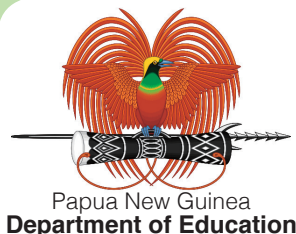


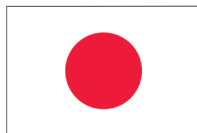
# National **SCIENCE** Textbook



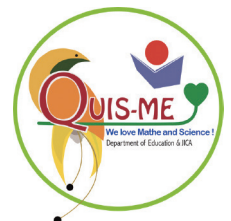
## Grade 3



Papua New Guinea  
Department of Education



From  
the People of Japan



## **Issued free to schools by the Department of Education**

First Edition

Published in 2019 by the Department of Education, Papua New Guinea.

© Copyright 2019, Department of Education, Papua New Guinea.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted by any form or by any means of electronic, mechanical, photocopying, recording or otherwise without the prior written permission of the publisher.

**ISBN** 978-9980-905-13-0

## **Acknowledgements**

The Grade 3 National Science Textbook was developed by the Curriculum Development Division in partnership with the Science specialists from Japan through the Project for Improving the Quality of Mathematics and Science Education also known as QUIS-ME Project.

The Science curriculum officers, textbook writers, pilot teachers from NCD and Central Provinces and the Subject Curriculum Group (SCG) are acknowledged for their contribution in writing, piloting and validating this textbook.

The Curriculum Panel members, members of the Subject Advisory Committee (SAC) and the Basic Education Board of Studies (BEBOS) are also acknowledged for their advice, recommendation and endorsement of this textbook.

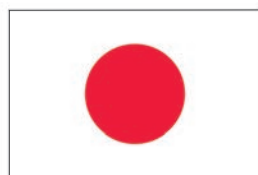
**A special acknowledgement is given to the People and the Government of Japan for the partnership and support in funding and expertise through Japan International Cooperation Agency (JICA) - QUIS-ME Project with Curriculum Development Division (CDD).**

# National Science Textbook

## Grade 3



Papua New Guinea  
**Department of Education**



**From  
the People of Japan**





## Minister's Message

Dear Grade 3 Students,

I am honoured to give you my message in this National Science Textbook. The Government of Papua New Guinea through the Department of Education has been giving priority to improve students' learning in the area of Science for many years. I would like to thank the Government of Japan for its support in improving the quality of learning and education for our children in PNG.

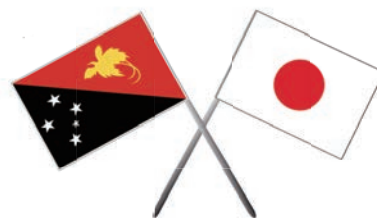
This Science Textbook was developed by our very own Curriculum Officers, Textbook Writers and pilot teachers who have worked together with the Japanese specialists for three years to complete this Textbook. I believe this is the best national textbook for Grade 3 students in PNG because it is comparable with international standards.

I am excited about this Textbook because it contains a lot of exciting student centered topics and activities for science recommended for learning in Grade 3. You will find many photographs, illustrations, charts and diagrams that are based on PNG context and are interesting and exciting for learning. I hope this textbook will motivate you to explore more because Science is about learning what, why and how things work in everyday life.

Students, Science is a very important subject because it allows you to make your own predictions, carry out experiments to test your predictions and find solutions for your predictions. This will then challenge you to find ways of improving your learning using the Science as Inquiry approach. Science is about everything – everywhere and by using the inquiry approach you will enjoy learning many things that happen around you every day. You will learn about why things move, how plants grow, why we have days and nights and many more interesting things that happen. In addition, Science processes will help you become an independent learner and empower you to become a scientist in the future to solve problems relating to life in PNG and anywhere else in the world.

I encourage you to be committed and to enjoy and love Science, because one day in the future you will be a very resourceful person, participating in developing and looking after this very beautiful country of ours and improving the quality of living.

I wish you a happy and fun learning experience with this Grade 3 Science Textbook.



**Hon. Nick Kuman, B.ApSci.UWSyd, MP**  
**Minister of Education**







## Message from the Ambassador of Japan

### Greetings to Grade 3 Students of Papua New Guinea!

It is a great pleasure that the Department of Education of Papua New Guinea and the Government of Japan worked together to publish national textbooks on science for the first time.

The officers of the Curriculum Development Division of the Department of Education made full efforts to publish this textbook with Japanese science experts. To be good at science, you need to keep studying with this textbook. In this textbook, you will learn many things about science with a lot of fun and interest, and you will find it useful in your daily life. This textbook is made not only for you but also for the future students.

