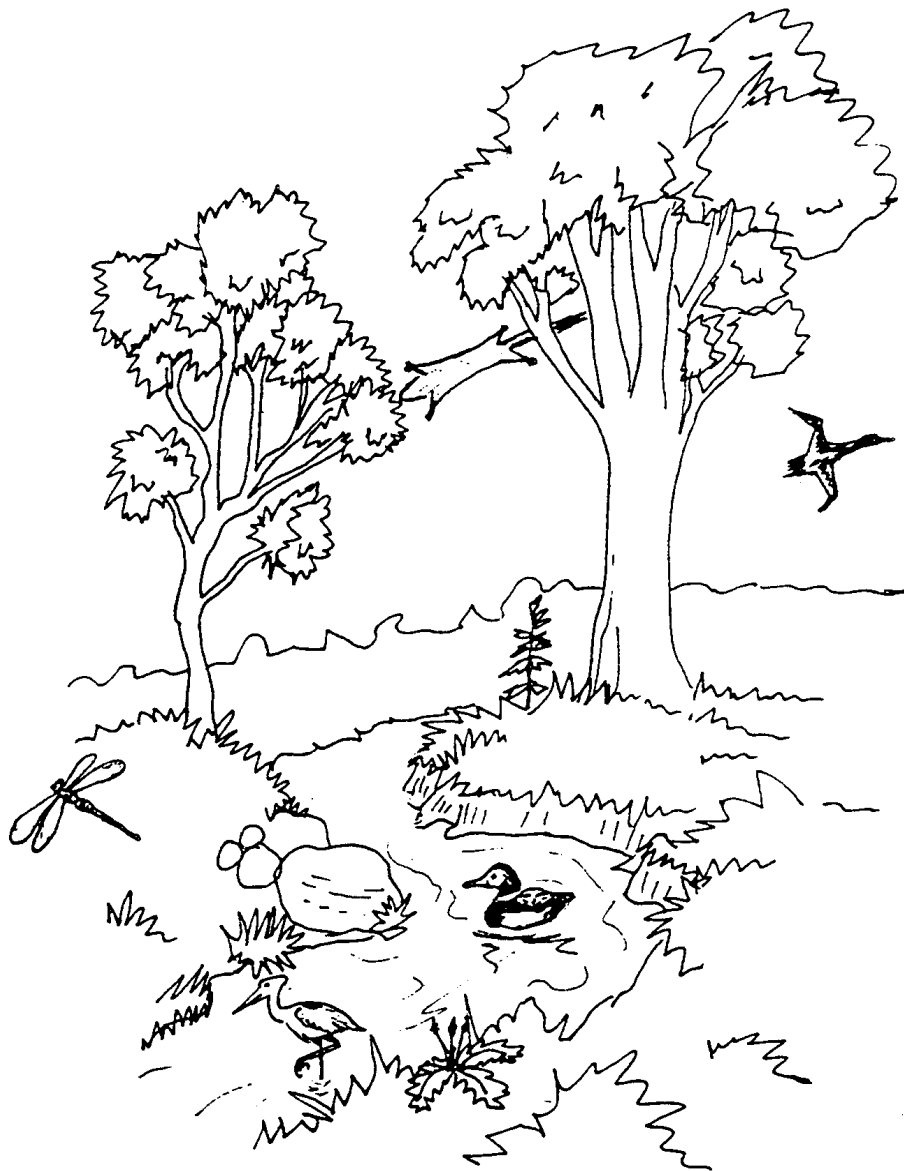


Living things

Part 1 What are living things?



