

Homi Bhabha Curriculum for Primary Science  
Pilot Version

# SMALL SCIENCE

• TextBook  
• Class V

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Small Science  
**TextBook**  
Class V  
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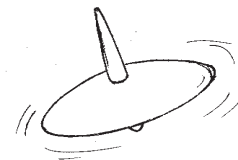
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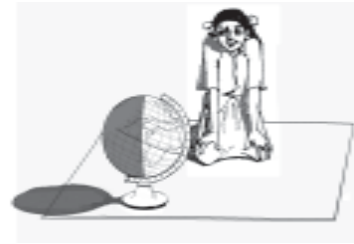
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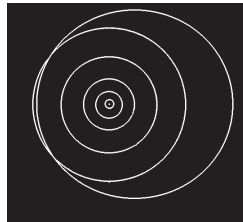
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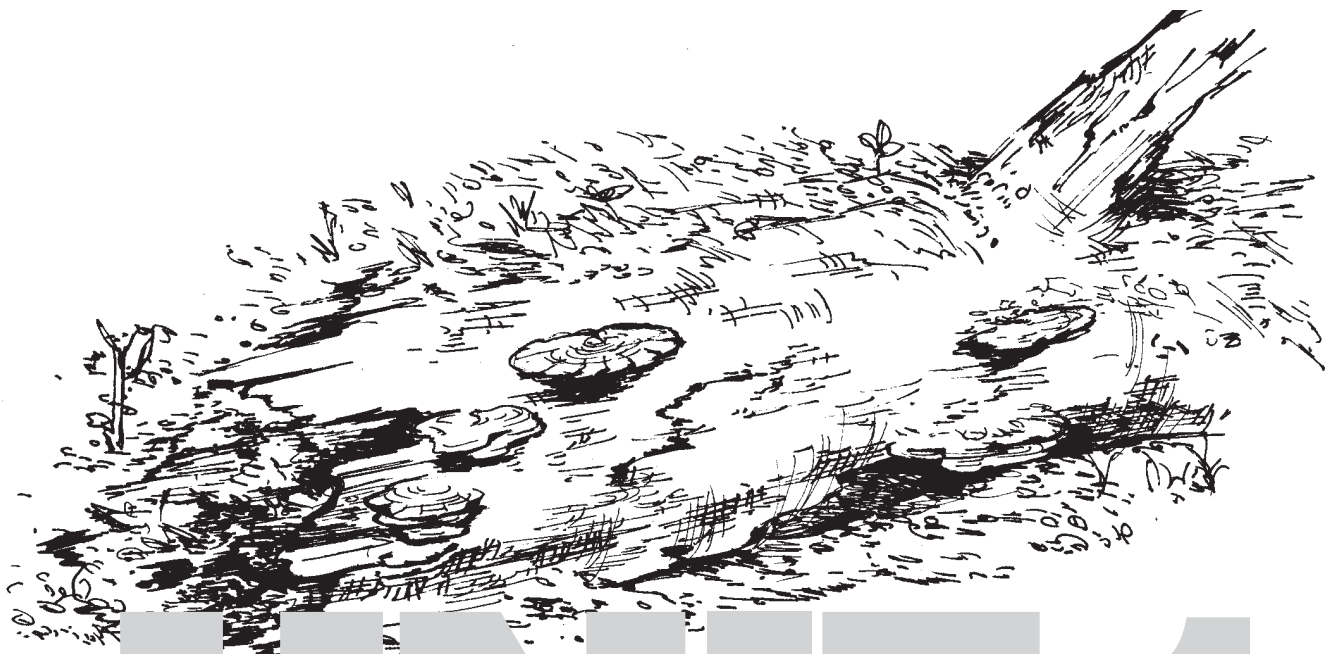
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The Homi Bhabha Curriculum (Primary science)



# UNIT 1

## THE WEB OF LIFE

Chapter 1

Living together

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# CHAPTER 1

## LIVING TOGETHER



*A green branch  
A spider's web  
A patient spider in the web*

*A hungry aphid sucking leaves  
A busy bulbul in the bush  
With twigs and cobwebs for its nest*

