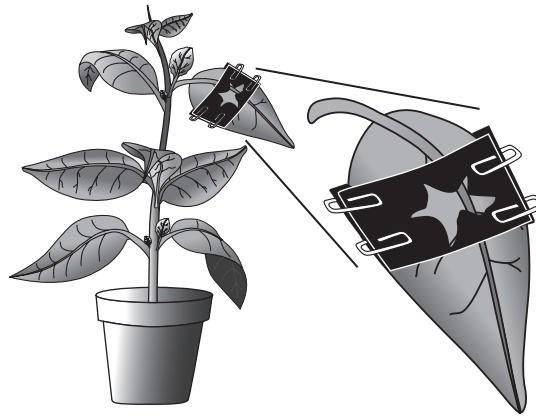


Worksheet 1.1 Do leaves need light to make starch?



- 1 Collect a healthy plant growing in a pot.
- 2 Cut out a piece of black paper or aluminium foil that will fit neatly over one of the leaves. Cut a shape out of the paper or foil. Fold it in half, and fasten it gently over one of the leaves on the plant.



- 3 Make a drawing of the leaf with the paper or foil on it, to show the shape that you have cut out.
- 4 Put the plant in a sunny window and leave it for one week.
- 5 Now take the leaf off the plant. Take the paper or foil off the leaf. Test the leaf for starch, as described in Activity 1.1 in the Coursebook.



Do leaves need light to make starch?: **Worksheet 1.1**



6 Make a drawing of the appearance of the leaf after you have tested it for starch.

7 What conclusions can you make from the results of your experiment? Write them down in the space below.

.....

.....

.....

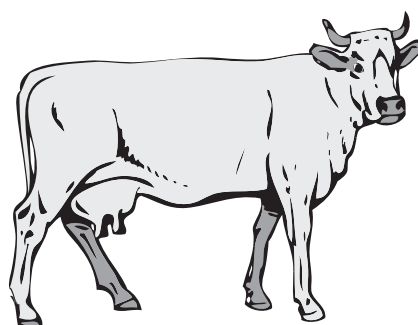
Worksheet 1.2A Different kinds of fertiliser



Six farmers in a village in Nigeria grow maize. They want to find out if adding fertiliser to their fields would increase the yield of maize.

They decided to try out two kinds of fertiliser:

- fertiliser bought in bags
- manure from the cattle that they keep.



- 1 The letters N, P and K show three of the elements that are contained in the fertiliser. Name these three elements.

.....

.....

- 2 Name a mineral that contains nitrogen and can be used by plants.

.....

- 3 The farmers carried out their experiment on an area of land with sides measuring 300 m. They divided up the land into 9 equal-sized plots, A to I. They added either no fertiliser, manure or NPK fertiliser to each plot, like this:

A no fertiliser	B NPK fertiliser	C manure
D NPK fertiliser	E manure	F no fertiliser
G manure	H no fertiliser	I NPK fertiliser



Different kinds of fertiliser: **Worksheet 1.2A**



The farmers planted the same number of maize seeds in each plot. At harvest, they counted the number of 90 kg bags of maize that they got from each plot. Their results are shown below.

A 18.0 bags

B 33.5 bags

C 31.5 bags

D 31.0 bags

E 30.5 bags

F 18.5 bags

G 31.0 bags

H 17.5 bags

I 31.5 bags

Draw a results table and complete it to show these results. Try to make it easy to see the yield that the farmers got for each kind of fertiliser. You should include a column for the mean yield.

- 4** Suggest why it was a good idea to arrange the plots in the pattern shown in the diagram.

.....

.....

.....

.....

- 5** Suggest **two** things that the farmers should have kept the same in each plot, other than the area of the plot and the number of seeds planted.

.....

.....



Different kinds of fertiliser: **Worksheet 1.2A**



- 6** All of the farmers decided that they would add manure to the soil where they grow maize in the future. Suggest why they made this decision.

.....

.....

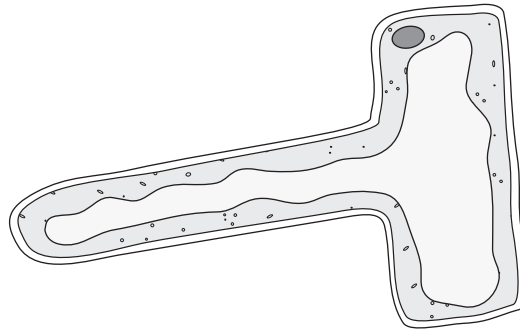
.....

