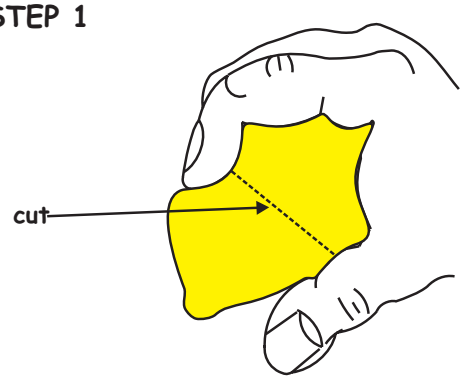
Activity 4.30 THE ELECTRIC LEMON

Focus question: What is the energy transformation in this activity?

You will need:

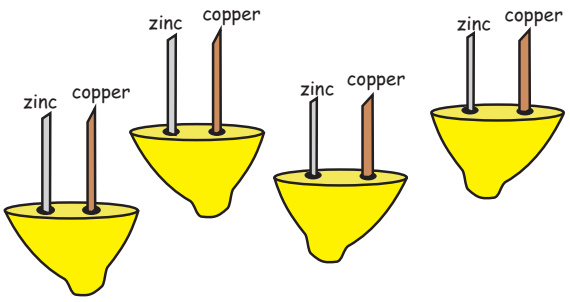
- 1 comboplate
- 4 x copper strips
- lemons (1 or 2)
- 2 x springs
- 1 bulb holder
- 4 copper wires
- 8 paper clips
- 4 x zinc strips
- a LED-light emitting diode
- a pair of scissors

STEP 1



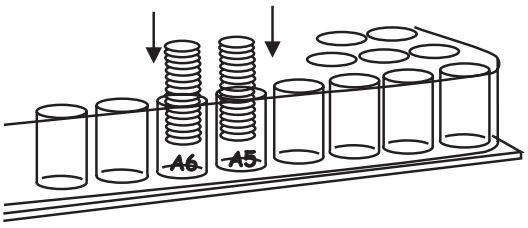
Squeeze the lemon gently and cut it into four equal pieces.

STEP 2



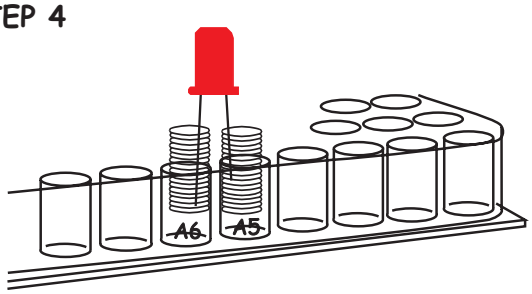
Push a copper strip into one hole and a zinc strip into the other hole of each lemon.

STEP 3



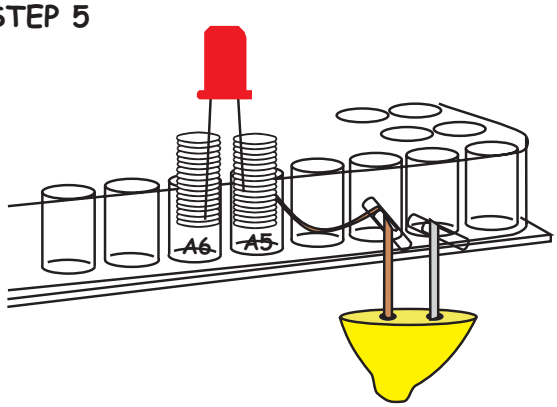
Put one spring into well A5 and the other in well A6 of the comboplate.

STEP 4



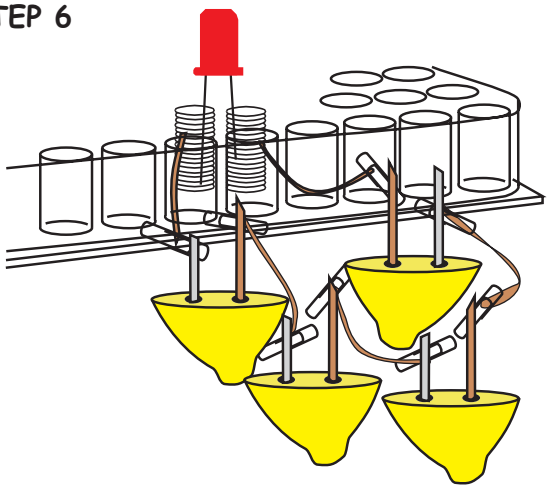
Insert the pins of the LED inside the two springs.

