

SENSITIVITY OF LIVING ORGANISMS

In Class 6, you did experiments on touch, smell, vision, etc in human beings. Are other living organisms also sensitive? In this chapter, we shall try and find the answer to this question by discussing some of our daily life experiences as well as the results of some experiments we shall perform. But you must remember one thing. Plants and animals cannot tell us how or what they feel, so we must decide whether they are sensitive or not by observing and judging their reactions during these experiments.

In the first part of the chapter, we shall discuss sensitivity of animals and in the second part sensitivity of plants.

PART I

Sensitivity of animals

Touch and observe

You may have touched different kinds of creatures, big and small. If you have not, touch the following animals and observe how they react:

cow, silverfish, earthworm, cricket, snail (1)

Did they react because you touched them? Are you sure? Is it possible that they reacted because they saw you or your finger?

Suggest an experiment which can definitely show that an organism is sensitive to touch. (2)

Give the names of five other animals that are sensitive to touch. Explain how you can find out the sensitivity of each of these animals. (3)

The effect of heat and cold

Give some examples, from your own experience, where you have observed the sensitivity of organisms to changes in temperature. (4)

When pests infest stored wheat, we dry the wheat in the sun. The pests leave the wheat. Have you ever wondered why they



flee? Is it because of the heat of the sun? Or is it because of the brightness of the sunlight?

Suggest an experiment to verify this. (5)

Have you observed that the behaviour and activities of some animals change with changes in the weather?

On the basis of your experience, list the changes you observe in the behaviour of dogs during summer, and winter. (6)

An experiment: a problem

You may have observed ants marching in a straight line. Try and find a colony of ants moving in a straight line. Take a wet cloth and wipe the trail clean between two ants. If they are marching on sand, it is enough if you just scatter the sand between them with your finger. Be careful not to kill any ant while doing so.



What effect does this have on the ants that follow behind? Note your observations in your exercise book. (7)

Discuss why this happens in your class. Write a brief summary of the discussion in your exercise book. (8)

Now consider one more thing. Ants can find their way into a closed box of sweets. How do they do it? They cannot see the sweets. Nor do they know that the box contains sweets. There could be two ways they get to know:

- They wander around and stumble on the sweets by chance.
- They smell the sweets.

Which of these two possibilities do you think is more likely to be correct? Give reasons for your answer and also suggest an experiment to verify it. (9)

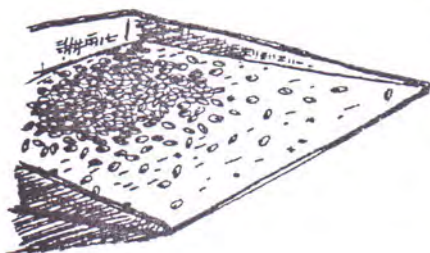
Mosquitoes reach you in the dark to suck your blood. How do they know where you are? (10)

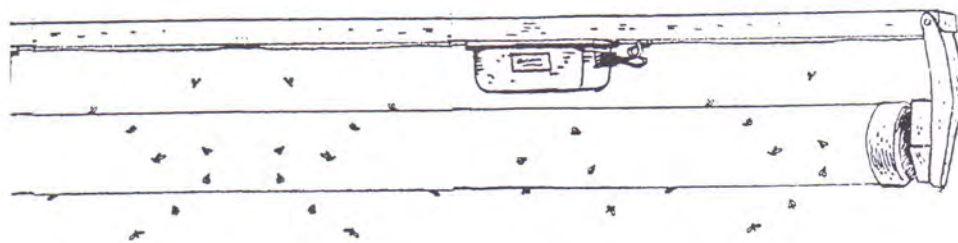
You might find the following information useful in answering this question. Several different kinds of ointments are sold in the market. When we apply these ointments to our body mosquitoes do not come near us. Some people use mustard oil for the same purpose.

Yet another interesting bit of information was obtained from an experiment. A person wore a pair of unwashed socks for several days. He found a host of mosquitoes hovering around his socks.

In another experiment with mosquitoes, two iron rods were kept in a room. One was at room temperature, while the other was slightly heated. There were more mosquitoes hovering around the heated rod than the unheated rod.

Now try and answer Question 10 on the basis of this additional information.





Attraction and repulsion to light

You may have seen insects hovering around a tubelight or bulb in your house during the monsoon season. The light seems to attract them. On the other hand, there are some creatures that prefer to stay in dark places even in daylight.

