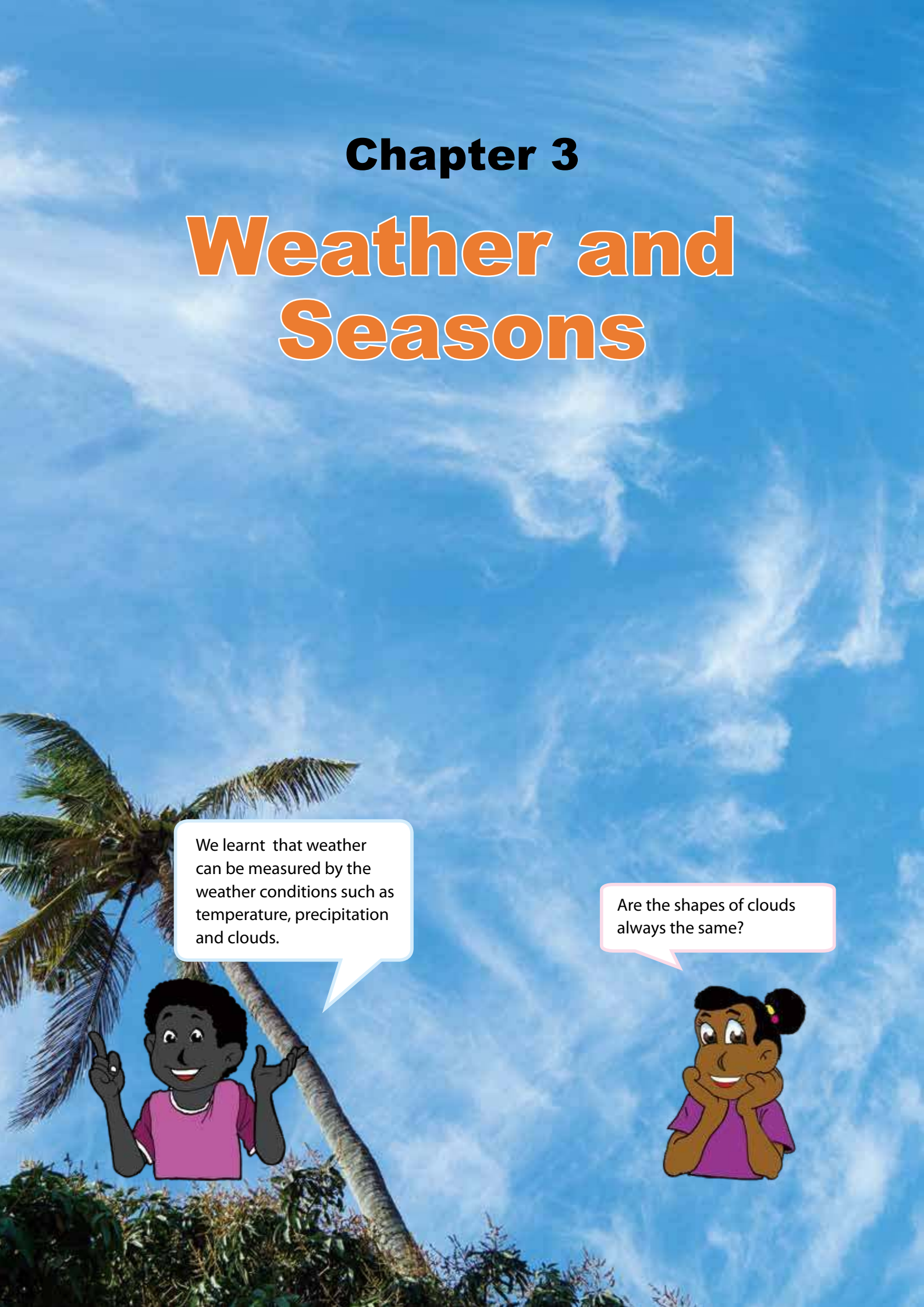
Chapter 3

Weather and Seasons



3.1 Observing Clouds

Lesson 1 Types of Clouds

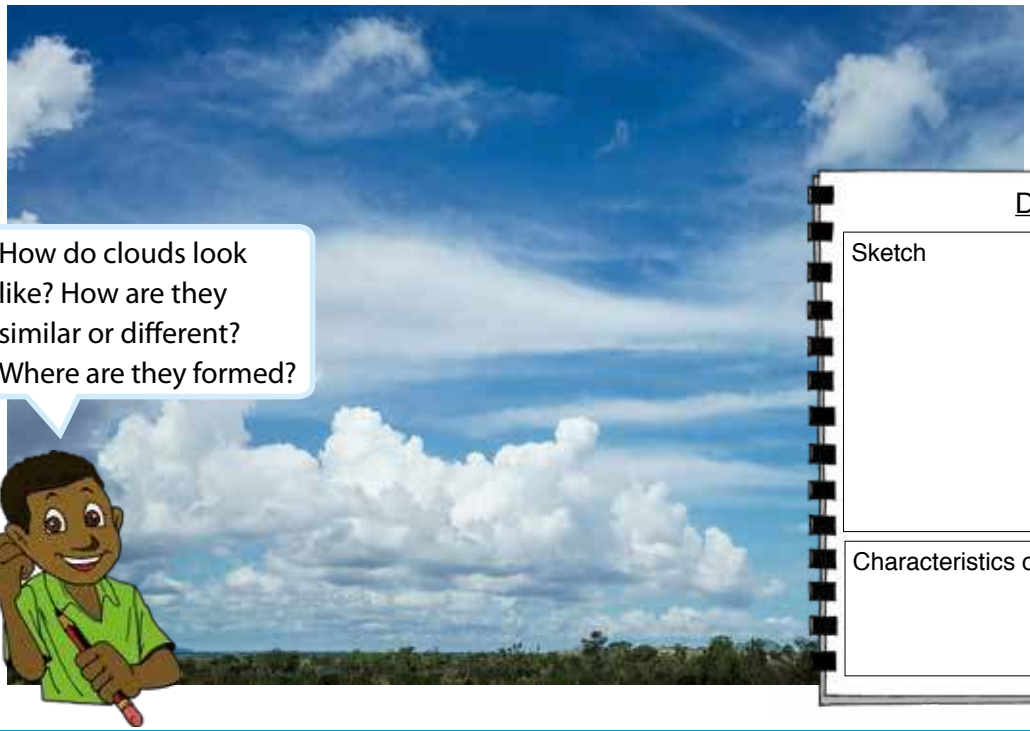
Look at the sky! We see clouds almost every day. Sometimes clouds are white and puffy. Sometimes they are dark and cover the entire sky.

What types of clouds can be observed?

Activity : Observing clouds

What to Do:

1. Go out of the classroom and observe the clouds in the sky.
2. Sketch the clouds in your exercise book.
3. Record the characteristics of clouds such as colour, size, shape and altitude.
4. Share your observations with your classmates. Discuss the types of clouds and their characteristics.