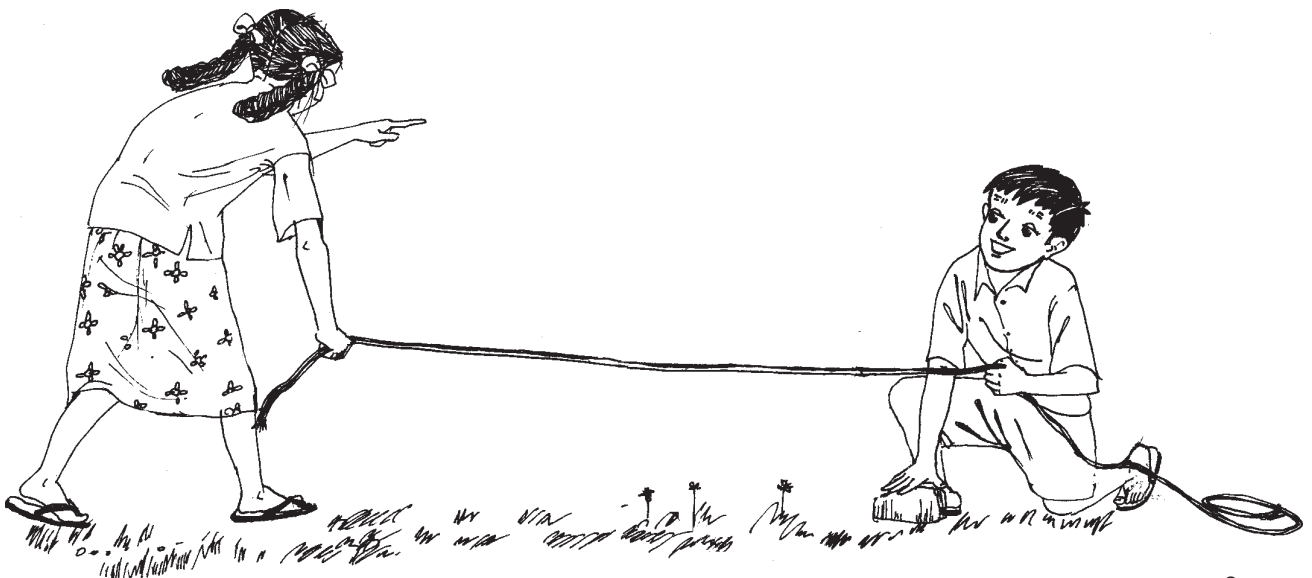


*Living things everywhere, need others too  
For food, for homes, for so much more...*



### Animals and their food

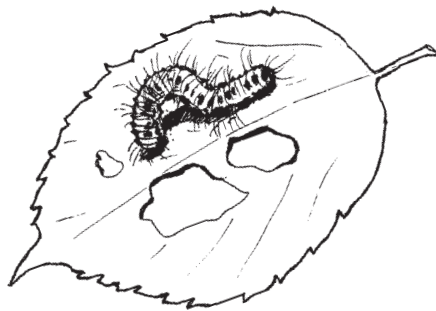
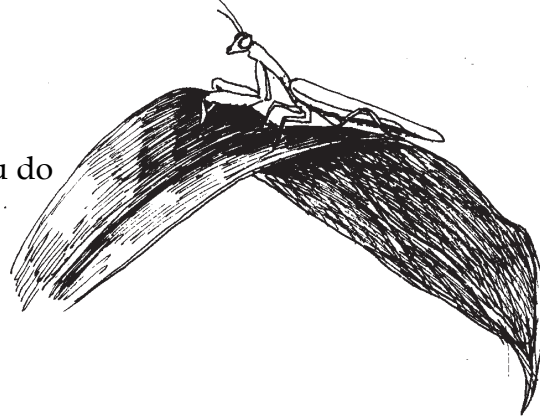
1. Find a plot of land in or near your school which has some grass, other plants, one or more trees and which has a lot of insects and other living things. You are likely to find more kinds of living things if your plot has a pond, *nullah* or some other water body in it. Mark the boundary of your plot with stones, twigs and sticks etc.



a. On page 3 of your WorkBook, make a list of all living things, parts of living things and homes of animals you find there. Look for birds, birds' nests, different kinds of worms, ants, ants' nests, spiders, spider webs and anything that is caught in them, etc.

Be sure to look inside flowers, under leaves and in cracks in the bark.

If you find any living thing whose name you do not know, write a short description of it. How big (or small) was it? Draw it.



Observe carefully where you saw the animals - both large animals and small ones like tiny insects and worms. Make a guess - what do they eat? In the list, circle the animals, as shown.

**Think! Think!**

*Where do plants get their food from?*

b. The plot where you found these living things.

On page 5 of your WorkBook, describe the shape of your plot. How big is it? Measure the lengths of the boundaries. Draw a map of your plot.

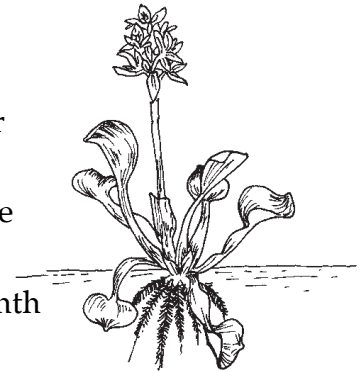
Mark the lengths of the boundaries on it. Draw the map to scale - decide how many centimeters on the map show one meter on the ground.



In the map, show where the trees and bushes were and write their names. Write the names of the animals where you found them.

c. Here is a list of some living things.

- |           |               |          |                |
|-----------|---------------|----------|----------------|
| ant-lion  | human being   | elephant | wall spider    |
| frog      | oyster        | fish     | rabbit         |
| bee       | flea          | sparrow  | dung beetle    |
| earthworm | root bacteria | rat      | crab           |
| red ant   | bat           | monkey   | water hyacinth |



water hyacinth

Where is each one found most often --- under the ground, on the ground, or in some other place?

Mark the correct column with a (✓) for each one on page 7 of your WorkBook.

If you mark the column 'in some other place', write in which place you find that living thing.

Are there living things which have a mark in more than one column? Now write all the names in the correct places in the diagram.