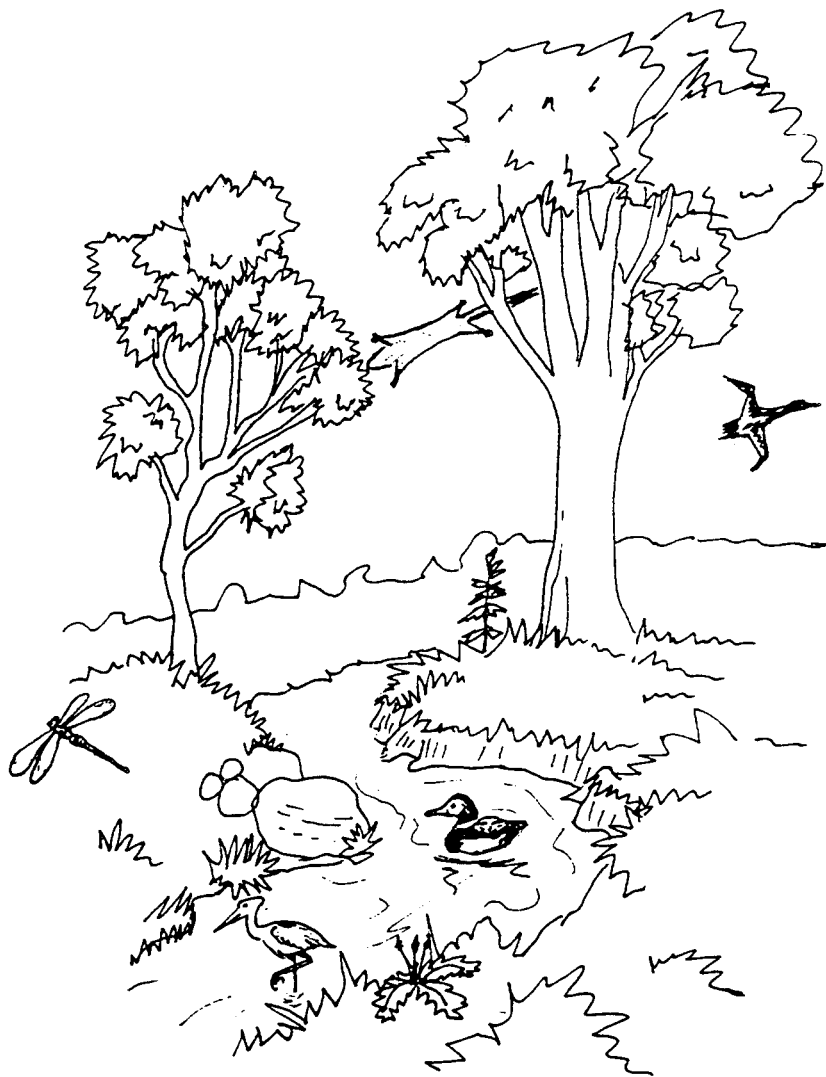
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Part 1 Introduction

There are living things all around you. Take the time to go outside and observe. When you look around, you might see a tiny black ant, hear a rooster crowing, smell freshly cut grass and maybe feel the soft, silky fur of a cat.

For example, look at this drawing. What can you see?



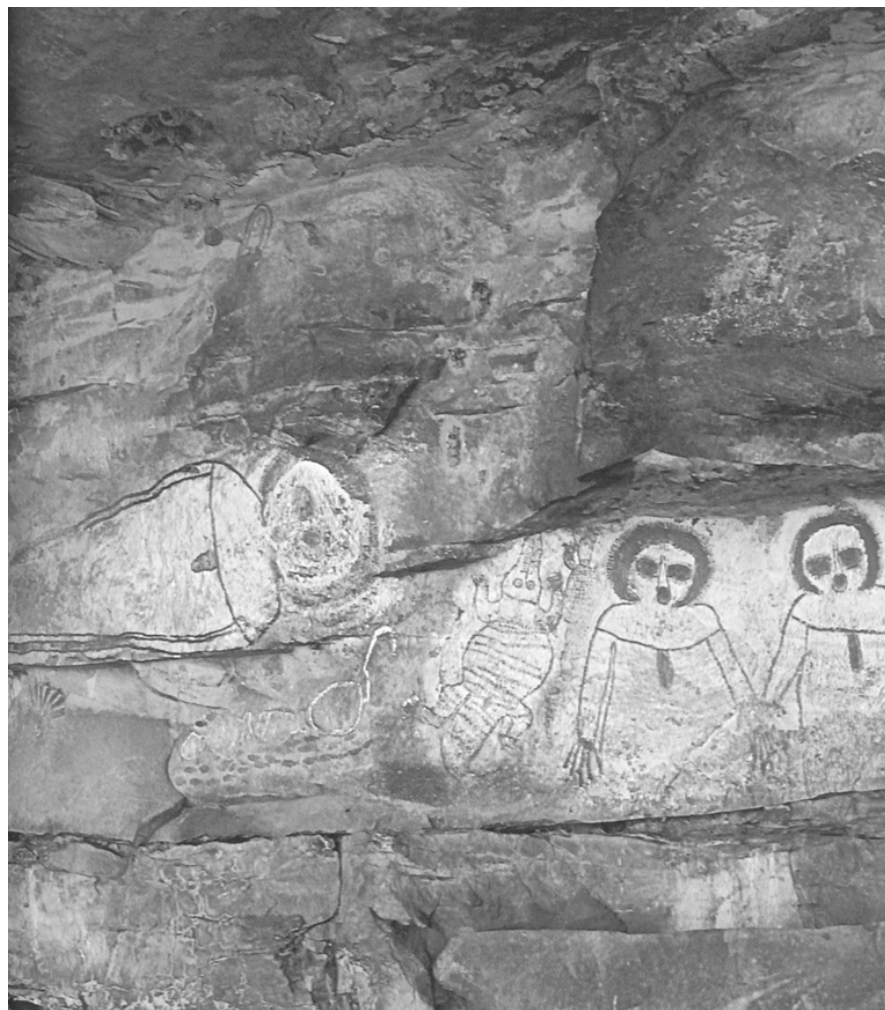
In the picture there are living things, such as plants and animals, as well as non-living things, such as rocks and water, that are not alive.