You will be able to think much better and smarter if you gain more knowledge on numbers and diagrams through learning science. I hope that this textbook will enable you to enjoy learning science and enrich your life from now on. Papua New Guinea has a big national land with plenty of natural resources, and a great chance for a better life and progress. I hope that each of you will make full use of knowledge you obtained and play an important role in realizing such potential.

I am honoured that, through the publication of this textbook, Japan helped your country develop science education and improve your ability, which is essential for the future of Papua New Guinea. I sincerely hope that, through the teamwork between your country and Japan, our friendship will last forever.



**Satoshi Nakajima**

**Ambassador of Japan to Papua New Guinea**



SCIENCE...

It's exciting...

It's amazing...

It's fun...



It's Science





## Secretary's Message

Dear students,

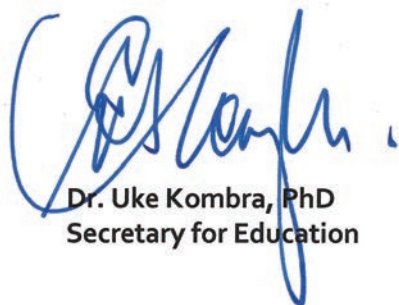
This is your Science Textbook that you will use in Grade 3. It contains a lot of very interesting and enjoyable activities that you will be learning in your daily Science lessons.

In our everyday lives, we come across many situations such as lifting heavy coffee bags onto a vehicle, travelling long distances to fetch water and trying our best to make our food plants grow during dry seasons. These situations are real and they contribute to the way we live. By learning Science through this textbook, it will help you address real-life problems.

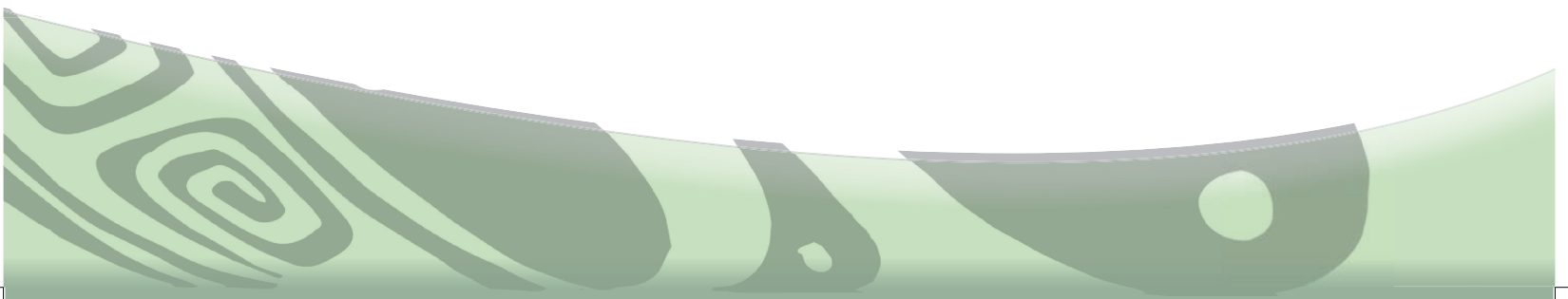
This Textbook provides you with a variety of science activities and ideas that are interactive. It allows you to learn with your teacher or on your own as an independent learner. The activities are designed in a way that a problem is given and you as the learner will have to solve the problem using the different scientific skills such as making predictions, measuring, recording data and communicating results. These are important tools needed to understand the concepts given in each chapter or topic and are applied in solving science problems. In addition, science process skills will help you to make decisions that will benefit you, your family, your community, province and the country to improve the standard of living in PNG in the 21st Century and beyond.

I encourage you to enjoy learning Science and think like a young Scientist who is competent to solve problems and issues that are happening in the community, country and the world today.

I wish you all the best in studying Science using this Textbook.



**Dr. Uke Kombra, PhD**  
**Secretary for Education**





# Content

## Chapter 1. Observing Our Environment



- 1.1. Environment around Us ..... 11
- 1.2. Interaction between Living Things and the Environment..... 21

## Chapter 2. Properties of Matter

- 2.1. Describing Matter..... 31
- 2.2. Measuring Matter ..... 45
- 2.3. Mixing Matter..... 57