**Think! Think!**

*Where would you put a mango tree in this diagram?*

## Living things depend on each other.

### 2. Every animal depends on other living things for its food.

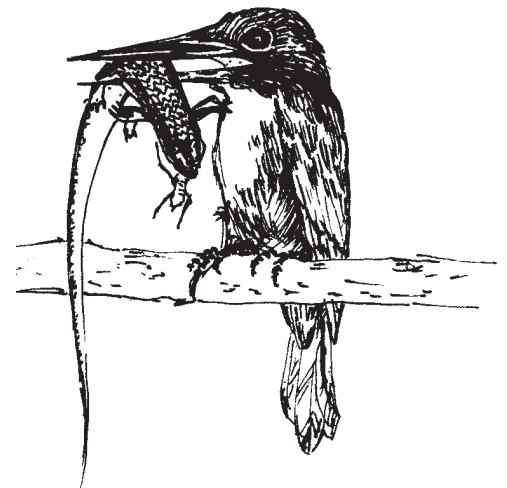
a. On page 9 of your WorkBook, select an animal from your list and write some things it eats :

Animal: \_\_

Eats: \_\_, \_\_, \_\_, \_\_, \_\_ etc.

Now all the animals which eat the animal you selected.

It is eaten by: \_\_, \_\_, \_\_



b. Food chain:

Draw arrows between the following living things, showing which eats the other. The arrow should always point from the plant or animal that is eaten (food) to the animal that eats it.



Here are two examples.

A cow eats grass  
grass ———> cow

An owl eats a mouse, a mouse eats rice

owl	<—	mouse	<—	rice
myna		earthworm		decaying leaves
koel		caterpillar		fresh leaves
wheat		mouse		snake
snake		frog		fly
mosquito		frog		stork
seagull		<i>bombil</i> fish		prawns

c. Make a web

On page 10 of your WorkBook is a part of a web showing some living things, showing who eats whom. Add more living things to this to make a larger web by asking questions like these:

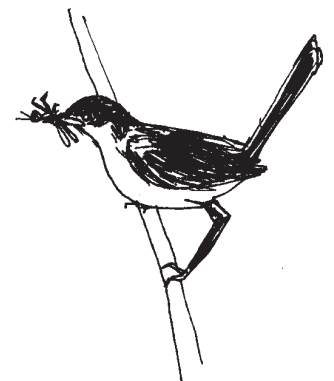
Who else eats a grasshopper?

What else does a frog eat?

Now....

weave (!) a story about five of the living things in your web.

Imagine that they can talk to each other.



**3. Animals depend on other animals and plants for many things, not just food.**

a. Pick one animal from your list, and write down some other living things it needs.

What does it need them for? Think of where it lives, whether it builds its home, and with what.

b. Look at the picture of a banyan tree on page 12 of your WorkBook. It shows

i) some things the tree uses **from** its surroundings and the living things in the surroundings.

ii) some things that the tree gives to its surroundings and the living things in the surroundings.

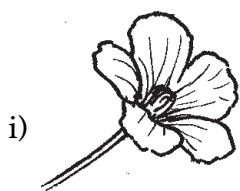
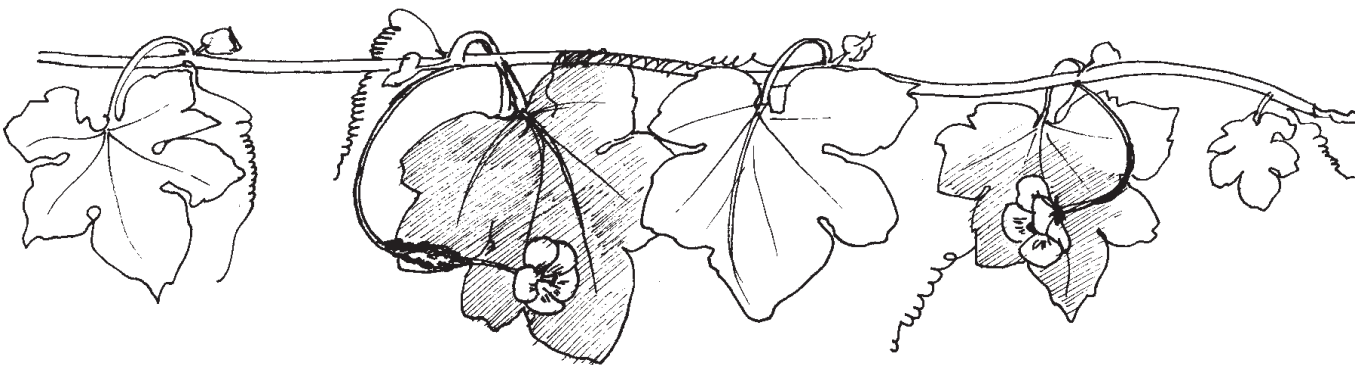
Add as many things as you can to this picture. Remember - the arrows have to point in the correct direction!

Now in your WorkBook draw a similar picture for an ant.

### Animals need plants. Do plants need animals?

#### 4. Pollination

a. The pictures below show how a *karela* (bitter-gourd) grows from a flower on the plant. The *karela* plant has two kinds of flowers - a male flower and a female flower.



This is a male *karela* flower.