STEP 5



Slide one end of the piece of copper wire into the spring in well A5. Clip the other end of the wire onto the copper strip of the first lemon with a paper clip.

STEP 6



Complete the circuit by joining the other three lemons using paper clips and the strips as shown in the picture.

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Q1 What happens when you connect the fourth piece of lemon to the spring in well A6?

If the LED does not light up, add more lemon pieces until it does.

Q2 What are the cells in this activity?

Q3 What will happen if you disconnect a wire between the second lemon and the first?

Q4 What forms a circuit in this activity?

Q5 What conducts the electricity inside the lemons?

Q6 What do you think can happen to the light if the number of lemons is increased?

Q7 What is the energy transformation in this activity?

Q8 What are the electrodes in this activity?

Q9 What forms an electrolyte in this activity?

Q10 Draw a rough circuit diagram to show how you connected the cells to the LED.

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ACTIVITY 4.31 A MOULD

INTRODUCTION

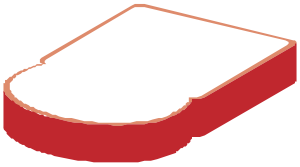
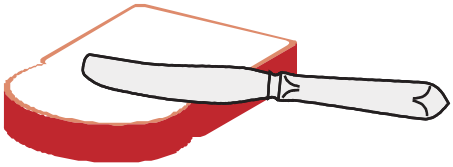
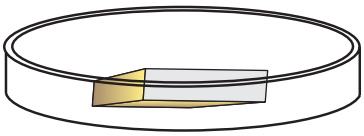
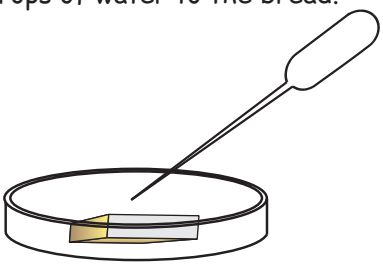
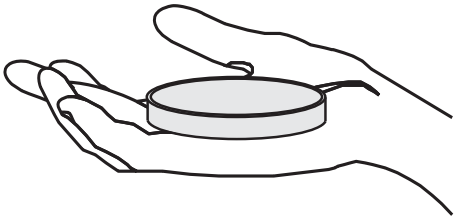
When things rot, they sometimes grow moulds. Certain moulds absorb food from dead and rotting materials. Some moulds are useful and some moulds are harmful.

You can grow a mould.

Part A

To grow a mould you need:

•a petri dish with lid •a piece of bread •propette •tap water

1 Get a slice of bread which is a few days old. 	2 Next, cut it into pieces which will fit into the petri dish. 
3 Put the pieces of bread in the petri dish. 	4 Then use the propette to add a few drops of water to the bread. 
5 Walk about and wave the petri dish in the air. 	6 Last, put the petri dish in a dark, fairly warm place with the lid ON. 

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Part B

To study a mould you need:

•hand lens •petri dish with mould •forceps

What to do:

Look at the bread in the petri dish after about a week. If nothing has changed, leave the bread for another few days. Mould should have developed by this time.

Use the hand lens to see the mould more clearly. Follow the instructions and answer the questions below.

Q1 What colour is the mould?

Q2 Does the mould have clear roots and stems?

Q3 In general, what does the mould look like? In your notebook, draw some of the mould.

Q4 Is the mould on the surface of the bread or in the bread?

Q5 There are swollen structures at the tips of some threads (**hyphae**). Look carefully at these. Draw a hypha with a swollen structure in your notebook.

These swollen structures are called **sporangia**. They produce **spores**. Moulds reproduce by means of spores.

