

# VARIATION IN THE LIVING WORLD

16

There is a saying in Hindi: "Boya ped babool ka to aam kahan se hoye" which means: "If you plant a *babool* tree, you can't expect to harvest mangoes." That's common sense. Mangoes don't grow on *babool* trees. Similarly, if you sow a grain of wheat, what you get is a wheat plant. Even from a distance, you can easily tell a *peepal* from a tamarind tree, and you would never mistake even the blackest cow for a buffalo. Or, no matter how fat an ant grows, it can never become an elephant. And if the elephant goes on a fast it can never become a mouse.

Every species of animal and plant has its own special characteristics. That means there are recognisable differences between different species of plants and animals. But suppose we compare two individuals of the same species. Will there be differences between them as well? That's what we shall try to find out in this chapter.

## EVERY TREE IS SPECIAL

### EXPERIMENT 1

Carefully observe two trees of the same species.

Are they similar? (1)

Do they have some differences as well? Make a list of these differences. (2)

Let us now observe some small plants. As an example let us take doob grass, or any other small plant that grows in large numbers. They all look alike, don't they? Let us try and find out if they are identical to each other. Select two plants from among those that look as like each other as possible.



Compare the two plants you have selected. Some points for comparison are listed in Table 1.

TABLE 1

No.	Characteristic	Plant 1	Plant 2
1.	Height		
2.	No of leaves		
3.	Length of top-most leaf		
4.	Length of lower-most leaf		
5.	Distance between 2nd and 3rd leaf from below		

Enter your observations in this table. (3)

Compare your findings with those of other groups in your class.

On the basis of your experiment and discussion with your friends, do you think it is possible to find two plants which do not have any differences among them? (4)

#### EACH LEAF A UNIQUE ONE

#### EXPERIMENT 2

A tree has hundreds of leaves. Is it possible to pluck two exactly similar leaves from among them? Let us try and find out.

Bring several similar looking leaves from any tree or bush. Try and find two leaves which are exactly similar.

Were you able to find two such leaves? If you did, show these leaves to everyone in the class. (5)

If you cannot find exactly similar leaves, then describe the differences you observed between them. (6)



#### VARIATION AMONG ANIMALS

Are such variations found only in plants and trees? Are such

differences to be found among animals and insects as well?

Try and search for two puppies or calves that look exactly alike?

If you think you have found them, take another careful look at the pair and try and spot the differences between them.

List at least five differences you observe. (7)

Try to observe differences among birds like parrots, cocks, chickens or insects like cockroaches.

Do you think you would find differences if you examined two small insects like ants. Write down the reasons for your answer. (8)

We all have two ears, two eyes and a nose. We have hair on our heads and nails on our fingers.

Everyone breathes through the nose, sees with the help of the eyes and eats with his or her mouth. In spite of such similarities, can you find two individuals who are exactly alike?

### TWIN BROTHERS, TWIN SISTERS

You may have seen or heard about twin brothers and sisters. Are there any such twins in your village or locality? Several films have been made about twins.

The plots of these films are based on the idea that it is impossible to distinguish between 'identical' twins. But is that really true?

Are there no differences between twin brothers or sisters?

If there are twins in your locality, find out how their parents tell them apart. If possible, meet the twins and find out for yourself whether there are any differences between them.

### YOUR FINGERS ARE ALSO UNIQUE

#### EXPERIMENT 3

Compare your index finger with those of your friends. Compare their length, the thickness at the base and the length of the middle segment.

Each group should record the measurements of the index fingers of its members in Table 2. (9)



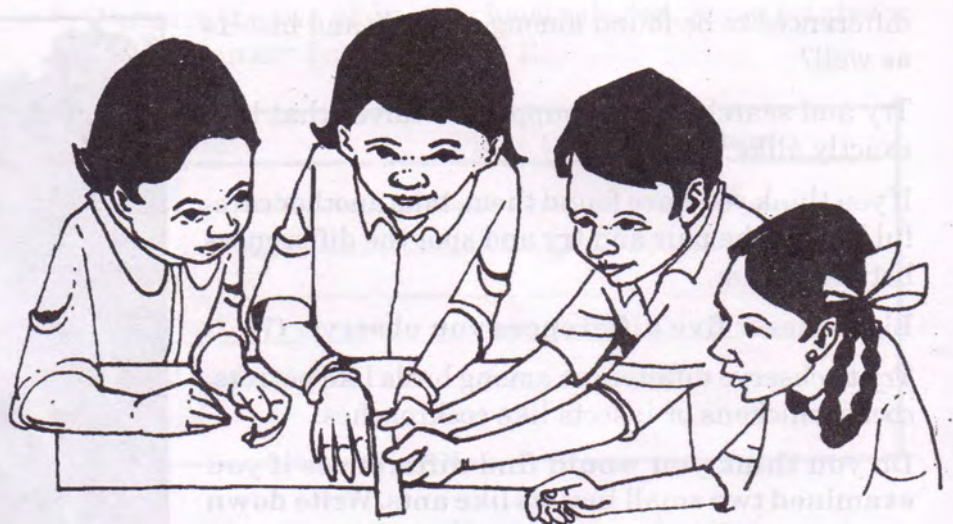


TABLE 2

No.	Name of student	Length of finger	Thickness of base	Length of middle segment
1.				
2.				
3.				
4.				