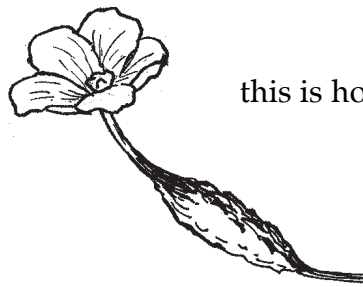


looks with the petals removed. The male flower has stamens. Each stamen has an anther at its end.

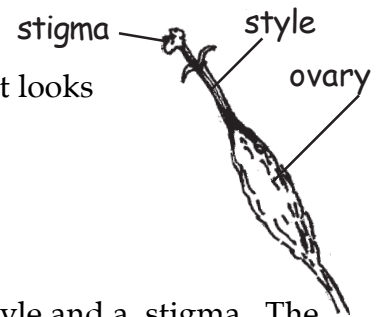
In the *karela* flower, the anthers are all joined together in the centre of the flower. The anthers are yellow-orange in colour.

They have pollen grains. If you touch the anthers, the grains come off on your fingers as a yellow powder.

ii) This is a female *karela* flower ;



this is how it looks



with the petals removed. The female flower has an ovary, a style and a stigma. The stigma is sticky. The style is a tube that joins the stigma to the ovary.

iii) A bee



comes buzzing along, looking for nectar. When it



sits on the male flower, the pollen grains stick to its body.

iv) The pollen grains can fall off on the next flower the bee sits on. If the bee later sits on a female flower of the *karela* plant, pollen grains from its body fall off on the stigma, and stick to it. The pollen grain grows into a long tube. It enters the ovary through the style and combines with the ovules inside. Only after this happens can the ovary grow in to a fruit



- the *karela* !



The ovules grow into seeds of the *karela*.

The pollen grains are very small. You need a microscope



to see each

pollen grain. The yellow powder that rubs off on your hand has hundreds or thousands of grains.

This is how karela pollen grains look

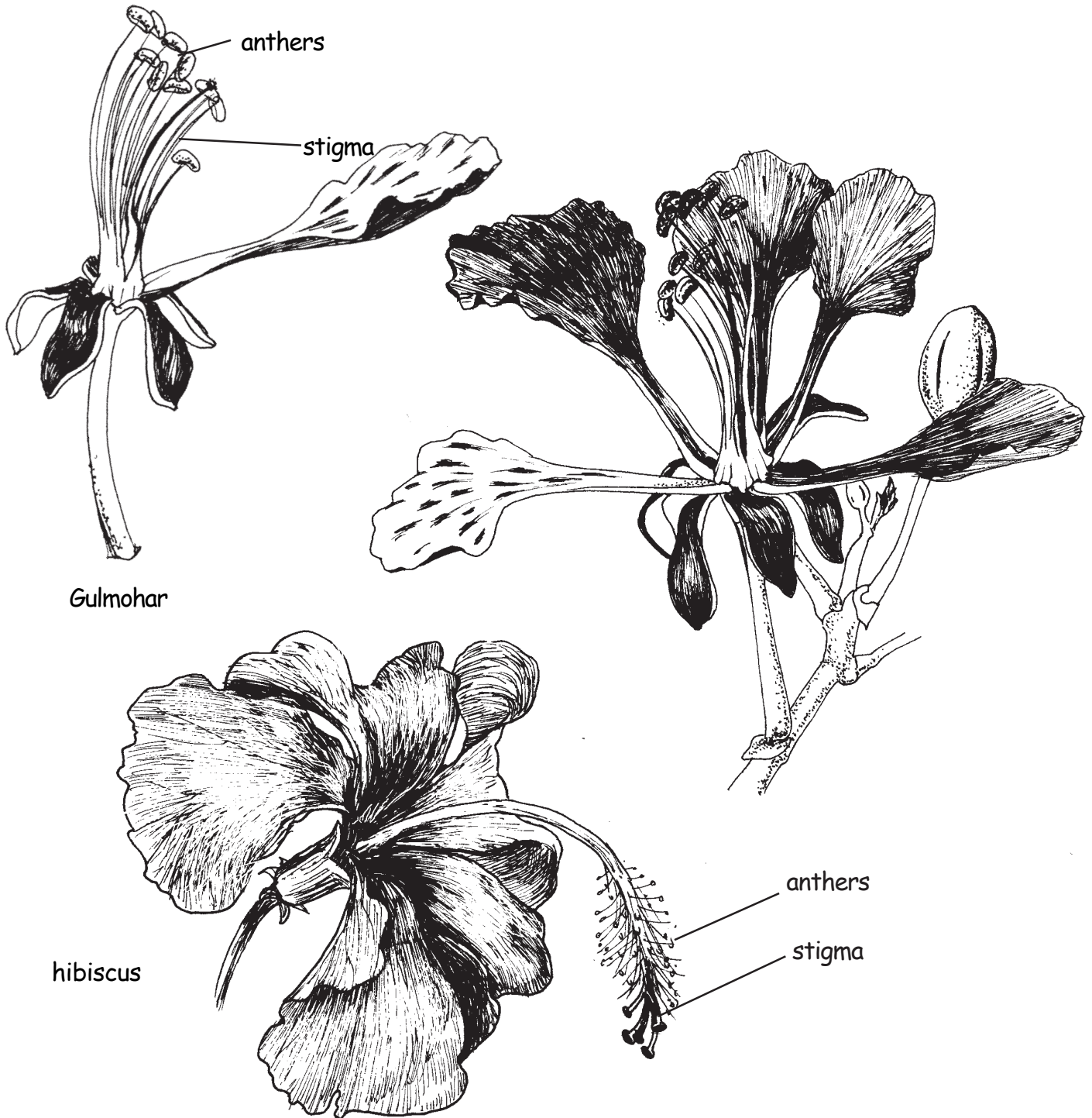


under a microscope, if magnified a hundred times.