Q6 Does the mould smell?

Extension questions

Q7 What you do you think is happening to the bread while the mould is growing on it?

Q8 Name some other things that you have seen with mould.

Q9 How do think the mould got onto your bread in the petri dish?

Q10 Mrs Gumede is angry. She bought some fishpaste two weeks ago and she used some. Today she wants to use some more and it is full of mould. She is going back to the shop to complain.

a) How did the mould get onto the fishpaste?

b) Pretend you are the shopkeeper. Write down all the questions you want to ask Mrs Gumede to find out more about the mouldy fishpaste.

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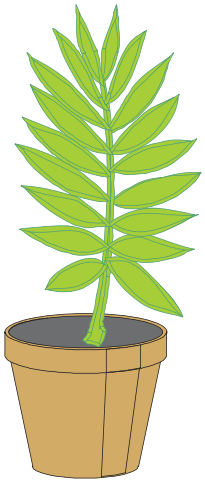
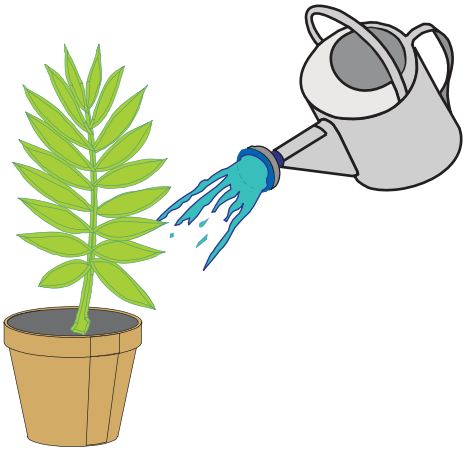
Activity 4.32 A FERN PLANT

INTRODUCTION

Today many people grow ferns in gardens and in pots. You can also grow a fern.

To grow a fern you need:

- a plant pot
- some stones or gravel
- potting soil

1 First put some stones or gravel in the bottom of the plant pot. 	2 Then fill the plant pot with potting soil. 
3 Next, put a small fern in the plant pot. 	4 Remember to water your fern every day. 

Now you can learn more about a fern.

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To study a fern you need:

•hand lens •propette •forceps •petri dish •tap water
•newspaper •fern plant

What to do:

Step 1 Complete the exercise below in your notebook.

PARTS OF THE FERN

The roots

Step 2 Examine the roots of the fern. Are they all about the same size or is there one main root?

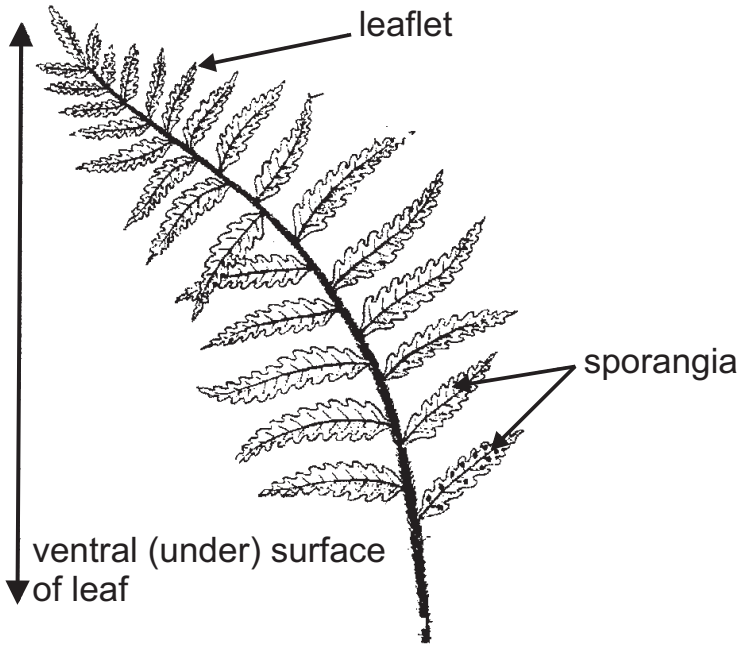
Q1 Is the root system a fibrous root system or a tap root system?