.....

Worksheet 1.3 Water movement through plants



- 1 The diagram shows a root hair cell.



- a On the diagram, use label lines to label each of these parts of the cell:
cell wall **cell membrane** **cytoplasm** **nucleus** **vacuole**
- b Which part of the cell controls what enters and leaves the cell?
- c Which part of the cell contains chromosomes?
- 2 Root hair cells absorb water and mineral salts from the soil. Explain how the shape of a root hair cell helps it to do this quickly.
-
-
- 3 Explain why root hair cells do not contain chloroplasts.
-
-
- 4 After the root hair cells have absorbed water and mineral salts, these substances move to the centre of the root. They go into tubes made of empty, dead cells joined end to end.
- These tubes carry the water and mineral salts all the way up to the top of the plant.
- What is the name of these tubes?
- 5 When the water gets to the top of the plant, some of it is used for photosynthesis.
- Write the word equation for photosynthesis.
-



Water movement through plants: **Worksheet 1.3**



- 6** Most of the water is not used for photosynthesis. It evaporates from the cells in the leaf, into the air spaces inside the leaf.

Explain what is meant by the word *evaporates*.

.....

.....

- 7** Water vapour diffuses out of the leaf into the air.

What is the name of the tiny holes through which the water vapour diffuses?

.....

Worksheet 1.4 Observing and recording flower structure



- 1** Collect a flower. Your teacher may give you a flower, or you can find one for yourself.
- 2** Study the flower carefully. Try to find each of the following parts:
 - petals – the coloured parts, perhaps with guidelines on them
 - sepals – a circle of structures outside the petals
 - anthers – the parts that make pollen; they are on the end of the stamens
 - stigma – the part that catches pollen
 - ovary – the part near the base of the flower, which contains ovules.
- 3** Place the flower on a wooden or cork surface. Using a sharp knife, cut it in half from top to bottom. Your teacher will show you how to do this.

Look for the ovule or ovules inside the ovary.
- 4** Now make a large drawing of one half of your flower. Remember to:
 - use a sharp pencil, and have a good eraser ready for when you need it
 - try to make each line smooth and clean
 - try to get the shapes and relative proportions of the different parts of the flower approximately correct
 - make your drawing large, but leave space around it to write labels.



Observing and recording flower structure: **Worksheet 1.4**



5 Label your diagram. Remember to:

- use a ruler to draw label lines
- make sure the end of the label line touches the structure you are labelling
- do not let label lines cross one another
- do not write labels on top of your drawing
- write your labels horizontally.



Worksheet 1.5 Which colour flowers do bees visit most often?

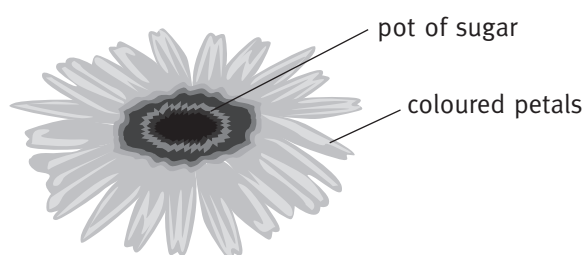


You are going to plan an experiment to try to answer this question. This is quite a challenging task because it is not broken up into small parts. It would be a good idea to organise your thoughts on a piece of rough paper before you begin to write your answer. When you have finished writing your plan, you might even be able to carry out the experiment yourself.

Yao Ming watched bees visiting flowers in his garden. He noticed that a group of yellow flowers seemed to get more bee visits than the other flowers.

Yao Ming decided to set up an experiment to find out if bees visited yellow flowers more often than flowers of other colours.

He made some model flowers, using thin plastic, like this:



- 1 Describe how Yao Ming should set up his experiment. Think about the variables he should change, keep the same and measure.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....





- 2 Draw a results table in which Yao Ming could record his results.

Worksheet 1.6 Comparing sexual reproduction in humans and flowering plants



Both humans and flowering plants reproduce sexually. You are going to think about how these processes are similar to each other in the two kinds of organisms, and how they differ.

1 Explain what is meant by each of the following terms:

gamete

fertilisation

zygote

2 Complete the table.

	Humans	Flowering plants
Where are the male gametes made?		
What are the male gametes?		
Where are the female gametes made?		
What are the female gametes?		
How does the male gamete get to the female gamete?		
Where does fertilisation happen?		
What does the zygote develop into?		
Where does the embryo develop?		
How does the developing embryo obtain food?		