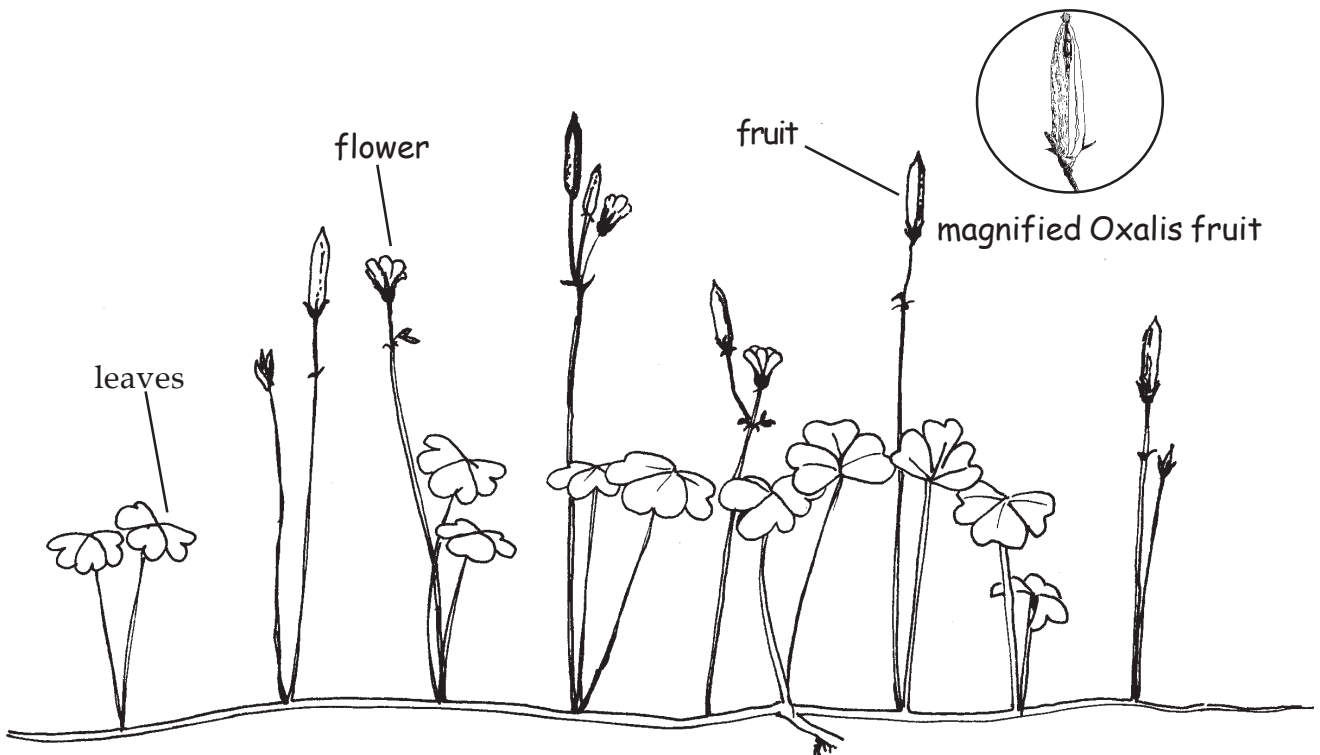
Flowers of many plants, like the hibiscus and gulmohar, have both the male parts (stamen, anthers, pollen) and the female parts (stigma, style, ovary) in the same flower.

On the next page are a few more flowers showing the male and female parts.

The flowers of most plants, even those with both male and female parts in the same flower, need insects or other animals for pollination.



Note: If you pick up fully opened Gulmohar flowers which have fallen from the tree, the anthers and stigma may have fallen off.



Oxalis plant - Actual size

- b. On pages 13 and 14 of your Work Book drawings of Oxalis, Pea, *Mirabilis (gulab bas)*, *Talinum (Ceylon basali)* flowers are shown. In these flowers, can the pollen reach the stigma without the help of insects or other animals?
- c. Find any flower that has only a few petals and draw it; show where the anthers, ovary and stigma are. Does your flower have both the male and the female parts?
- d. Which animals, other than bees, pollinate flowers?