Give the names of some creatures that are attracted to light at night. (11)

Give the names of some creatures that prefer to stay in the dark even during the day. (12)

What effect does light have on the following creatures?

- Cockroach
- Earthworm
- Housefly
- Mosquito. (13)

How did you find out about the effect of light on these creatures? (14)



An interesting fact

How many creatures have you seen that have antennae or feelers? Actually these antennae/feelers are used in many ways. They are sensitive to touch, pressure, sound, smell, taste, temperature and moisture.



A question to ponder over

In this chapter, you may have noticed that we asked you several times, how you found out about something or the other. There is a reason for asking. In the introduction to the chapter, we had said that living creatures cannot tell you what they feel. We have to observe them and decide whether or not they are sensitive to a particular thing. But during an experiment, many things may change at the same time.

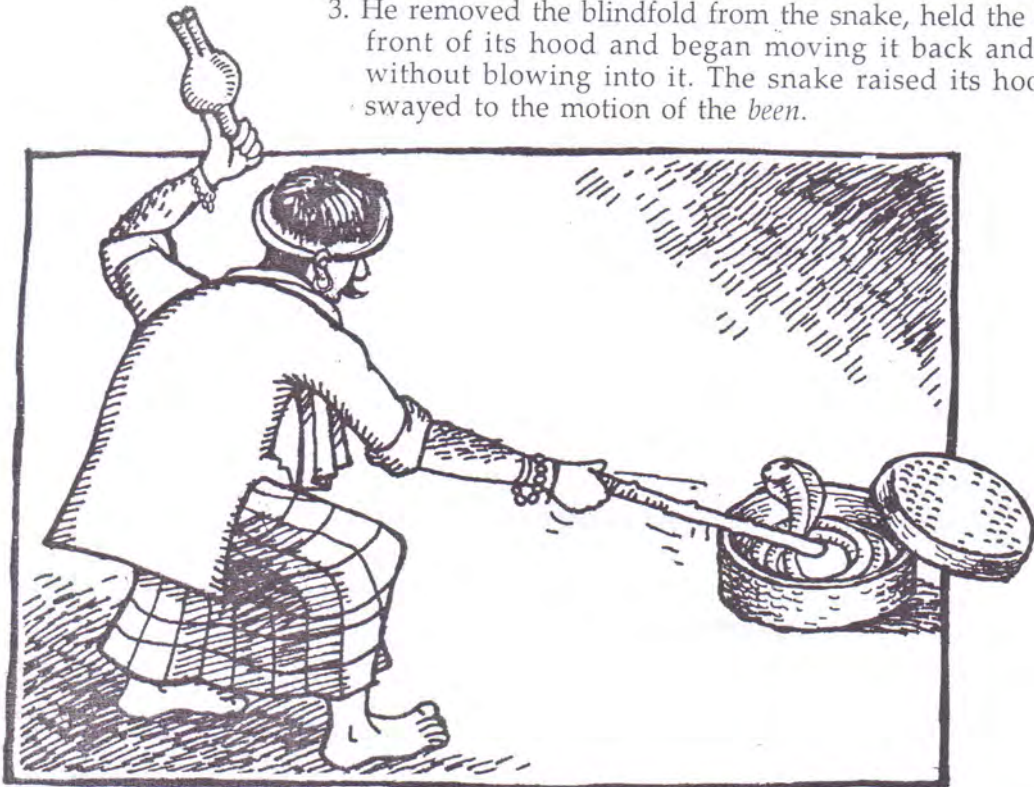
For example, if we light a candle and an insect is attracted to it, what conclusion can we draw? A candle gives light, so can we say the insect is attracted to the light? But a candle also produces heat. Is it not possible that the insect came near the candle because it was attracted to the heat? To avoid such confusing situations,

we need to take care in choosing experiments. We should try and ensure that only one thing changes at a time.

Take the example of the scientist who experimented with snakes to find out more about their sensitivity.

He did the following things and noted his observations:

1. He blindfolded the snake and played a *been* - an instrument snake charmers use to make snakes dance to their tune. The sound of the *been* had no effect on the snake.
2. He then dragged a chair without lifting it. The snake spread its hood.
3. He removed the blindfold from the snake, held the *been* in front of its hood and began moving it back and forth, without blowing into it. The snake raised its hood and swayed to the motion of the *been*.



4. Instead of the *been*, he now took a stick and moved it in the same way, pretending to blow into it. Again the snake swayed to the motion of the stick.