The stem

Q2 Is the stem above the ground or is it below the ground?

The leaves

The leaves (or fronds) of ferns are usually divided into many smaller leaflets. The dia gram below shows a fern leaf.



Step 3 Draw one of the leaves of your fern. Be sure to show the leaflets.

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HOW A FERN REPRODUCES

On the underside of some of the leaves you will find little dots. We call these structures **sporangia**. These contain many **spores**.

Step 4 Draw the underside of a leaf or leaflet to show the pattern of sporangia.

Step 5 Use the forceps to scratch some of the sporangia from the surface of the leaf into the petri dish.

Step 6 Use the hand lens to examine a sporangium and its spores.

Step 7 Make a drawing of the sporangium and its spores.

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Example 1: A DICOTYLEDON

INTRODUCTION

We use flowering plants for many things. Many people grow flowering plants for sale. You can also grow a flowering plant. We will start with a dicotyledon.

To grow a dicotyledon flowering plant you need:

•a plant pot •some stones or gravel •potting soil •a few soaked bean seeds

1 First put some stones or gravel in the bottom of the plant pot. 	2 Then fill the plant pot with potting soil. 
3 Next, put two soaked bean seeds into the soil, about 3 cm deep. 	4 Remember to water your seeds every day. 

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You will soon see little green shoots above the surface of the soil. They will grow into young plants. If the young plants get too big for the pot, you can plant them in the soil outside or in another suitable place.

Now you can learn more about a flowering plant (bean).

To study a bean plant you need:

- propette
- hand lens
- petri dish
- forceps
- water
- newspaper
- bean plant about 15 cm tall

What to do:
Place a whole bean plant on damp newspaper. Complete the exercise below in you note book.

PARTS OF THE BEAN PLANT

The roots

Step 1 Examine the roots of the bean plant.

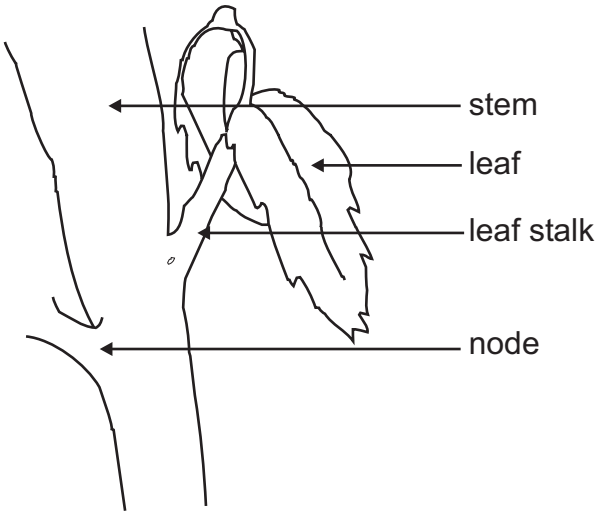
Q1 Are they all about the same size or is there one main root?

Q2 Is the root system a fibrous root system or a tap root system?

Step 2 Use the hand lens to find root hairs.

The stem

The drawing below shows the stem of a plant.



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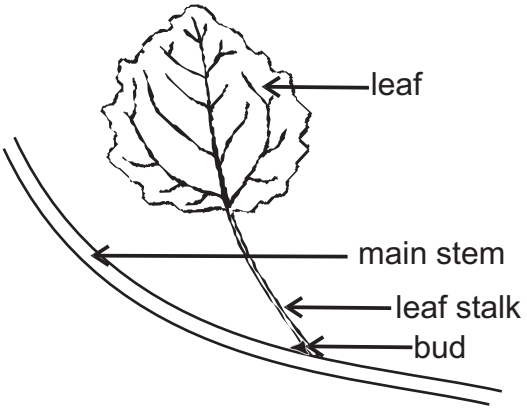
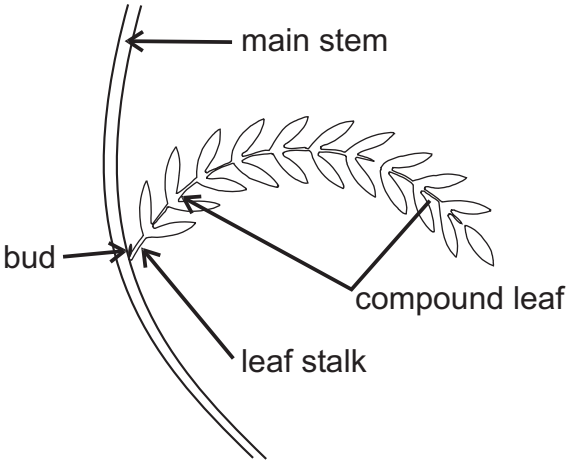
Q3 Find the labelled structures on your own plant.
Q4 Make a drawing of part of your plant, showing some of the stem and one leaf.