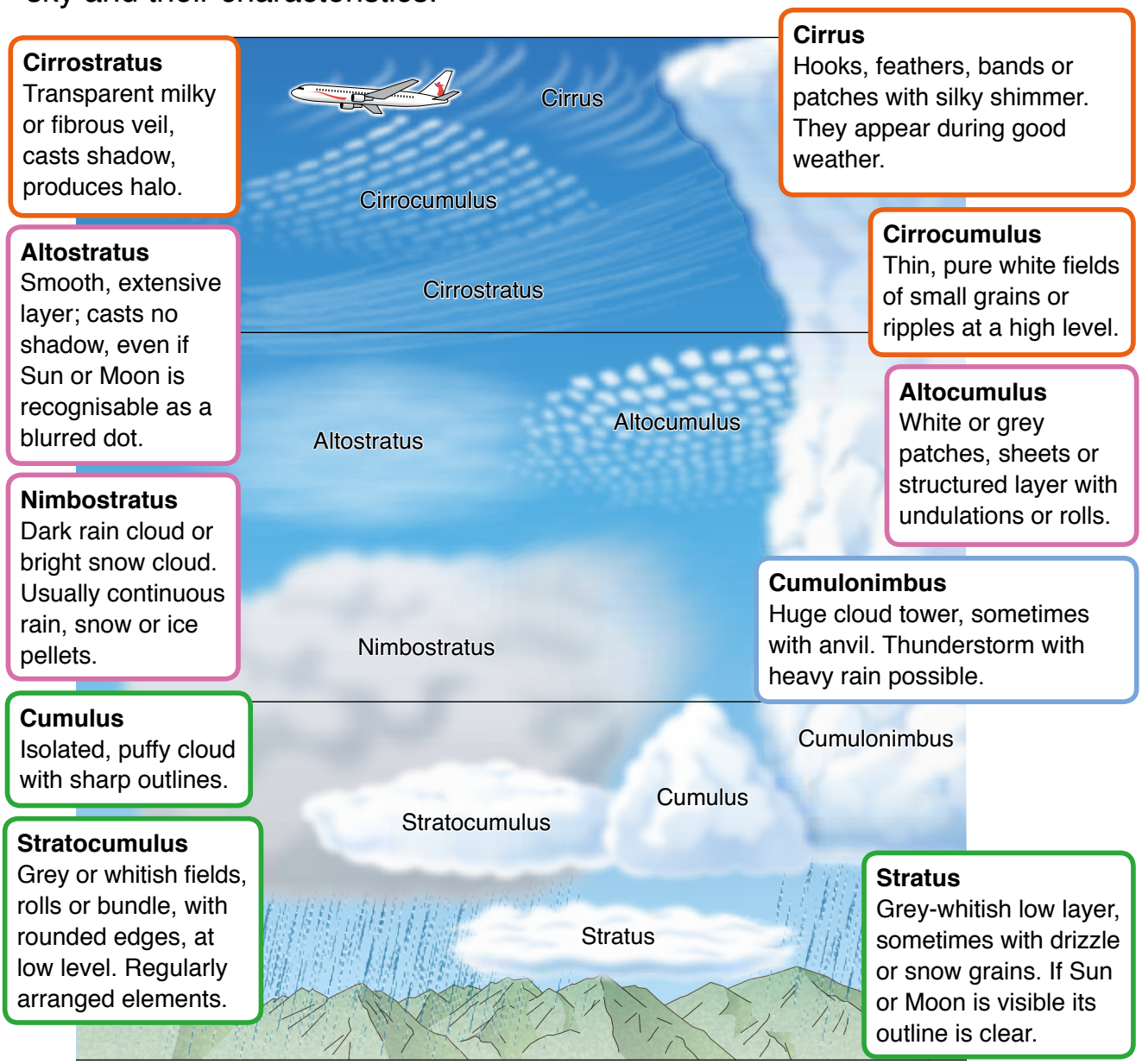


Summary

A **cloud** is made of water droplets or ice crystals floating in the sky. Clouds are classified by where they are formed in the sky. There are ten different types of clouds.

Where clouds are formed in the sky.	Types of Clouds
High Level	Cirrus, Cirrocumulus, Cirrostratus
Middle Level	Altocumulus, Altostratus, Nimbostratus
Low Level	Stratocumulus, Stratus, Cumulus
Range from Low to High Level	Cumulonimbus

The diagram below shows where different types of clouds are formed in the sky and their characteristics.



Lesson 2 Weather Forecast

Weather changes from day to day. It also changes throughout a day. Weather can be forecasted based on the cloud condition. **Weather forecast** predicts the upcoming weather.

How can we forecast weather?

Activity : Weather and clouds

What to Do:

1. Go out of the classroom and observe the sky on a sunny day and on a rainy day.
2. Sketch the clouds you observed in your exercise book.
3. Identify and name the types of clouds that you observed.
4. Share your observations with your classmates. Discuss the relationship between the types of clouds and the weather.

Clear sky

Cloudy sky

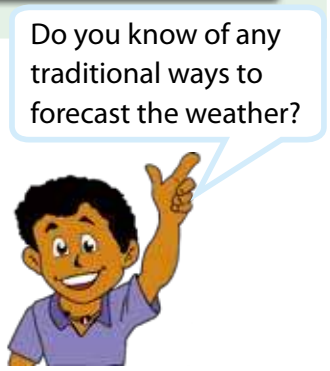
Summary

Clouds can help us to predict the weather. When we observe clouds, we can forecast the weather in the hours and days ahead. The types of clouds tell us about the weather. The table below describes the types of clouds that may cause bad weather such as rain, strong wind and lightning.

 **Cirrus:** Cirrus clouds can indicate that a change in the weather will occur within 2 or 3 days.	 **Cirrocumulus:** A storm may come. In tropical regions, that could be a hurricane.
 **Cirrostratus:** Cirrostratus clouds usually come 12-24 hours before a rainstorm.	 **Altostratus:** Altostratus clouds often form ahead of continuous rain.
 **Nimbostratus:** They often produce light to moderate rain. Rain can be long lasting.	 **Cumulonimbus:** These clouds mean thunderstorms, including lightning and heavy rain.