Compare these measurements with those of other groups.

**Are the index fingers of any two students identical? (10)**

In the chapter on measuring distances, each of you had measured the length of the same object with the span of your hand. The measurement of each student was different.

**Can you now explain why measurements vary from person to person when the handspan is used as a measure? (11)**

### OUR UNIQUE THUMBS

#### EXPERIMENT 4

Many people cannot sign their names so they put their thumb impression on a document. Sometimes we are asked to put our thumb impression along with our signature. Do you know that the thumb impression of each person is different and unique? Let us find out the nature of the differences between thumb impressions of different persons.

Ask 10 of your friends to put their thumb impressions on a page in your exercise book. The impressions should be clear and visible. You could use an ink pad, inkpot or pen to get the impressions.

Now study these impressions with a magnifying glass.

Are any two thumb impressions identical?

Could you identify circular and shell-shaped patterns in the impressions?

**Write down the differences you observed between any two thumb impressions. (12)**

The impressions of the thumb and fingers of each person are unique. They differ so much from person to person that an individual can be identified solely on the basis of these impressions. Police use fingerprints to identify criminals. The police maintain records of the fingerprints of known criminals. If a person present at the site of a crime touches some object, that person's fingerprints are left on the object. Such impressions are compared with the fingerprints maintained in the police records. If they match, then the police can identify the person present at the scene of the crime.

It is an interesting fact that even the fingerprints of twin brothers and sisters are different.



### VARIATIONS AND MORE VARIATIONS

We see so much variation around us. On the one hand, we see many different species of plants and animals. On the other, we also see many differences between two plants or animals of the same species. For example, no two human beings are alike in all respects.

But variation does not only mean that someone's finger is thicker or thinner than someone else's; or that one leaf of a plant is bigger or smaller than another. There are variations in many other properties as well. Take rice, for example. In our country there are around 20,000 to 25,000 varieties of rice. One may be a high-yielding variety while

another may mature early. One may have a pleasant flavour, while another may be resistant to disease. Farmers select seeds according to the properties they require.

### VARIATION SAVED MOSQUITOES

Mosquitoes are real pests. There are so many of them and they can be quite irritating. They keep buzzing around you, biting you and not letting you sleep in peace. But the story of these mosquitoes is quite interesting.

Before we begin our story you must know one other important fact about mosquitoes. Their bite can give you malaria.

You are probably familiar with malaria. That is the disease in which you run a high temperature, feel cold and start shivering. The fever comes every alternate day. In many places malaria is called *ektara*.

Many people suffer from malaria. When a person contracts malaria (s)he has to take a medicine called quinine. If a patient is not treated in time, (s)he may even die. People thought that since malaria is transmitted by the bite of a mosquito, the disease could be wiped out if we killed all the mosquitoes.

So, around 40 years ago, sometime in the 1960s, a programme for eradicating mosquitoes was launched.

There are some chemicals that kill mosquitoes. DDT and BHC are examples of such chemicals. Have you heard these names before? DDT and



BHC were dissolved in water and sprayed in all areas where mosquitoes were found.

The mosquitoes were killed in large numbers. Seeing this, some experts thought this was the perfect way to rid the world of mosquitoes.

So, more chemicals were sprayed and more mosquitoes were killed. But were all the mosquitoes in the world wiped out? No, they were not. It so happened that variations in the living world helped the mosquitoes.

You have seen in this chapter that no two living beings are exactly alike. Similarly, there are variations among mosquitoes as well. So, among the millions of mosquitoes, there were one or two that were not affected by these chemicals.

They did not die when the chemicals were sprayed. This characteristic which helped these mosquitoes resist the effect of chemicals was passed on to their offspring.

Slowly and steadily, the number of mosquitoes which could not be killed by DDT or BHC increased. So while earlier most mosquitoes died when DDT or BHC was sprayed, the situation today is quite different. Not many mosquitoes die when these chemicals are sprayed.

It is variations in the living world that saved the mosquitoes from becoming extinct. Otherwise we may have had a world free of mosquitoes today.

### QUESTIONS FOR REVISION

1. What differences would you expect to find between two similar looking grass plants if you were to observe them closely?
2. What would be the possible consequences if the thumb of each individual was not unique and a number of persons had identical thumb impressions?
3. Answer the following questions on the basis of the story related at the end of the chapter:
  - i. Which chemicals were used in the attempt to wipe out mosquitoes?
  - ii. Did all the mosquitoes die when these chemicals were sprayed?
  - iii. Why were all the mosquitoes not killed even after spraying so much DDT and BHC? Was there anything wrong with the DDT and BHC which were used?

iv. If a new chemical is discovered which could kill all those mosquitoes that survived the spraying of DDT and BHC, can one be certain that all the mosquitoes in the world would be wiped out if we use this new chemical? Give reasons for your answer.

### NEW WORDS

variations      expert