The leaves

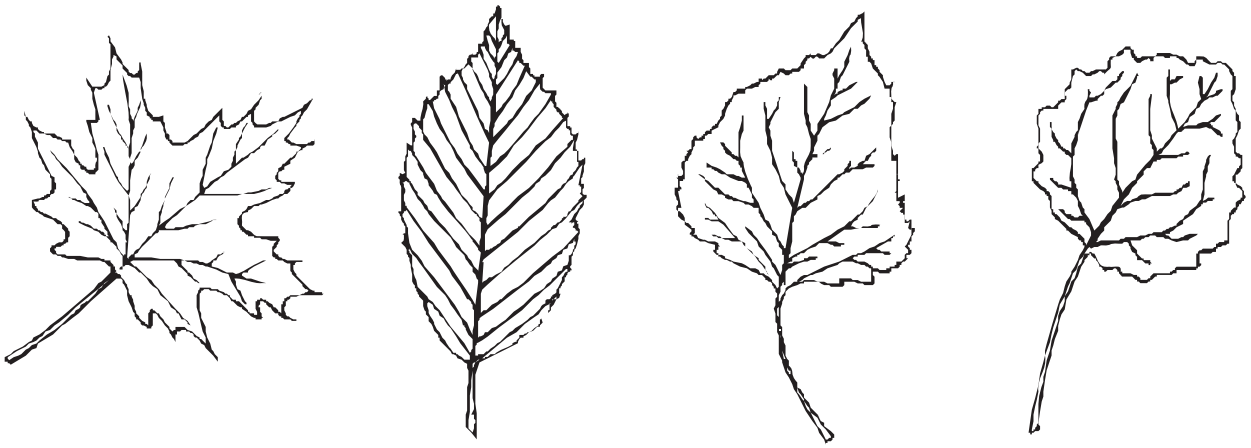
The leaves of flowering plants may be simple or compound. The figures below show a simple leaf and a compound leaf.





Q5 What is the difference between simple leaves and compound leaves?
Q6 Is the leaf of your plant a simple leaf or a compound leaf?

The figures below show different leaves from dicotyledonous plants.



Keep this page in a safe place. You will need it later when you study the leaves of monocotyledons.

In your notebook, draw a leaf of your plant and show:

- ❑ margins
- ❑ veins
- ❑ mid-rib
- ❑ petiole (stalk)
- ❑ apex (tip)

Roots, stems and leaves are called the vegetative parts of plants. Later you will look at the flowers of dicotyledons.

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ACTIVITY 4.34 A MONOCOTYLEDON FLOWER

INTRODUCTION

You have already studied the roots, stems and leaves of monocotyledons. Now you will study a flower of a monocotyledon.

To obtain a suitable flower:
Your teacher will tell you what to do.

To study a monocotyledon flower you need:
•hand lens •petri dish •forceps •propette •flower

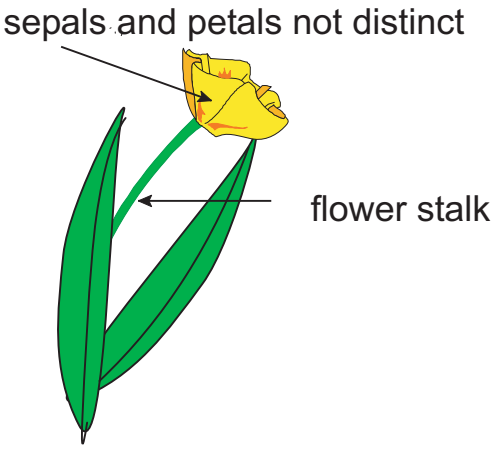
Step 1

Place the flower on the petri dish.