Worksheet 1.7B Fruit dispersal by toucans (extension)



Read the information below and then answer the questions.

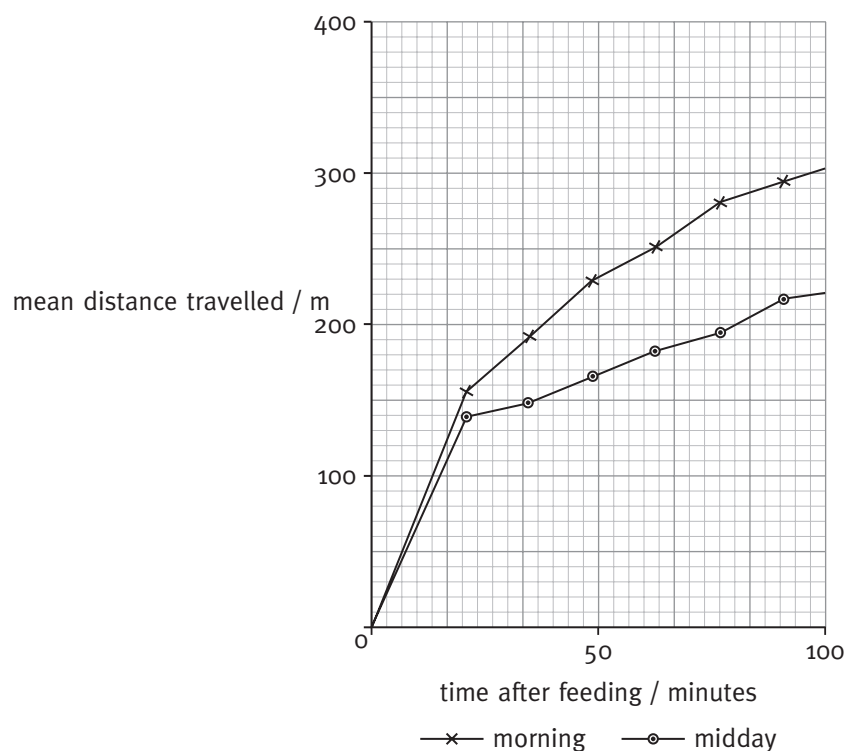
In 2011 and 2012, scientists conducted an investigation into how toucans help to disperse nutmeg seeds.

First, the scientists studied captive toucans in a zoo in Rotterdam, in the Netherlands. Toucans love to eat nutmeg fruits. They swallow the fruits whole, and then regurgitate (bring up) the hard seeds.

The scientists fed 100 nutmeg fruits to five toucans. They timed how long it took for each seed to be regurgitated. They found that this could be anything between 4 minutes and 98 minutes after the toucan had eaten the fruit.

Next, the scientists captured six wild toucans in Ecuador. They fitted each toucan with a backpack containing a GPS (global positioning system) unit. This meant that they could track the toucans, and find out where they were at any time.

The scientists recorded the distance that each toucan travelled at various time intervals after feeding at a nutmeg tree. They used their results to calculate the mean distance travelled. They did this when the toucans fed in the early morning, and also when they fed at midday. The graph shows their results.



Fruit dispersal by toucans (extension): **Worksheet 1.7B**



- 1** Explain the difference between a fruit and a seed. (You could refer to the last sentence in the second paragraph in your answer.)

.....

.....

- 2** Suggest why the scientists chose to do the first part of their experiment in a zoo, rather than in the wild in Ecuador.

.....

.....

- 3** Look at the graph.

- a** If a toucan regurgitates a nutmeg seed 50 minutes after eating a fruit in the morning, how far is the seed likely to be dispersed from the tree?

.....

- b** Explain why we cannot be sure that a seed regurgitated after 50 minutes will be dispersed this distance from the tree.

.....

.....

- c** Use the graph, and the information in the third paragraph, to predict the greatest distance that a nutmeg seed could be dispersed from the tree. Explain your answer.

.....

.....

- 4** Use the graph to suggest how producing ripe fruits ready to be eaten in the early morning, rather than later in the day, could be an advantage to nutmeg trees.

.....

.....

.....

.....

.....



Fruit dispersal by toucans (extension): **Worksheet 1.7B**



- 5** Do you think the scientists planned their experiments well? Suggest how they could improve their investigation.

.....

.....

.....

.....

.....