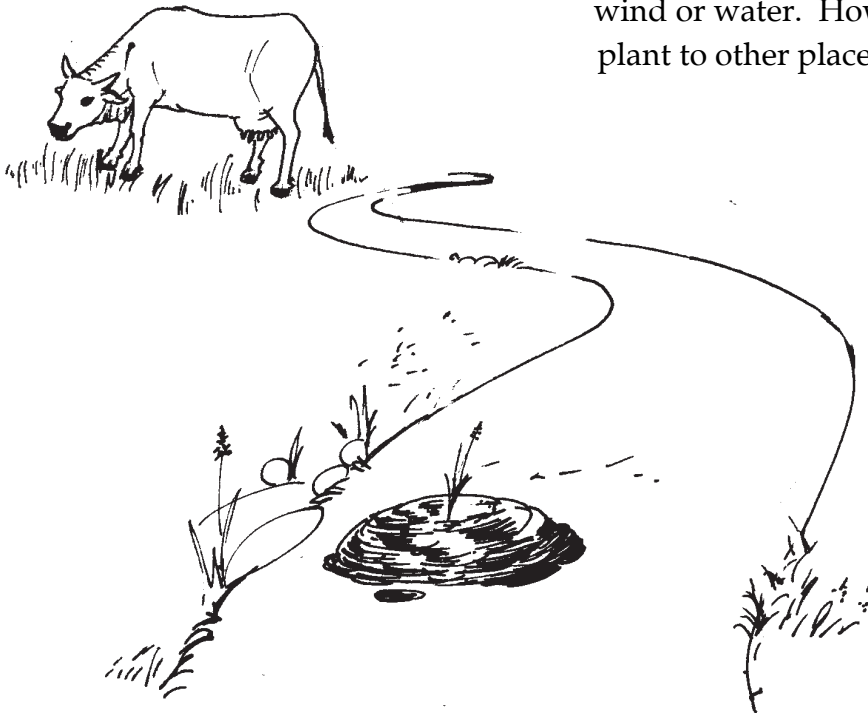


## 5. Dispersal of seeds

Slowly the fruit ripens and the seeds are ready to grow into plants. How do they go from the plant to some other place in the soil? Make a guess.

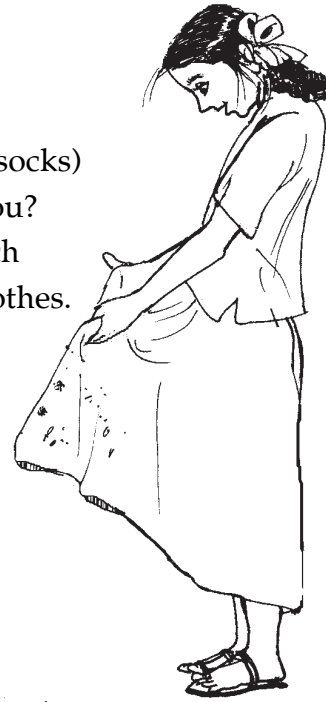


- a. You learned last year how some seeds can be carried by the wind or water. Think of some seeds which cannot be carried by the wind or water. How can they travel from the plant to other places where they can grow?



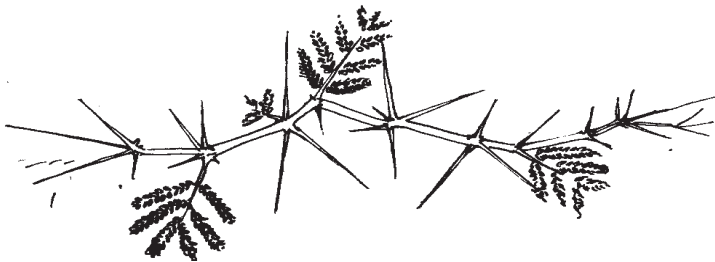
- b. Many animals eat fruits and their faeces contain the undigested seeds. The seeds grow where the faeces are dropped.
- c. Some seeds stick in different ways to the hair or skin of animals. Walk through an area where grass grows wild (not lawns).

Check your clothes and legs (and *chappals* or shoes and socks) for seeds that got stuck there. How did they cling to you? Pick out these seeds and fruits. Draw them. Show which part of the seed or fruit attached itself to you or your clothes.



***Take care!***

*Be careful not to step on thorns; be alert for snakes, ants etc. which may bite you. Don't walk into thorny plants.*



***Think! Think!***

*Plants and animals die, parts of plants like leaves and branches fall off. What happens to all these dead plants?*

**Know these words**

pollination, pollen, stigma, anther, ovary, style, ovule, dispersal



## EXERCISES

### Interesting questions

1. In the following, fill in the blanks. One is filled out for you.

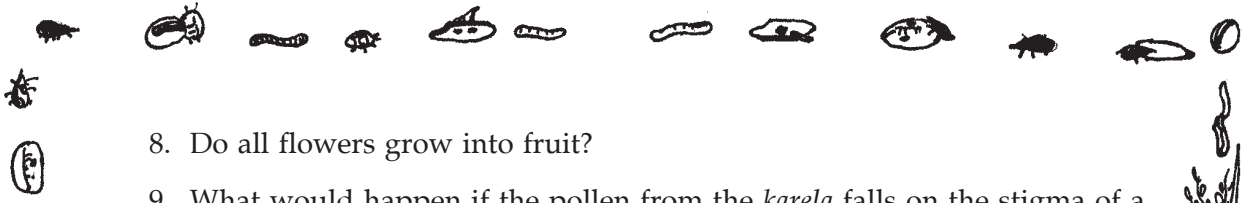
- More snakes -> fewer rats -> more grain.  
 More \_\_\_\_\_ -> fewer rats -> less plague.  
 More \_\_\_\_\_ -> fewer mosquito larvae -> less malaria.  
 More snakes -> fewer frogs -> more \_\_\_\_\_  
 More bulbuls -> fewer \_\_\_\_\_ -> more grain  
 Less bees -> less pollination -> fewer \_\_\_\_\_.  
 More people -> more \_\_\_\_\_ -> less trees.  
 Less trees -> fewer bulbuls -> more \_\_\_\_\_ -> less \_\_\_\_\_

Add similar lines of your own.