A study of living things leads to an appreciation of the natural world – the plants, the animals, and how they affect each other and make up our environment.

So what is our environment?

It is all the things that are around us.

Sometimes people use the word 'environment' to explain the Aboriginal idea of 'land'. 'Land' includes all the things an Aboriginal person experiences, including animals, plants, people, rocks and spirit. Can you find any of these things in the rock painting below?



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Did you notice people, a crocodile and a spirit person?
You may have seen other things as well.

In science, environment is soil, rocks, water, animals, plants, air – everything in your surroundings. And that includes you!

What will you learn in Part 1?

At the end of Part 1, you should be able to:

- decide if something is living or non-living
- give reasons for deciding if something is a living thing
- recall that biology is the investigation of living things
- identify the types of things that biologists investigate
- identify when an explanation does not use scientific thinking
- make careful observations by listening to an audiotape
- complete tables of information from your observations
- classify things in the surroundings as either living or non-living
- extract information about an experiment from text and diagrams
- organise information about an experiment into a table and column graph
- analyse information from an experiment about how living things grow
- write a definition for the term reproduction
- analyse examples of how living things respond to changes in their environment
- identify a response and a stimulus
- match a plant response with its environmental stimulus
- deduce the meanings of some scientific terms by looking at the parts of the words
- list some reasons why humans need to take in water and food
- explain why living things need to exchange materials with the environment
- define some terms used in this part.

What do you need for Part 1?

Here is a reminder of the items you need for Part 1.

To save time, it might be a good idea to get all these things ready before you start.

From home	Enclosures
CD or tape player	CD or audiotape called <i>Mum's place</i>

Investigating living things

In this lesson, you are looking at differences between living and non-living things. You'll ask yourself – what makes something a living thing?

What will you learn in this section?

At the end of this section, you should be able to:

- decide if something is living or non-living
- give reasons for deciding if something is a living thing
- recall that biology is the investigation of living things
- identify the types of things that biologists investigate
- identify when an explanation does not use scientific thinking.

Is it living or non-living?

All things in our surroundings are either living things or non-living things.

Living things are alive.

Non-living things are not alive,
have never been alive or are dead.

By now you are probably fairly familiar
with a large number of living things.
The hard question is – what makes something alive?

The activity below contains a list of things, some living, some non-living. Can you tell the difference between them?



Activity 1: Can you tell the difference?

Tick a box beside each thing –
yes if you think it is a living thing or
no for a non-living thing.

	yes	no
1 Is a gum tree a living thing?	☐	☐
2 Is a worm a living thing?	☐	☐
3 Is a cloud a living thing?	☐	☐
4 Is a butterfly a living thing?	☐	☐
5 Is a fire a living thing?	☐	☐
6 Is a car a living thing?	☐	☐
7 Is seaweed a living thing?	☐	☐
8 Is a snail a living thing?	☐	☐



Compare your responses with the suggested answers
at the back of this part.