## Chapter 3. Characteristics of Plants

- 3.1. Observing Plants ..... 67
- 3.2. Grouping Plants..... 75



## Chapter 4. Characteristics of Animals

- 4.1. Observing Animals ..... 87

## Chapter 5. Energy

- 5.1. Energy around Us ..... 109





## Chapter 6 . The Sun



- 6 .1. Properties of the Sun..... 119
- 6 .2. Movement of the Sun ..... 125

## Chapter 7 . Light

- 7 .1. Properties of Light ..... 137

## Chapter 8 . Magnet

- 8 .1. Properties of Magnet..... 157

## Chapter 9 . Force






- 9 .1. Objects in Motion ..... 175
- 9 .2. Simple Machine ..... 189

## Chapter 10 . The Earth

- 10 .1. Surface of the Earth..... 203

### Strand

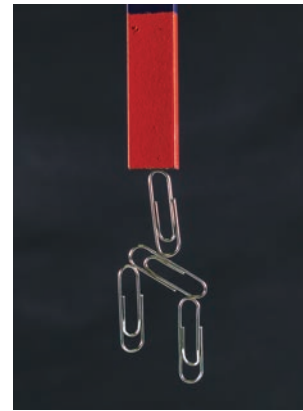
-  Life
-  Physical Science
-  Earth and Space



# How to learn SCIENCE

## 1 Wonder or Question

- Look carefully at things in nature around you and things in your daily life.
- Realise things that you wonder about.
- Identify the **key question** in the lesson.









## 2 Research

- Guess what will happen at the end of the activity.
- Understand the steps of the activity.
- Observe or conduct experiment in the activity.
- Record the result in your exercise book.
- Check if the result is the same with your guess.
- What do you find from the observation or experiment?



### Symbols used in this textbook

Each symbol gives you an attention about:

-  : Key question in the lesson.
-   : Activity that you will try.
-  : Discussion question with your friends.
-  : Caution and warning.
-  : Try it!

# with this Textbook

*Learn about nature, learn from nature*

## 3 Findings

- Present and share your findings to your friends.
- Discuss with your friends to make sure if your findings are correct.
- Make conclusion to the key question.



## 4 Summary

- Read the textbook and confirm what you learnt in the lesson.
- Summarise what you did in the lesson.
- Let's try to use things you learnt in your daily life.



## Friends learning together with you

### Friends learning together in this textbook



Mero



Naiko



Sare



Gawi



Kekeni



Ambai



Vavi



Yamo

Enjoy SCIENCE with us!!





## Chapter 1

# Observing Our Environment



What can you see  
in this picture?  
Where do they live?

I can see a bird! What  
is the bird doing?





# 1.1

## Environment around Us

### Lesson 1: “Our Environment”

Look around us! We are surrounded by different kinds of things.

**?** What are we surrounded by?

#### **🔍** Activity : Finding things around us

##### What to Do:

1. Make a table like the one shown below in your exercise book.

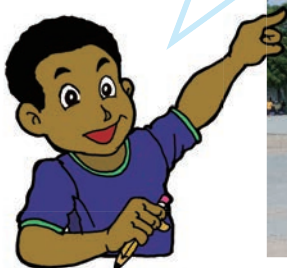
Name of things you found	Where did you find the things?

2. Find things inside or outside your classroom.

3. Write the name of the things you found and the place where you found the things in the table.

4. Share your ideas with your classmates. Talk about what you are surrounded by.

What things can you find outside?



When you go out of your classroom, you should follow teacher's instructions.



## Summary

We can find many different things around us. In the classroom, we may find pens, textbooks, chairs, desks and classmates.

We may also find different kinds of things outside the classroom, such as flowers, trees, ants, butterfly, rocks and water.

We are surrounded by various kinds of things. All things around us make up our **environment**. The **environment** is everything that makes up our surroundings. We all live in the environment.



Things inside the classroom



Things outside the classroom

Our surroundings include houses, roads, bridges and buildings.

The air, soil, water, plants and animals also make up our environment. In some environments, it is hot, warm or cold. It may be dark or bright and dry or wet in other environments.



What things make up this environment?

## Lesson 2: “Types of Environments”

The environment is everything that makes up our surroundings. We all live in the environment. Are there different types of environment around us?



What types of environments are there?

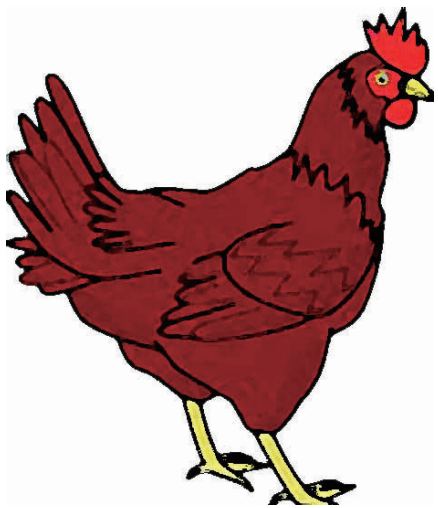


### Activity : Finding different types of things

#### What to Do:

1. Make a table like the one shown below in your exercise book.
2. Observe things around you and sort the things into two groups; the things made by people and the things not made by people. Write your observation in the table.
3. Share your ideas with your classmates.

Things made by people	Things not made by people



Chicken



Fried Chicken

A chicken and fried chicken, are they the same thing, or not?