Step 2

Use the hand lens to see more clearly when it is necessary.

PARTS OF THE FLOWER



The figure above shows the parts of a monocotyledon flower which you are likely to see on the outside. Remember flowers from different plants do not look exactly the same.

Step 3

Find the labelled parts on your flower.

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Step 4

Look carefully at your flower and answer the following questions:

Q1 Is it possible to tell the difference between sepals and petals?

We call these parts (petals and sepals together) perianth parts or **tepals**.

Q2 What colour are the perianth parts?

Step 5

Remove two or three perianth parts from the flower. Now the inside parts are visible.

Observation Questions

Q3 How many stamens are there on your flower?

Q4 Are the parts of the flower in multiples of three or of five?

Q5 Are the perianth parts joined to each other or are they free?

Q6 Compare the flowers of monocotyledons and dicotyledons. You can use a table like the one below.

	Monocotyledon	**Dicotyledon**
flower parts		
in multiples of		

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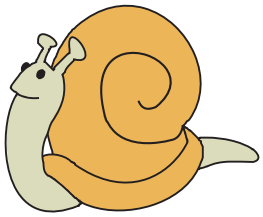
ACTIVITY 4.35 A SNAIL ZOO



INTRODUCTION

> At sunset, when the night-dews fall,
> Out of the ivy on the wall
> With horns outstretched and pointed tail
> Comes the grey and noiseless snail.
>
> James Reeves (b. 1909)

Have you ever kept a snail? It is easy to make a home for snails in your lunch box. Your teacher will tell you what else to do.

What to do:

Part 1 Setting up an environment for snails

- ♣ Snails are very efficient escape artists so you must devise a way to keep them in the lunchbox without keeping the lid on permanently. Discuss your plan with your teacher.
- ♣ When you collect the snails, take care that you also pick some of the plant material on which they were feeding.

Part 2

Step 1 Set up the lunchbox as shown on the next page, with about 2 snails per container.

Step 2 Examine the snails every day, remove old plant material and replace it with fresh food with a few drops of moisture.

Step 3 Observe the snails carefully and answer the questions that follow.

To keep a snail you need:

- a plastic lunch box with a lid
- petri dish
- propette
- damp soil
- some lettuce, spinach or cabbage leaves
- a snail
- tap water
- some mesh (wire screen - provided by your teacher)

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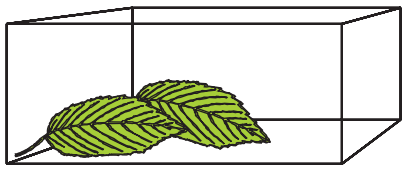
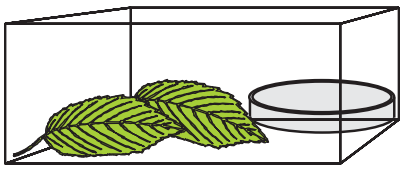
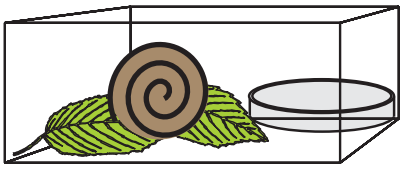
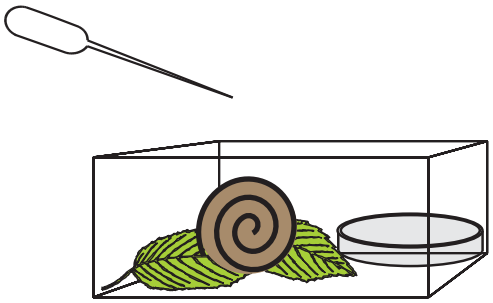
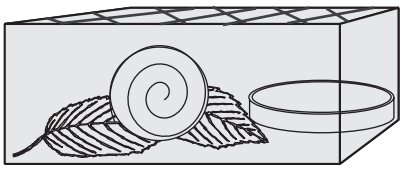
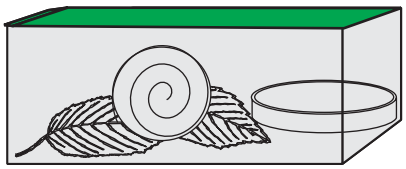
1 First put some damp soil and leaves in your lunch box. 	2 Then put the petri dish with a little water in the lunch box with the leaves. 
3 Next put the snail on a leaf in the lunch box. 	4 Use the propette to add a few drops of water to the leaves. 
5 Place the mesh over the lunch box. 	6 Last, cover the lunch box lightly with the lid. 