2. Suppose two flowers are very far apart. How can pollen from one flower reach the stigma of the other? Can this happen without the help of insects? How?
3. What would happen to leaves if snails and earthworms did not eat them?
4. Name some animals which
- drink the blood of other animals
  - eat grain
  - eat dead animals
  - eat wood
  - eat insects
  - eat decaying leaves
5. Now what would happen if you used insecticides to kill off all insects?  
 If you burned all dead leaves?
6. What did people eat before they started farming?
7. Do all fruits grow from flowers?







8. Do all flowers grow into fruit?

9. What would happen if the pollen from the *karela* falls on the stigma of a papaya flower?

10. Which of these vegetables are fruits, and which ones are not? How do you know?

*Bhindi*, tomato, potato, brinjal, ginger, beet-root, chilli, *palak*, green peas, radish

### Observe and draw

Flowers of as many fruits as you can, like those of *Ber*, papaya, mango, *neem*, tamarind, drumstick, tomato, *bhindi*.

### Act it out

Pretend to be any animal of your choice. Describe it, then act like it.

- a) How does this animal move?
- b) Does it make any sound you can hear?
- c) Does it build its home? Where, and with what?
- d) How does it eat?
- e) Does it hunt other animals? How?
- f) Is it hunted by any animal? How does it try to escape?

### Ask and find out

Are there places near your school or house that had less animals and plants than they do now? How did this happen?

Are there places that have **more** animals and plants now than they had before? How did this happen?





**Play with words**

Write a poem on your favourite living thing.

**Show and tell**

Bring to class and show any baby fruit with part of the flower still attached. You may find such tender vegetables in the market (or garden or field).

**Figure it out**

1. On page 19 of your WorkBook is a map of Apu’s plot. Study the map and answer the questions.
  - a) Give your answers in meters for the questions below:  
 How far is the plant with big leaves from the tamarind tree? You can measure from the base of the tree to the base of the plant.  
 How far is the lizard from the ant?
  - b) There is a banyan tree 30 m from the hibiscus plant.  
 Can you show this on the map? If not, what can you change about the map so that you can show the tree on it?

2. A rat's tale

On page 20 of your WorkBook there is a story about a rat. As you read the story, answer the questions in each box.

**Play this game**

Ask your friend to choose one of the animals from this list:  
Owl, eagle, crow, sparrow, cat, squirrel, mosquito, fly, spider, cobra, lizard, butterfly, frog, fish, cow, horse, sunbird, earthworm, moth.





Your friend will not tell you his or her choice right now.

Ask questions which have 'yes' or 'no' answers to find out what your friend chose.

Q1. \_\_\_\_\_

Ans \_\_\_\_\_ (yes or no)