Try it!

Let's observe clouds to forecast tomorrow's weather based on the types of clouds using the information in the table above.

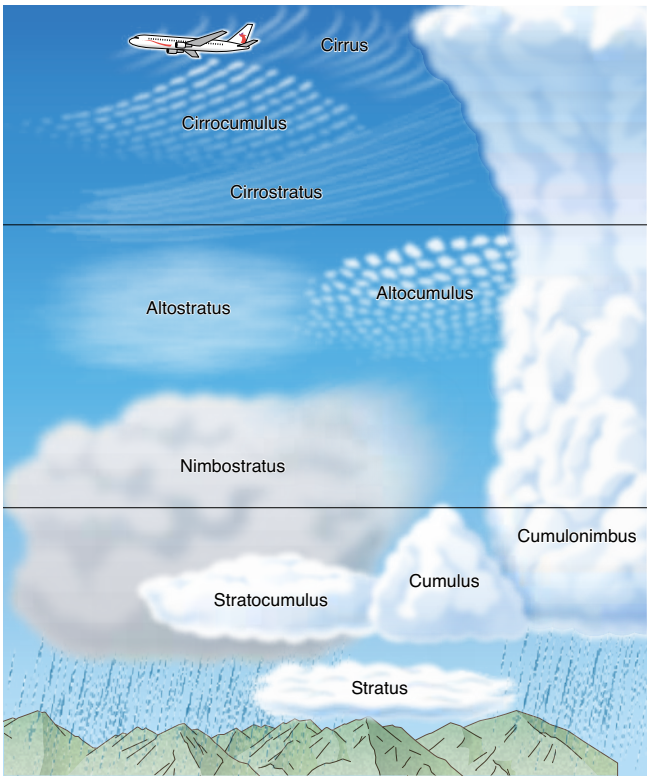


Summary and Exercise

Summary 3.1 Observing Clouds

Types of Clouds

- A cloud is made of water droplets or ice crystals floating in the sky.
- There are ten different types of clouds.
- Different types of clouds are located at different altitudes in the sky.



Weather Forecast

- Weather forecast predicts the upcoming weather.
- Clouds can help us predict the weather.
- When we observe the clouds, we would forecast the weather in the hours and days ahead.
- The types of clouds tell us about the weather.
  - Cirrus clouds can indicate that a change in the weather will occur within 2 or 3 days.
  - Cirrocumulus clouds suggest that a storm may come. In tropical regions, that could be a hurricane.
  - Cirrostratus clouds usually come 12-24 hours before a rainstorm.
  - Altostratus clouds often form ahead of continuous rain.
  - Nimbostratus clouds often produce light to moderate rain. Rain can be long lasting.
  - Cumulonimbus clouds mean thunderstorms, including lightning and heavy rain.

Summary and Exercise

Exercise 3.1 Observing Clouds

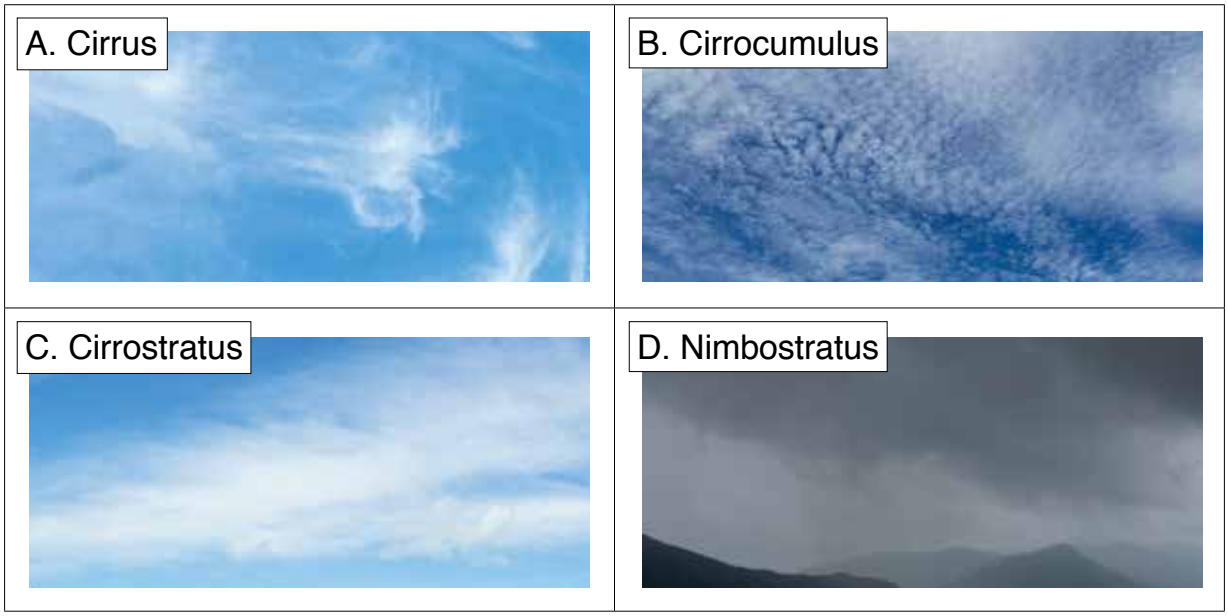
Q1. Complete each sentence with the correct word.