Now you can learn more about a snail.

Part B

To study a snail you need:

•hand lens •petri dish •tap water •forceps •propette •snail

What to do:

Step 1 Watch the snail carefully and complete the exercise below in your notebook. Hold the snail on a leaf and use the hand lens to see more clearly.

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PARTS OF THE SNAIL

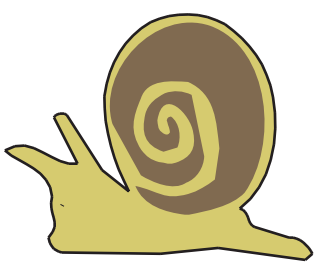
The head

Q1 Snails have feelers called tentacles. How many tentacles are there? Are the tentacles all the same?

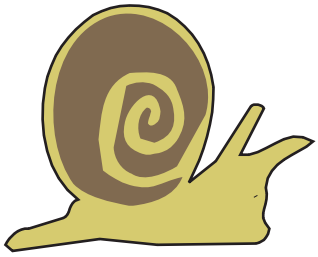
Q2 Look for the snail's mouth at the front of its head. What shape is the mouth?

The shell

Q3 On what side of the snail is the shell? Left or right? To find out which is left or right, look at the snails below:



Snail A



Snail B

You are looking at the left side of Snail A and at the right side of Snail B. We work out the left and right of snails and other animals in the same way as we work out left and right on ourselves, that is from the direction they face or from the direction in which they normally move.

Q4 Do all snails have the shell on the same side?

Q5 What is the use of the shell, do you think?

Q6 Draw the shell of a snail. Be sure to put in the right number of spirals.

The snail's stomach and intestine and some other organs are inside the shell.

The foot (the rest of the snail)

Q7 Why is this part called the foot, do you think?

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PART B WHAT THE SNAIL DOES

How the snail moves

Step 1 Use the propette to add a few drops of tap water to the petri dish.

Step 2 Put the snail on the petri dish.

Step 3 Hold the petri dish above eye level.

Step 4 Look at the undersurface of the snail's foot and write down what you observe.

Step 5 Put the snail back on a big leaf and watch it move for a while. You may see a white trail of mucus (slimy material) which the snail leaves behind.

Q8 How does this slimy material help the snail to move?

Q9 Can the snail climb upwards and downwards or can it only move on a horizontal (flat) surface?

Q10 Work with other people in your class to design an investigation to find out the average speed of 10 snails. Write out your method, carry out the investigation and report your results. Show all your calculations.

How the snail eats

Step 6 Place the snail on a fresh, green leaf.

Step 7 Use the hand lens to observe the snail as it moves along, eating the leaf. Write down what you see.

Q11 What does the eaten part of the leaf look like? Draw it or describe it.

How the snail breathes

Step 8 Look at the snail's body near the widest end of the shell. You will see a small opening. If you watch it carefully, you will see it open and close. This is the opening to the snail's "lung".

Something to think about

Q12 Read the poem on page one. Why do you think snails come out "at sunset when the night dews fall"?

Q13 There is also a cartoon drawing of a snail on page one. Look at the drawing and look at the real snail. In what ways is the cartoon drawing **incorrect**?

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