use a drop of oil or glycerine to make a lens. Look at the thread, strand of hair etc through these lenses also. Remember, you may have to move the slide up or down in order to see the object clearly.



### THE MICROSCOPE

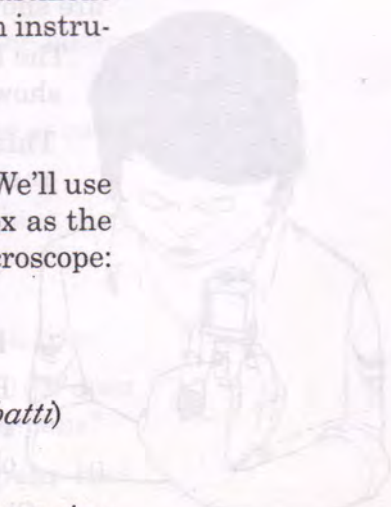
Whenever you wish to see anything clearly with a lens, you have to move the lens either closer or further away from the object. To make this task of adjustment easier, the lens is fitted into an instrument. Such an instrument is called a microscope.

### A MATCHBOX MICROSCOPE

We will now make a microscope using a matchbox. We'll use a drop of water or oil for our lens and the matchbox as the body. Collect the following materials to make the microscope:

- an empty matchbox (made of cardboard)
- a pin
- white paper
- a one-sided blade
- a stick of incense (*agarbatti*)
- two rubber bands
- glue

Use the blade to cut a window in the top of the outer casing of the matchbox (Figure 1). Take the inner tray of the matchbox and paste a strip of white paper on the surface marked





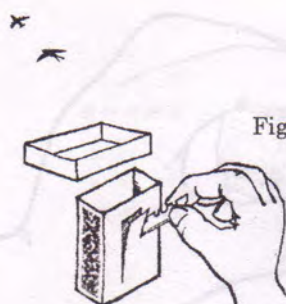


Figure 1

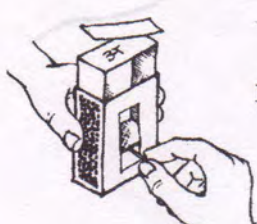


Figure 2

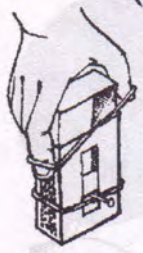


Figure 3

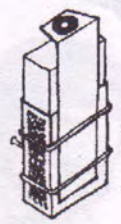


Figure 4

'A'. Slide the inner tray part of the way into the casing. Stick a pin through the casing window into the lower wall of the tray (Figure 2).

On the last two pages of this book you will find a strip of stiff paper which you can use for making your microscope. Cut it out. At one end of this strip is a black circle with a white dot in the middle. Burn out this white dot with a lighted *agarbatti* so that you now have a small round hole. Fold this flap along the dotted line XY at a right angle.

Fix this strip to the back of the outer casing of the matchbox with the help of the two rubber bands (Figure 3). Apply a little oil on the black circle. Then dip your finger in water and gently tap a drop of water into the hole in the centre to make the lens. Your microscope is now ready (Figure 4).

Place whatever you want to see with the microscope on the white surface of the matchbox tray. Look at it through your water-drop lens. Adjust the distance between the lens and the object by moving the inner tray up or down, using the pin as a handle, to get the clearest view.

The matchbox microscope will give the clearest picture if you use it outside in bright sunshine.

### THE MICROSCOPE IN YOUR KIT

Ask your teacher to let you look at the microscope in your kit (Figure 5). Ask your teacher to separate its parts and show you these parts. The separate parts of the microscope are shown in Figure 6.

The lens of this microscope is a glass bead. The picture shows where to fit the lens into the microscope.

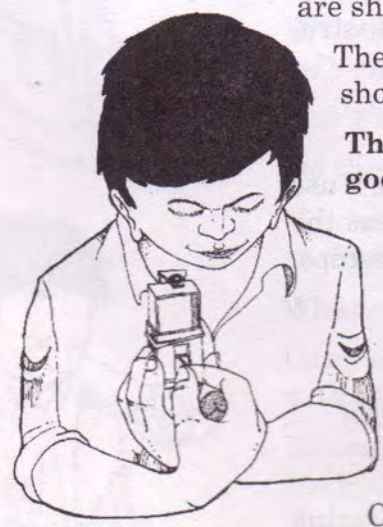
**This glass bead is the life of your microscope. Take good care of it.**

Clean it and put it back into the microscope and then cover it with the lens cap.

### HOW TO USE YOUR MICROSCOPE

Place the object you want to examine on a glass slide. Fix the slide under the two clips. Ensure that the object lies directly below the lens.

Close one eye and look into the lens with the other. Turn the knob of the microscope to adjust the distance between the lens and the object, until you see the object clearly.