You probably had no trouble identifying (choosing)
the living things. But you still haven't answered the question –
what makes something a living thing?

What makes something a living thing?

First examine the ideas you have about living things. Later in this section you can compare your ideas with scientists' ideas. You may be surprised at how similar your ideas are!



Think about how you decided what was living or non-living. Make a summary of your reasons for each decision below. You'll probably find that you use the same reasons over and over again.

1 Why is a gum tree a living thing?

2 Why is a worm a living thing?

3 Why is a butterfly a living thing?

4 Why is seaweed a living thing?

5 Why is a snail a living thing?

Now that you have thought about what makes things living, let's look at what scientists say makes something living.

Scientific ideas about living things

The scientific investigation of living things is called biology.
What are scientists who study biology called?

Biologists are scientists who are mainly concerned with investigating living things. But what makes a living thing alive? That is, how is a living thing different from a non-living thing?



Read about what some biologists are investigating and then you may be able to decide what biologists think makes something alive. Features that biologists look for have been emphasised in bold in the following information.

Investigation 1

Trees **can die** from a sickness called 'die-back'. Sick trees are stunted and malformed. This means that trees with this disease do not **grow** very tall and their leaves and branches do not **develop** as normal.

Biologists are investigating the insects that live in the trees and how they affect the health of the trees.

Investigation 2

The lemurs that live in Madagascar are slowly being reduced in number.

Many zoos all over the world are investigating how these animals **reproduce**. If a successful breeding program is developed then these animals may not become extinct.

Investigation 3

Biologists are interested in studying animals that live in the desert. These animals **take in materials** – food, oxygen, but very little water from the environment. More water is produced by **processes that occur inside their bodies**. **Materials given out** to the environment do not contain much water. This means that these animals are able to live in areas that are very dry.

Investigation 4

The amount of carbon dioxide in the air is increasing. This may have far-reaching effects on the climate of the planet. This will in turn affect plant and animal life.

Some biologists are studying how plants respond to an increase in the amount of carbon dioxide. Plants may **respond to this stimulus** by growing better.

Can you decide from these investigations what sorts of things interest biologists?

They are interested in the things that living things do. These are called the **characteristics of life**. They are also known as the characteristics of living things.



Activity 2: Characteristics of life

Write a list of the characteristics that scientists use to separate living things from non-living things. These characteristics are written in bold print in the four biological investigations above. Try to write your list in sentences.

- _____
- _____
- _____
- _____
- _____
- _____
- _____



Compare your responses with the suggested answers at the back of this part.

The characteristics of life are one of the things that biologists study.

Do you think like a biologist?



Think about your reasons for identifying living things. You wrote them on page 7. Compare your reasons with the characteristics of life that biologists use.

Are your reasons and biologists' reasons very different? Probably not. If your ideas aren't quite the same then there are very good reasons for it. Biologists have investigated large numbers of living things for many years. Your ideas may become more similar to biologists' ideas as you study more living things. Another reason for the difference may be that you are using other non-scientific ways of thinking that come from society or culture.

Does everyone think like a biologist?

Scientific thinking is only one way to look at the world. People from different cultures, in the past and in the present, have developed their own explanations for things they observe. Here is an example of an Aboriginal explanation about life.



Read this Aboriginal story about Bahloo, the moon.

Bahloo the moon made baby girls. Sometimes Wahn the crow helped him. Although Wahn could make baby girls by himself, Bahloo didn't like to let him because the girls Wahn made grew up noisy and quarrelsome like crows.

(Bumayamul the wood lizard made boys and sometimes Bahloo helped him.)

They always made new babies. But one day, Wahn suggested, 'Let's bring dead people back to life instead of making new babies.' Bahloo did not like the idea at all. 'No,' he said. 'Leave dead people dead. Their spirits may have moved into other people, or into plants or animals, or into rivers or rocks. We can make new babies without interfering with the dead.'

They argued and argued. Then Wahn told Bahloo about a tree with lots of grubs in it. 'Come and eat with me,' Wahn said. When they got to the tree, Wahn asked Bahloo to climb the tree and use a hooked stick to dig the grubs out of the bark and throw them down.