(1) A _____ is made of water droplets or ice crystals floating in the sky.

(2) Different types of clouds are located at different _____ in the sky.

(3) Clouds can help us predict the _____.

Q2. Choose the letter with the correct answer to answer (1) and (2).



(1) What type of clouds indicates that there would be a change in the weather within 2 or 3 days?

(2) Which of the given types of clouds mean there will be light rain to moderate and the rain can be long lasting?

Q3. Look at the picture on the right and answer the following questions.

(1) What is the name of the cloud?

(2) At what level of altitude is this cloud located?

Q4. Alice went outside the house and saw that the clouds looked like hooks and feathers high up in the sky. What do you think her prediction of the weather would be?

3.2 Seasons

Lesson 1 Seasons

It may be 'hot' and said to be a 'dry season' or it may be 'wet' and said to be a 'wet season'. Is season similar to or different from weather?

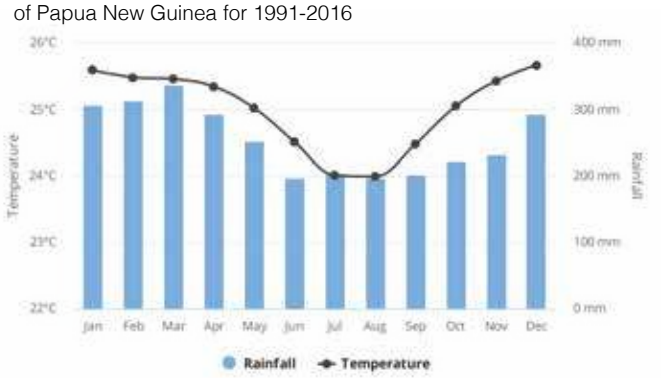
What is a season?

Activity : Seasons in Papua New Guinea

What to Do:

1. Study the graph below. This graph shows average monthly temperature and rainfall of Papua New Guinea from 1991-2016.

Average Monthly Temperature and Rainfall of Papua New Guinea for 1991-2016



(Source: Climate Change Knowledge Portal, THE WORLD BANK GROUP)

2. Think about the following questions.
   (1) Is the temperature the same all year around?
   (2) Which months are warmer with temperatures at 25°C and over?
   (3) Which months are cooler with temperatures below 25°C?
   (4) Does the rainfall occur all year around?
   (5) Which months are drier with less than 200 mm of rainfall?
   (6) How many months are wetter with more than 200 mm of rainfall?
   (7) What patterns of temperature and rainfall are there in PNG?
3. Share your ideas with your classmates. Discuss your answers and the seasons in Papua New Guinea.

Summary

Weather changes from day to day. When weather remains the same for a long period, we call it **season**. Season is a period of the year that is divided by typical weather conditions. Each season has its own weather pattern. There are some months that are very hot or cold. It rains heavily during some months. The seasons change in the same order every year.

In many places of the world, there are four seasons; spring, summer, autumn (fall) and winter. **Spring** is the season that follows winter. The weather begins to get warmer. It often rains in spring, too. **Summer** is the season that follows spring.

Summer is the warmest season of the year with long hours of sunlight. **Autumn (Fall)** is the season that follows summer. The weather slowly gets colder. **Winter** is the season that follows fall. Winter is the coldest season of the year with fewer hours of sunlight. In some places, the coldest weather causes snow, hail and sleet.