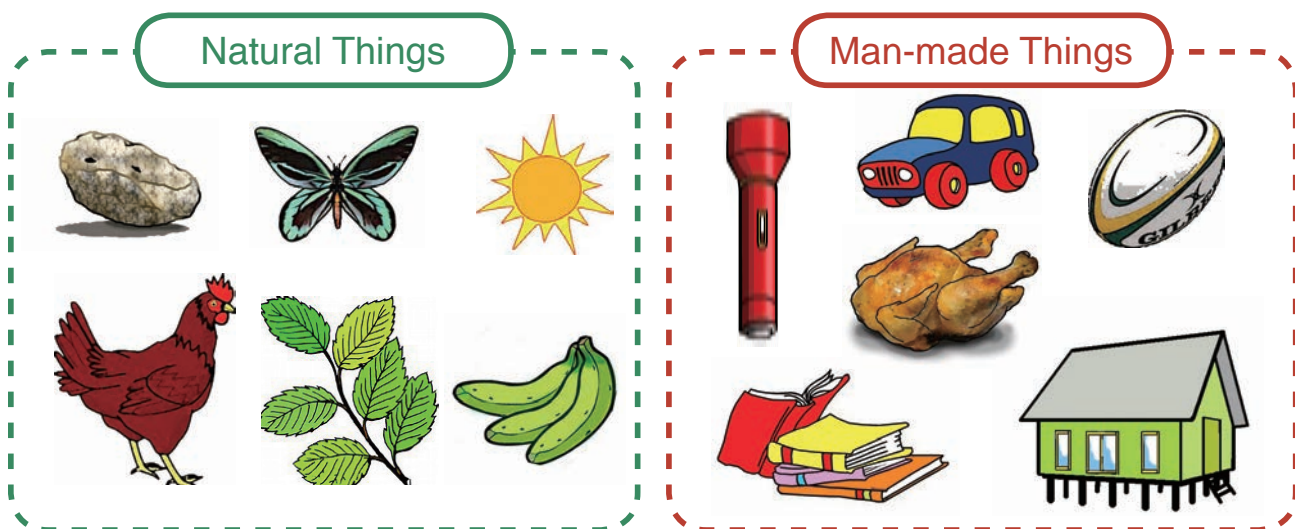




# Summary

## Natural Things and Man-made Things

We can group things into **natural things** and **man-made things**. Natural things are things that come from nature and not made by people. Plants, animals, soil, air and water are natural things. Man-made things are things made by people. Houses, food, clothes, and cars are examples of man-made things.



## Types of Environment

The environment can be grouped into natural and man-made environment. **Natural environment** is the environment made of natural things. **Man-made environment** is the environment that is made of man-made things. We usually live in both the natural and the man-made environment.



Man-made Environment



Natural Environment



# Lesson 3: “Things in the Environment”

We learnt that there are two types of things in the environment; natural and man-made things. But, are there any other ways to group things in the environment?



**Can we group things in the environment in different ways?**



## Activity : Is it living or not?

### What to Do:

1. Make a table like the one shown below in your exercise book.

It is living.	It is not living.

2. Look at the pictures of different things below. Group the things into living or not living and write them in the table.

3. Share your ideas with your classmates. Talk about how you sorted the things into two groups.

If a thing is living, what can it do?

I think a fire is a living thing because it is moving and growing!

The illustration shows a boy on the left looking thoughtful and a girl on the right speaking. Between them are various items: a red fire truck, a fish, a turtle, a flashlight, a book, a flower, a kiwi bird, a campfire, a soccer ball, a butterfly, a potato, a frog, and a waterfall. A speech bubble from the boy asks, 'If a thing is living, what can it do?' and a speech bubble from the girl says, 'I think a fire is a living thing because it is moving and growing!'.

## Summary

All things in the environment can be classified into **living things** and **non-living things**.

### Living things

People, birds, frogs and trees are living things. Living things grow, change and breathe. Living things can move by themselves and produce new living things. Living things need water, food and air to survive. Living things can be classified into plants and animals. People, cows, and birds are animals. Trees and grasses are plants.

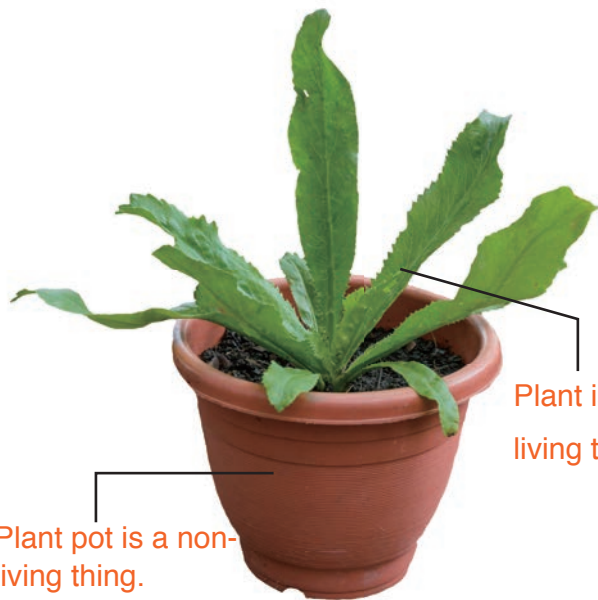
### Non-living things

Cars, air, water and soil are non-living things. Non-living things do not grow, change and breathe. Non-living things do not eat and drink.