Bahloo was concentrating on his job and didn't notice that Wahn was blowing on the tree. As each grub fell, Wahn blew and Bahloo and the tree gradually rose higher and higher into the air.

When the tree was almost touching the top of the sky, Bahloo looked down and noticed what had happened. Wahn called up, 'Stay up there in the sky and I will make baby girls by myself.'

Each night, Bahloo the moon and the tree could be seen high in the sky. Bahloo travelled across the sky trying to find a way back to earth. He even changed his shape to try to get down. Every morning, Bahloo was chased away by his enemy Yhi the sun.

(Bahloo was resourceful and found another way to get down, in the form of an emu, so that he could keep making new babies.)



Activity 3: An Aboriginal story

Answer the questions about living and non-living things in this story.

1 What are three observations that are explained by this story?

- _____
- _____
- _____

2 Do you think that the people who told this story sorted living and non-living things like a biologist?

Yes or no? _____

Give an example from the story to support your answer.



Compare your responses with the suggested answers at the back of this part.

Now check that you remember the information in this summary.

Summary

- Things can be living or non-living.
- Biologists investigate living things.
- Living things are different from non-living things because all living things:
 - grow and develop
 - can reproduce
 - can respond to a stimulus
 - take in materials
 - process materials inside their bodies
 - give out materials to the environment
 - die eventually.
- People from different cultures can have different ways to explain observations and to group objects.

Did you remember all these things from this section?
Then you are making excellent progress.



Turn to the exercise section at the back of the part and complete Exercise 1.1: Thinking like a biologist.

In the next lesson, you will be observing different surroundings. You will be identifying living things in the environment and using biologists' ideas about the characteristics of life.

Part 1 Suggested answers

Check your responses against these suggested answers.

Activity 1: Can you tell the difference?

The living things are ticked as a yes.

Non-living things are ticked as a no.

	yes	no
1 Is a gum tree a living thing?	☒	☐
2 Is a worm a living thing?	☒	☐
3 Is a cloud a living thing?	☐	☒
4 Is a butterfly a living thing?	☒	☐
5 Is a fire a living thing?	☐	☒
6 Is a car a living thing?	☐	☒
7 Is seaweed a living thing?	☒	☐
8 Is a snail a living thing?	☒	☐

Activity 2: Characteristics of life

The following list contains the characteristics that all living things have in common.

- Living things can die.
- Living things grow and develop.
- Living things can reproduce.
- Living things take in materials.
- Processes occur inside the bodies of living things.
- Materials are given out by living things.
- Living things respond to a stimulus.

Activity 3: An Aboriginal story

These answers are sample answers. You may have written different answers that are also correct. Your answers may be shorter, as extra information is provided here to make the ideas clearer.

- 1 Here are five observations explained in the Aboriginal story on page 7.
 - New baby girls and boys are made.
 - The moon is in the sky.
 - The moon is not usually seen when the sun is in the sky.
 - The moon appears to change its shape.
 - There can seem to be a tree on the surface of the moon.
(You may be more used to seeing a face than a tree!)

- 2 Personal responses are expressions of opinion and are written in the first person, 'I'. The following response is one possible answer.

No. I don't think that the storytellers thought like biologists. The storytellers describe the moon using characteristics that biologists use for living things, but biologists would say that the moon is non-living. A biologist would not say that the moon could make babies, talk, eat or climb a tree to catch grubs because these are things that living things may do.

The storytellers have a different way to look at the world. They do not sort living and non-living things like a biologist.

Part 1 Exercises

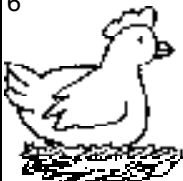
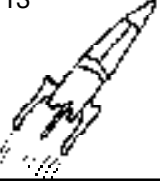
Exercises 1.1 to 1.5

Name _____

Class _____

Exercise 1.1 Thinking like a biologist

Complete the questions below using the table which shows 15 things that scientists might study.

1 	2 	3 	4 	5 
6 	7 	8 	9 	10 
11 	12 	13 	14 	15 

- 1 Circle the number in the drawing of each thing that a biologist might study.
- 2 Choose one of the numbers you have circled.
List the characteristics of life that you think this thing would show.
 - a Number of object _____
 - b Characteristics of life shown by this thing