Do you know the seasons shown in these pictures?

Some places near the Equator have one hot season all year around or only two seasons; dry season and wet season. The seasons of Papua New Guinea are quite diverse from place to place, but in general Papua New Guinea has dry season and wet season.

The **dry season** is a time of year when little rain falls. The dry season in PNG is generally from May to October. The **wet season** is the time of year when most of the rain falls. The wet season in PNG is generally from November to April.

Wet season in Papua New Guinea

Lesson 2 Seasonal Changes and Living Things

Seasons change in the same order every year. Each season determines the types of clothes people wear. Do seasons also cause any changes in plants and animals pattern of living?

How do living things change with seasons?

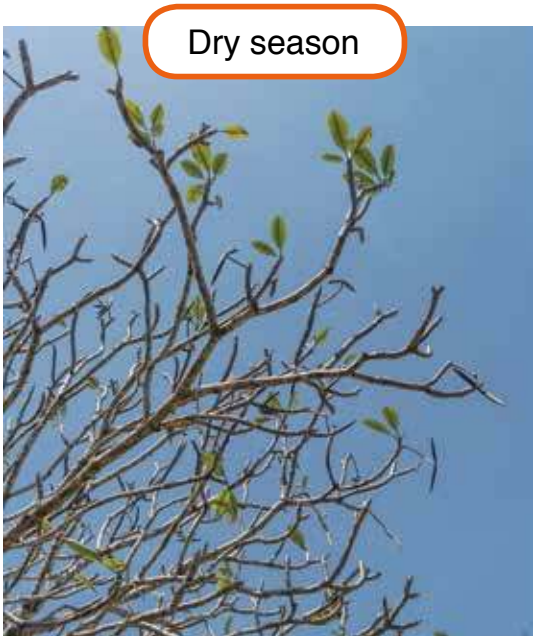
Activity : How are they different?

What to Do:

1. Draw a table like the one shown below.

Seasons	How does the tree change with the seasons?
During Dry season	
During Wet season	

2. Study the two pictures below of the same tree. The picture on the left was taken during a wet season and the picture on the right was taken during a dry season.
3. Observe how they look. Are they similar or different? Record your observations in the table.
4. Share your ideas with your classmates. Discuss how plants and animals change with the season.



Summary

Changes in seasons cause living things to change. Living things need to adjust with seasonal changes.

Spring

Plant seeds begin to sprout. Buds on trees and shrubs grow. Leaves grow and flowers bloom. Many animals have young in spring.

Plant seed begins to sprout.

A bird has young in spring.

Summer

In summer, many plants grow flowers. Fruits grow from the flowers. Young animals grow and become stronger.

In summer, fruits grow from the flowers.

Autumn (Fall)

Some trees drop their fruits. The leaves of trees change colour and fall to the ground. Some animals move to warm places and others gather and store food.

Winter

Many trees and bushes stop growing or grow slowly. Some animals go into a long, deep sleep. The fur on some animals may get thicker and change colour.

Dry and Wet Season

During dry season, trees lose their leaves and some plants die. Some amphibians and insects will burrow deep into the soil and go into a long sleep until the rains return. As the wet season begins, rain helps plants to bloom and turn green. Animals thrive and have their young.

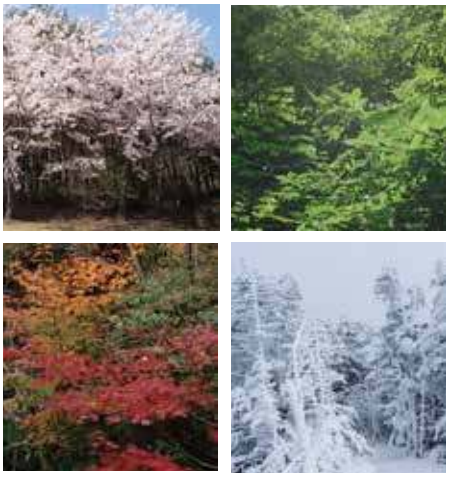
Rain helps plants to bloom and turn green in wet season.

Summary and Exercise

Summary 3.2 Seasons

Seasons

- A season is a period of the year that is divided by typical weather conditions.
- In many places in the world there are four seasons:
  1) Spring: the weather begins to get warmer.
  2) Summer: the warmest season of the year due to the long hours of sunlight.
  3) Autumn (Fall): the weather gets colder.
  4) Winter: the coldest season of the year due to the fewest hours of sunlight.