They cannot produce new ones. Some non-living things such as a fire may act like living things. For example, a fire moves and grows. But a fire doesn't drink water and eat food. A fire is a non-living thing.



Dogs grow and produce new ones



Plant is a living thing.

Plant pot is a non-living thing.



A fire is non-living thing

## Lesson 4:

# “Living Things and Non-living Things”

All things in the environment can be grouped into living and non-living things. What is the relationship between living and non-living things?



**How do living things depend on non-living things?**



## Activity : Non-living things necessary for living things

### What to Do:

1. Make a table like the one shown below.

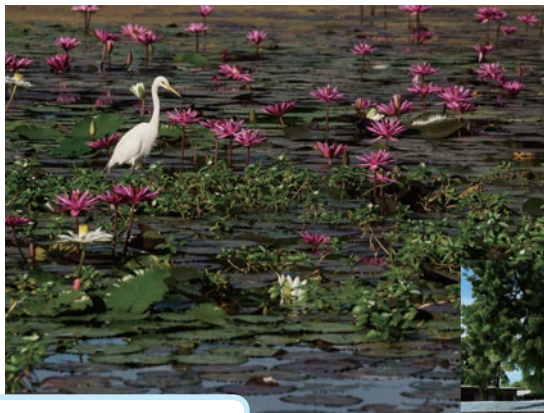
Living Things	What kind of non-living things do living things need?	How do living things use the non-living things?
Animals		
Plants		
People		

2. Make a list of non-living things needed by living things to live.

And then, think about how living things use the non-living things and write your ideas in the table.

3. Share your ideas with your classmates. Talk about how living things depend on non-living things.

Non-living things are water, air, soil... mmm. How do living things use non-living things?



What kind of non-living things can you find?



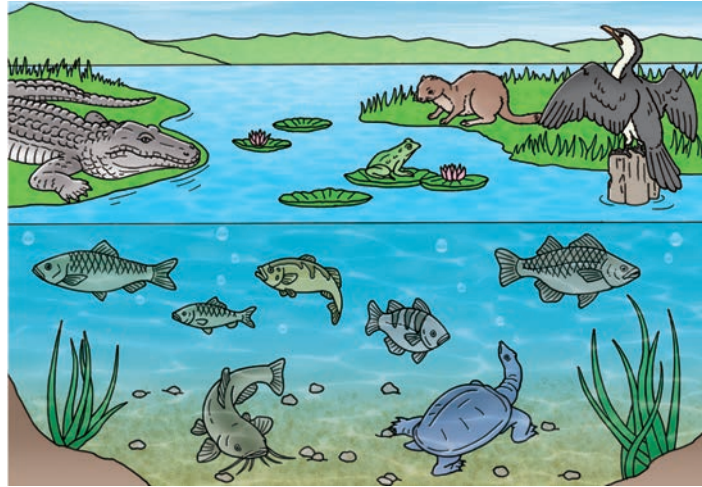


# Summary

Living things need non-living things to survive. They depend on non-living things in many ways.

## Animals

Animals need non-living things for survival. Animals use air to breathe and water to drink. Some animals live in soil and some live in water.



Some animals need water to live.

## Plants

Non-living things are very important for plants too. Plants need sunlight, air and water to make food. Plants use soil, water and space to live and grow.



Plants need soil and water to grow.

## People

People also depend on non-living things in many ways. They need air to breathe and water to drink for survival. They use soil for growing crops and for making pottery. They also use non-living things such as cars and electric appliances to make their life easier.