So the animal can be one of these - \_\_\_\_\_

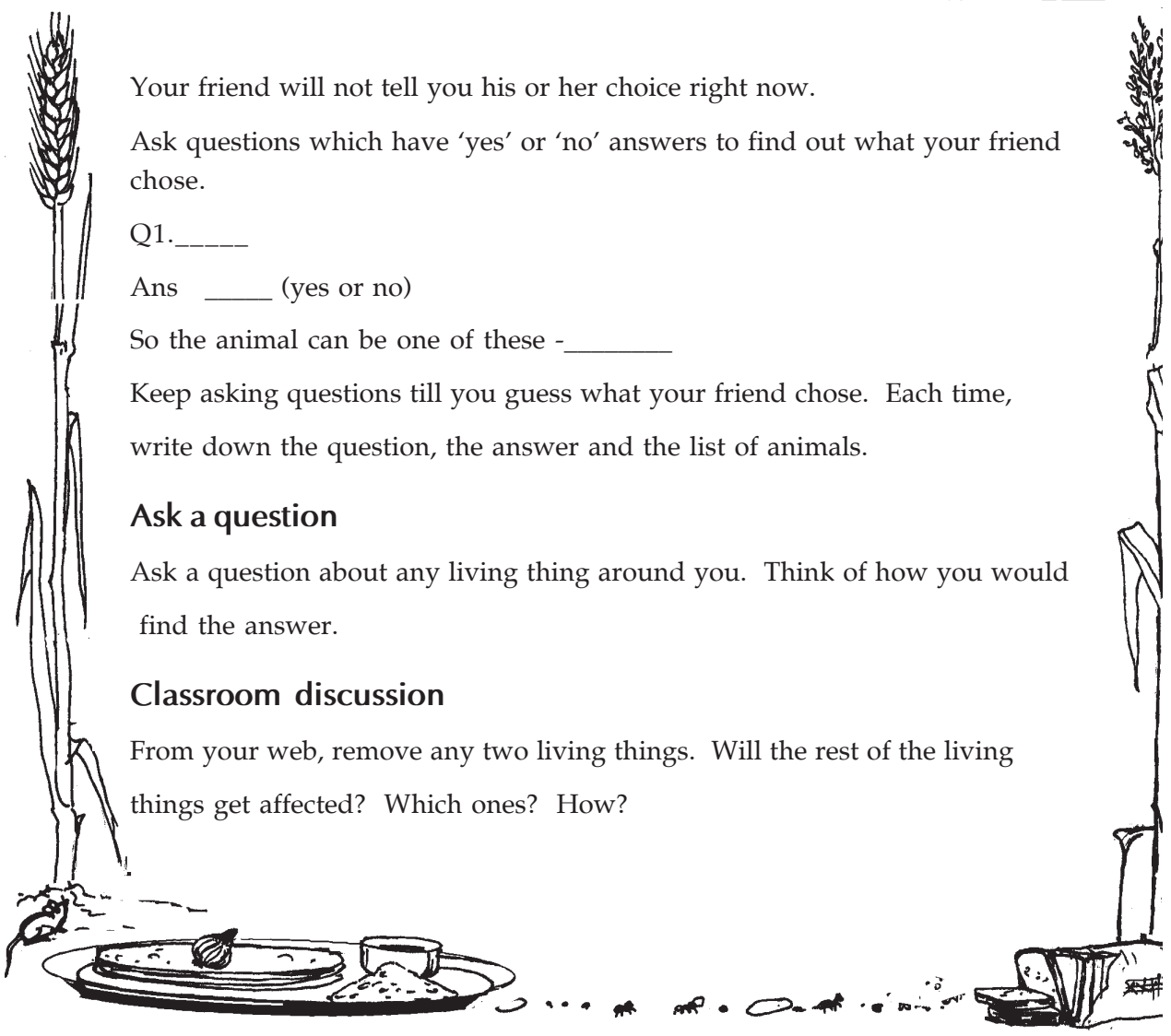
Keep asking questions till you guess what your friend chose. Each time, write down the question, the answer and the list of animals.

### Ask a question

Ask a question about any living thing around you. Think of how you would find the answer.

### Classroom discussion

From your web, remove any two living things. Will the rest of the living things get affected? Which ones? How?



### DID YOU KNOW?

1. A kind of bird called the dodo used to live on the island of Mauritius. This bird could not fly. Dodos were easily hunted by sailors, and dodos' eggs were eaten by rats and dogs which the sailors brought with them.

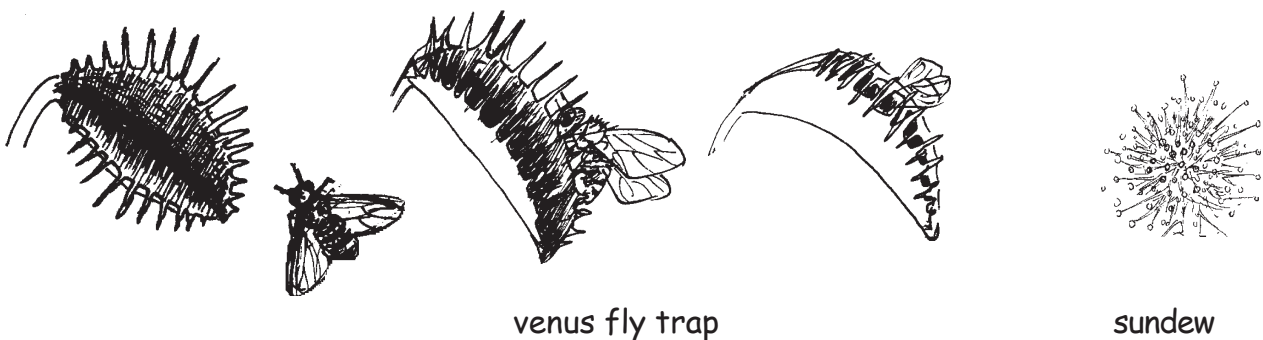
In 1681, the last dodo was killed; i.e. the dodo became **extinct**. The dodo ate the fruit



of a tree called *Calvaria* (also called *tambalacoque*). The seeds of the tree could sprout and grow into trees only after they passed through the dodo's digestive system. So after the dodo became extinct, no new *Calvaria* trees could grow on the island. There are only 13 *Calvaria* trees on the island now, and all are more than 300 years old. Scientists are now trying to make the seeds sprout by making another bird, the turkey, eat it. Some seeds have sprouted, but the plants are still too young to grow fruits of their own.

2. Some plants, like the sundew and the venus fly trap shown here, trap and digest insects.

The sundew flowers are very sticky. When insects land on them, they get stuck and cannot fly away.



3. The cheetah became extinct in India about 50 years ago, because people hunted and killed all the cheetahs we had.



4. There are about 8000 kinds of birds in the world. 25% of them are in India and its neighbouring countries.