- Papua New Guinea and some other tropical countries have only two seasons: Dry and Wet.

Seasonal Changes and Living Things

- Changes in seasons cause living things to change. Living things need to adjust with seasonal changes.

Spring	• Leaves grow and flowers bloom. • Many animals have their young.
Summer	• Fruits grow from the flowers. • Young animals grow and become stronger.
Autumn (Fall)	• Leaves of the trees change colour and fall to the ground. • Some animals move to warm places, others gather and store food.
Winter	• Many trees and bushes stop growing or grow slowly. • Some animals go into a long, deep sleep.
Dry and Wet seasons	• During the dry season, trees lose their leaves and some plants die. • During the wet season, rain helps plants to bloom and turn green.

Summary and Exercise

Exercise 3.2 Seasons

Q1. Complete each sentence with the correct word.

(1) A period of the year that is divided by typical weather conditions is called _____.

(2) Living things need to adjust with seasonal changes in temperature and _____.

(3) Papua New Guinea has _____ season and wet season.

(4) Summer is the _____ season of the year due to the long hours of sunlight.

Q2. Choose the letter with the correct answer.

(1) Which of the following list shows the correct order of seasons?

A. Spring → summer → autumn → winter

B. Summer → autumn → spring → winter

C. Spring → autumn → winter → summer

D. Summer → spring → winter→ autumn

(2) During which season do some animals hibernate or go into a deep sleep?

A. Spring

B. Summer

C. Autumn (Fall)

D. Winter

Q3. Study the picture on the right and answer the question.

What will happen to this plant during dry season?

Q4. Explain why seeds of many plants in Papua New Guinea germinate during wet season.

Why do animals go into a very long sleep during winter?

You are probably aware that some animals fall into a very long sleep during winter, this is called Hibernation. Hibernation is an adaptation that helps many animals conserve energy by remaining inactive and reducing their body temperature for days, weeks or even months at a time.

Typically, animals hibernate in order to survive long periods when food is scarce. Hibernating animals will generally eat a lot of food before hibernation and then survive off the energy stored in their fat.

Hibernating animals can sense seasonal changes. The moment they sense autumn (fall) approaching, they get busy preparing by eating more than usual, the animal builds up extra layers of fat. During hibernation, the animal's body will feed on this fat to keep itself alive. Extra fat also helps the animal to stay warm when they are asleep. They then find a shelter where they will be safe while they are asleep if they want to survive.

Only warm-blooded animals can truly hibernate because cold-blooded animals cannot regulate their own body temperatures. Bears, ground squirrels, woodchucks and groundhogs all hibernate during winter.

This animal has gone into a deep sleep during winter.

Chapter Test

3. Weather and Seasons

Q1

Complete each sentence with the correct word.

(1) Different types of clouds are located at different _____of the sky.

(2) The types of clouds tell us about the upcoming_____.

(3) Some places near the_____have one hot season all year round or only two seasons, dry and wet.

Q2

Choose the letter with the correct answer.

(1) Papua New Guinea has two seasons, what are they?

A. rainy and winter

B. wet and dry

C. spring and dry

D. summer and winter

(2) Which cloud is formed at a range from low to high level altitude and like a huge cloud tower?

A. cirrocumulus

B. cumulonimbus

C. cirrostratus

D. cumulus

(3) What can clouds tell us about? They can tell us about

A. what the upcoming weather will be like.

B. when it will be full moon.

C. what time the sun rises.

D. how many seasons there are.

(4) In which season do leaves of trees start to change their colours and drop to the ground and the nights begin to get colder?

A. Spring

B. Summer

C. Autumn

D. Winter

Q3

(1) What would be the expected weather when the clouds are thin, pure white fields of small grains or ripples at a high alttitude as shown in the picture on the right?

_____

_____

_____

(2) How are plants different in wet and dry season?

_____

_____

(3) The graph on the right shows monthly rainfall in a city. Is it dry season or wet season from July to October?

_____

Q4

(1) What do animals do in Autumn (Fall) to get ready for winter?

_____

_____

(2) Farahlyn observed the sky one day and saw that the clouds looked like hooks, feathers and patches with silky shimmer.

(i) What type of cloud did she see?

_____

(ii) What do you think the weather would be like by looking at those clouds?

_____

_____

_____