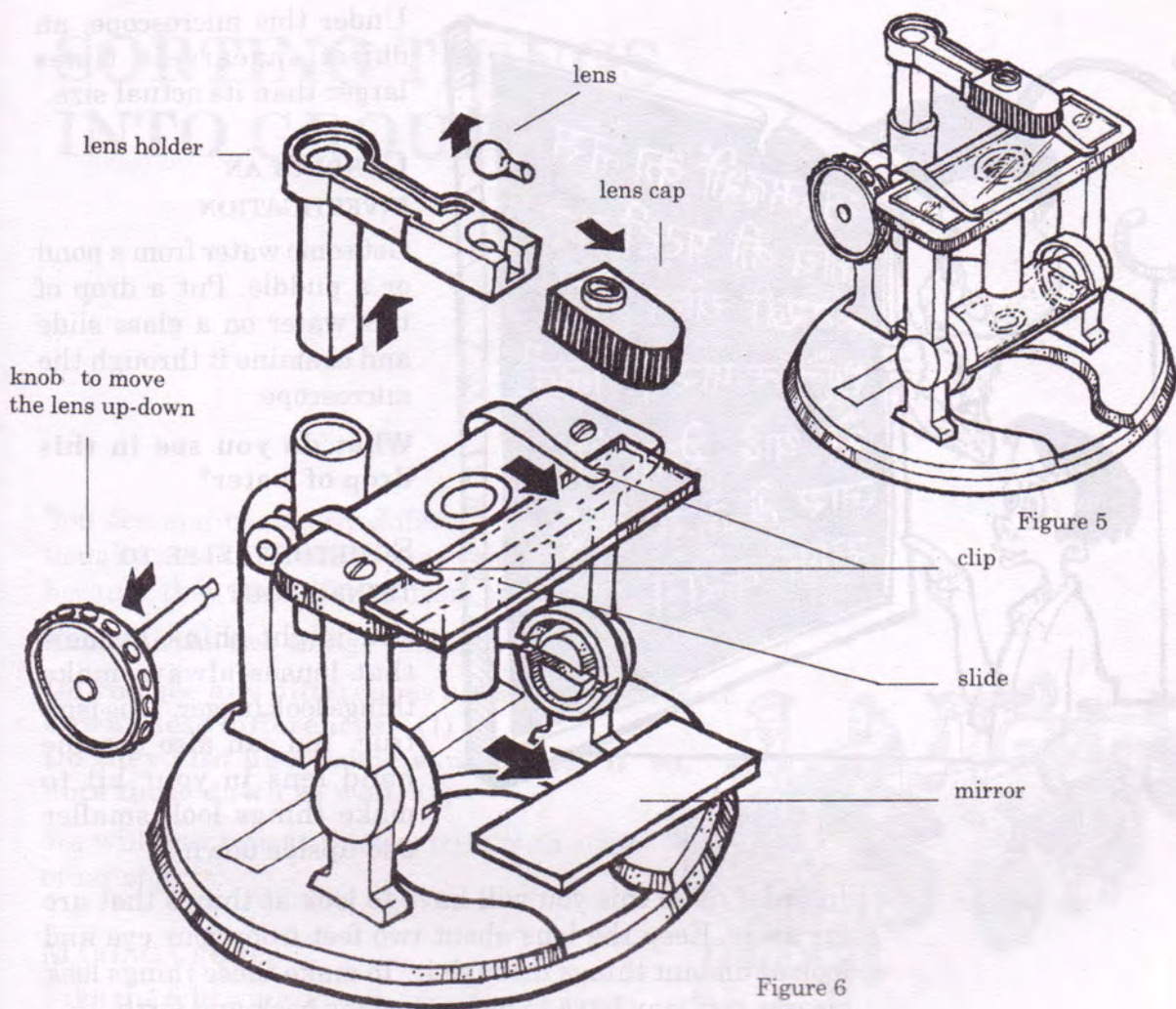


Figure 5

Figure 6

Turn the mirror attached to the microscope towards a light source and then rotate it till you see the object more clearly.

You will have to take turns practising how to use the microscope in order to learn to use it correctly.

Your microscope is a very delicate instrument. Use it carefully.

Use your microscope to look at a strand of your hair, tiny insects, the petal of a flower, grains of sugar, an ant etc.

**How thick does your hair appear?**

**What do the legs of a small insect or an ant look like?**

The lens should not touch the object on the slide. If it does touch the object by mistake, how will you clean the lens?

**What does the shape of a grain of sugar appear like through the microscope?**

**Can you see any new features in the flower petals?**





Under this microscope, an object appears 50 times larger than its actual size.

#### CONDUCT AN INVESTIGATION

Get some water from a pond or a puddle. Put a drop of this water on a glass slide and examine it through the microscope.

What do you see in this drop of water?

#### SOMETHING ELSE TO THINK ABOUT

You might think by now that lenses always make things look bigger. This isn't true. You can also use the hand lens in your kit to make things look smaller and upside down.

In order to do this you will have to look at things that are far away. Keep the lens about two feet from your eye and look at distant things through it. To make these things look clearer you may have to move the lens back and forth.

#### NEW WORDS

hand lens	lens	microscope
instrument	slide	kit

The method of making the matchbox microscope (page 4) was developed by Shri Jagdish Chandra Srivastav, a teacher in Shasakiya Middle School No. 1, Sanwer, Indore District.