On the basis of these experiments, answer the following questions:

Does a snake dance when it hears the sound of the *been*? (15)

How did the snake know a chair was being dragged? (16)

What kind of sensitivity causes the snake to dance to the motion of the *been*? (17)

On the basis of the observations from these experiments, what can you conclude about the sensitivity of snakes? (18)

Based on the discussion so far what can you say about the

sensitivity of living creatures? Discuss the subject in your class and write the answer in your own words. (19)

PART II

Sensitivity of plants

Are plants also sensitive? You may have seen the touch-me-not plant. Its leaves close when you touch them. After a while they re-open on their own.

Fill in the blank:

The leaves of the touch-me-not plant are sensitive to
(20)

Have you seen plants whose leaves close at night? Discuss some examples in class and note down the names of these plants. (21)

Find the names of some flowers whose petals open during the day but close at night. (22)

Collect information about flowers that remain closed during the day and open only at night. Write their names in a separate list. (23)

What are these leaves and flowers sensitive to? (24)

In which season do trees shed their leaves? Can we take the shedding of leaves as an example of a plant's sensitivity to something? To what is it sensitive? (25)

Discuss the following questions in class:

1. In which month do flowers begin to appear on a mango tree?
2. During which season does the *jowar* plant flower?
3. When does the *palaash* tree bloom? (26)

Find the names of some plants that flower in:

- winter
- summer
- monsoon/rainy season
- throughout the year. (27)

Most plants flower during a particular season. This shows that they are sensitive to the weather/seasons. This sensitivity affects their cultivation. We shall talk about this link between plants and weather/seasons in the chapter on "Crops".

Experiment 1

Plants and light

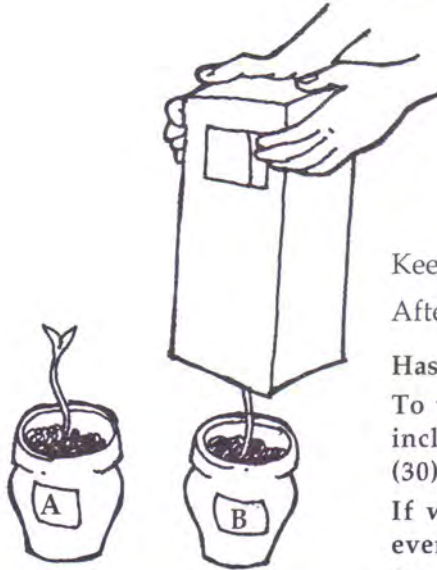
Take two paper or earthen (*kulhad*) cups and fill them with soil from a field. Add a little cow dung to the soil. Make sure the cups have a hole at the bottom. Label them A and B.

Put some *moong* seeds in both cups and water them daily.

As soon as the *moong* seeds sprout, select a shoot each from the two cups. The two shoots should be the same height. Remove all the other shoots from the cups.



You will need a rectangular box with a small window in one of its sides. A shoebox would be ideal. Cut a 1 x 1 cm window in one side.



When the shoots are 10 cm long, cover the plant in Cup B with the box. Each group in the class should place their box facing in a different direction from the window. Keep Cup A uncovered.

Before placing the box on Cup B, make a diagram of the exact position of the plant in the cup. (28)

Keep both cups in an open place with plenty of sunlight.

After 2 to 3 days, look at the plants again.

Has the position of the plant changed in any cup? (29)

To which side has the plant in Cup B inclined? Has this plant inclined in the same direction for all the groups in your class? (30)

If we continue to keep Cup B under the box, will the plant eventually emerge from the window? (31)

On the basis of this experiment what can you say about the sensitivity of plants? (32)

The plant gets two things through the window in the box - air and light. That means the plant bends towards the window for either of these two factors.

Can you think of an experiment which could confirm why the plant bends towards the window? (33)

A mental exercise

In Class 6, you learned that the main shoot/stem of a plant always emerges from one side of the seed. This place is fixed for each kind of seed. But while sowing, farmers simply scatter the seeds in the field. So the seeds fall in different positions on the ground. In spite of this, the roots of all plants always grow downwards into the soil.

Why does this happen? Think well before answering. (34)

Can you think of an experiment to verify this fact? (35)

Some questions for revision

1. It is said that a crow sees with only one eye. Can you suggest an experiment to verify this?
2. Bats are blind. Find out how they fly and are able to find their food without any problem.