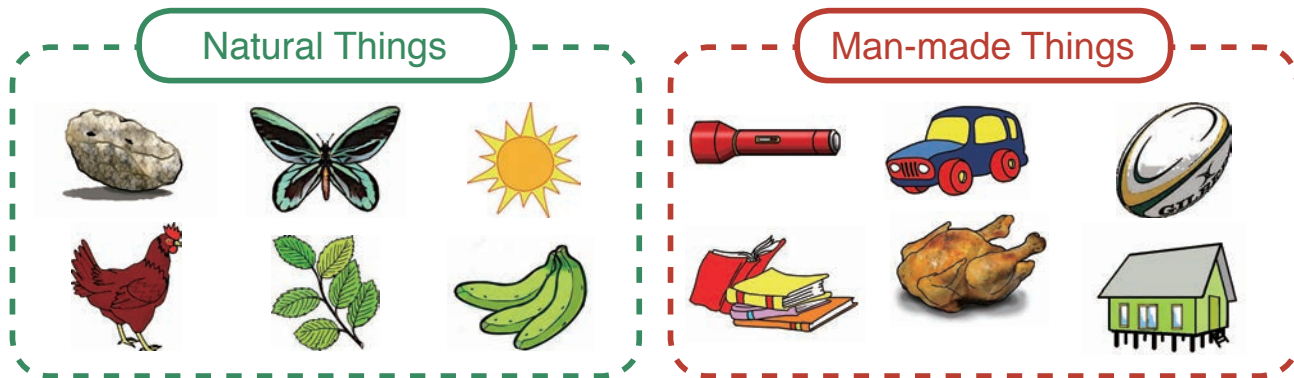


People depend on non-living things in many ways.



## Our Environment

- Environment is everything that makes up our surrounding.
- Environment can be classified as natural and man-made environment.
  - Natural environment is the environment made of natural things.
  - Man-made environment is the environment made of man-made things.



## Things in the Environment

- All things can be classified into living and non-living things.

Living Things	Non-living Things
<ul style="list-style-type: none"> <li>• Grow and change</li> <li>• Reproduce</li> <li>• Need food, water, air</li> </ul>	<ul style="list-style-type: none"> <li>• Do not eat, drink and grow</li> <li>• Do not reproduce</li> <li>• Do not need food, water, air</li> </ul>

## Living Things and Non-living Things





- Living things need non-living things to survive.
  - Animals and people need air to breathe and water to drink.
  - Plants need sunlight, air and water to make food.
  - People also use non-living things to make their life easier.

Q1. Complete each sentence with the correct word.

- (1) All things around us make up our \_\_\_\_\_.
- (2) A \_\_\_\_\_ thing grows, changes and breathes.
- (3) Birds, frogs and the sun are \_\_\_\_\_ things.
- (4) The environment can be grouped into natural and \_\_\_\_\_ environment.
- (5) Plants need sunlight, \_\_\_\_\_ and water to make food.

Q2. Choose the letter with the correct answer.

- (1) Which of these are parts of the classroom environment?
  - A. Desk
  - B. Pencil
  - C. Students
  - D. All above
- (2) Which of the following picture is a living thing?

			
A. Torch	B. Stone	C. Hibiscus	D. Fire

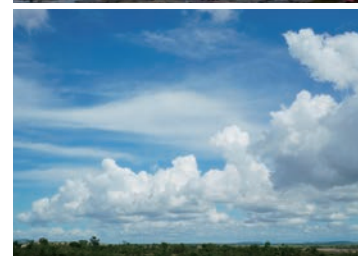
Q3. Answer the question below.

Look at the picture of a swamp on the right.  
What are the living things and non-living things in this environment?



Q4. Clouds move and change shapes.

But it is a non-living thing. Explain why cloud is not a living thing?



# 1.2

## Interaction between Living Things and the Environment

### Lesson 1:

### “Living Things in the Environment”

Plants and animals are living things. Living things make up our environment. Where can we find them in the environment?



Where do living things live and grow in the environment?



#### Activity : Finding where living things live

##### What to Do:

1. Draw a table like the one shown below.

Name of animal	Where the animal lives

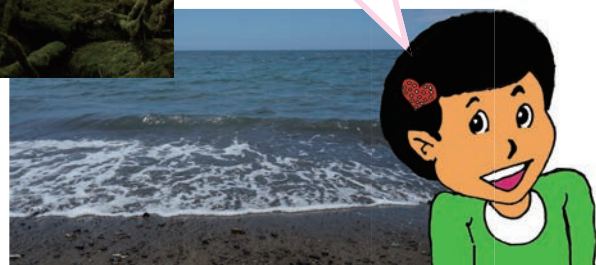
2. Think of different animals you have seen. Write the names of the animals and the places where they live in the table.

3. Share your ideas with other groups. Talk about where animals live in the environment.

Where can we find plants and animals? Do pigs and fish live in the same place?



We can find a mango tree on the ground. Can we also find seaweeds on the ground or not?





# Summary

Different plants and animals live and grow in the different environments.

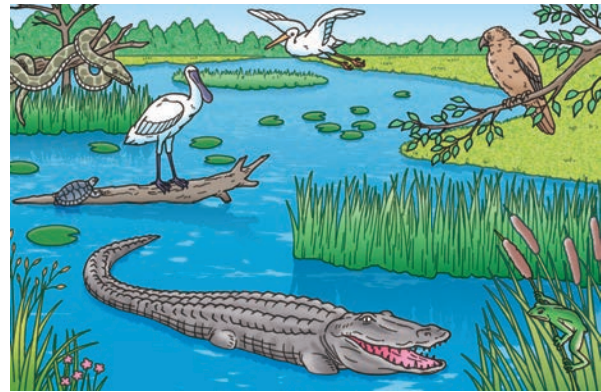
## Forest

A **forest** is a place with many trees that grow close together. Different kinds of plants and animals can be found in a forest. Forest animals live in trees, bushes, on the ground or underground.



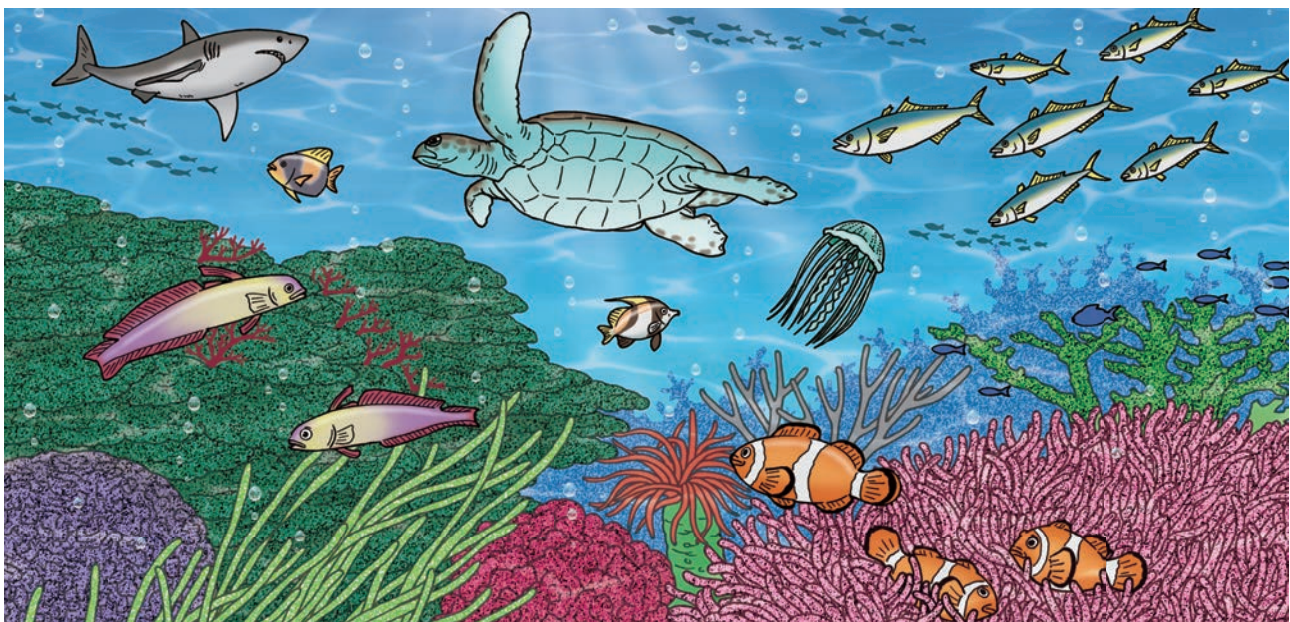
## Wetland

A **wetland** is a place that is very wet. It includes areas such as rivers, lakes and swamps. Many kinds of plants and animals live in wetlands.



## Ocean

An **ocean** is a vast body of salt water. Oceans have many plants and animals in them.



## Lesson 2:

# “Basic Needs of Living Things”

Living things grow. What do they need to grow? From where do they get their needs?



What do living things need to live?



## Activity : The needs of living things

### What to Do:

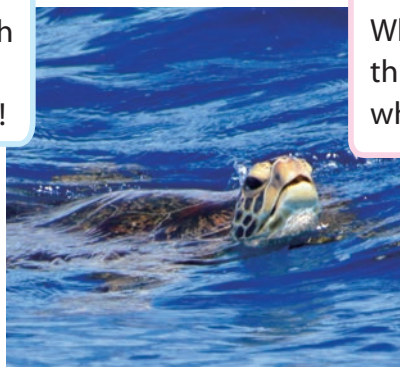
1. Make a table like the one shown below.

What do living things need to live?

2. Think about what living things need in order to grow and write your ideas in the table.
3. Share your ideas with your classmates. Talk about the needs of living things for growth.



If I cover my nose and mouth with my hand, I cannot breathe!



When we feel thirsty or hungry, what do we do?



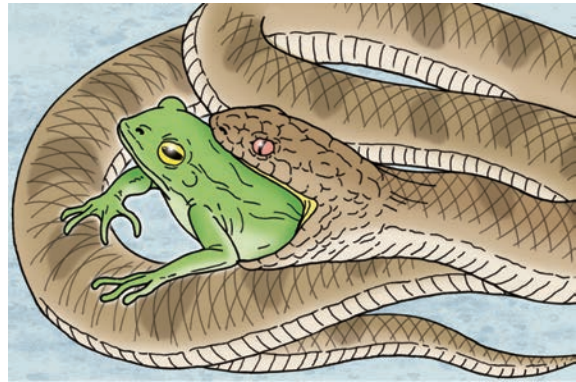


## Summary

Living things get their needs from the environment. The following are the basic needs of living things. Living things need:

### Food

Living things need food to get energy. Plants make food to grow by using sunlight, air and water. Animals eat plants or other animals as food.



### Water

Living things dry up and die without water. Plants get water from roots. Most animals get water by drinking.



### Air

Air is very important for living things. Plants use air to breathe and to make their own food. Animals breathe in air.



### Space

All living things need space to grow and live. Plants need space to get enough sunlight and water and animals need space to find food and homes.



### Sunlight

Living things need sunlight. The sunlight keeps the earth at the right temperature so that living things can grow. Plants use the light from the Sun to make food.





Q1. Complete each sentence with the correct word.

- (1) Crocodile, frog and water lilies live and grow in the \_\_\_\_\_.
- (2) An \_\_\_\_\_ is the vast body of salt water.
- (3) A forest is a place where many \_\_\_\_\_ grow close together.
- (4) Living things need \_\_\_\_\_ to get energy.
- (5) Animals breathe in \_\_\_\_\_.

Q2. Choose the letter with the correct answer.

Which of the following is the correct explanation about basic needs of living things?

- A. Animals eat only plants as food.
- B. Animals need water by drinking.
- C. Plants don't need air to breathe.
- D. Plants use the sunlight to make water.

Q3. Answer the following.

- (1) Name two living things that live in a river.
- (2) Name two living things that live in a forest.



Q4. How do animals use a tree to meet their basic needs?

## Chapter 1

### •Science Extras•

## Living things in Extreme Environments

It is tough for living things to live in extreme environments on the Earth. But we can find living things in such extreme environments.

**Desert** is an extremely hot and dry place for living things to survive. There is almost no rain throughout the year so plants cannot grow and the surface of desert is covered by dry and hot sand.



**Arctic** and **Antarctic** are places covered by ice and snow all year. It is extremely cold to survive there. Animals living in this environment have thick fur to keep themselves warm against the cold temperature.





## Chapter Test

# 1. Observing Our Environment

**Q1**

Complete each sentence with the correct word.

- (1) We all live in the \_\_\_\_\_, which is everything that makes up our surroundings. Such as air, soil, water, plants, animals, houses, roads, bridges and buildings.
- (2) A thing that grows, changes, breathes and reproduces children is called a \_\_\_\_\_ thing.
- (3) Animals need \_\_\_\_\_ things for their survival. For example, animals use air to breathe and water to drink.

**Q2**

Choose the letter with the correct answer.

- (1) Which of the following do not explain the use of non-living things by animals?

- A. Some animals live in soil.
- B. Some animals live in water.
- C. Animals use air to breathe.
- D. Animals need sunlight to grow.

- (2) Why do plants need space shown in the picture?

- A. To eat other plants or animals as food.
- B. To find food and air.
- C. To get enough sunlight and water.
- D. To breathe and make their own food.



- (3) Which of the following list contains natural things?

- A. Tree, soil and water
- B. Cars, house and books
- C. Fried chicken, grilled fish and shell money
- D. Chicken, butterfly and fried meat

- (4) Which of the following is the correct explanation about fire?

- A. It moves and grows, thus it is living thing.
- B. It does not eat and drink, thus it is non-living thing.
- C. It breathes and changes, thus it is living thing.
- D. It reproduces and moves, thus it is non-living thing.

### Q3

(1) Observe the picture on the right and identify at least three living things and non-living things.

---

---

(2) Identify and categorise the types of living things in the box according to their living place in a particular environment.

Trees, seaweed, snake, dolphins, owl, cuscus, lilies, crocodile, eels, frogs, sharks, heron, tilapia, bird of paradise and whales

List the living things in wetland: \_\_\_\_\_

(3) Why is it important to grow vegetables in a garden and not inside a house? Explain it from the ideas of the basic needs of living things to grow.

---

---



### Q4

(1) The moon moves and changes its shape. But it is a non-living thing. Explain why the moon is not a living thing?

---

---



(2) A camel is an animal living in extreme environment called desert. Camels, store fats in their humps on the back and their pee is very little. Explain how their body structure suits their living environment in terms of basic needs of living things.

---

---

---

---

