Science Around US

Book 3

A GOG/IDB Project
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FOREWORD

One welcomes the publication of this series of textbooks as part of the Primary Education Improvement Project funded by the Inter-American Development Bank and the Government of Guyana.

This series of texts has been long in planning, writing and producing. In the process however, many Guyanese have developed skills in textbook writing and publication. This will serve Education well in the future.

We congratulate all those responsible for the production of these texts. They have done a good job. Guyanese children at the Primary level, and, indeed, the society as a whole, will be the beneficiaries of their labour.

Thanks to the Inter-American Development Bank for its financial support. Primary Education in Guyana will benefit considerably with the availability of relevant reading material.

Dale A. Bisnauth

Senior Minister of Education and Cultural Development
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CHAPTER 1 THE HUMAN BODY

FOOD NUTRIENTS AND THEIR SOURCES

LOOKING AT FOOD NUTRIENTS

What do we know about the foods that we eat? Take a look at the food chart below. How many food groups can you identify?

The foods we eat can be divided into many groups. Some of the groups we can identify are:

- Staple foods
- Legumes/nuts
- Dark green leafy and yellow vegetables
- Fruits
- Foods from animals
- Fats
Why do we need food from each food group?

Each food group contains vital substances that our body needs to be healthy. These substances are called nutrients. There are six main types of nutrients:

- Proteins
- Fats and oils
- Carbohydrates
- Minerals
- Vitamins
- Fibre

STAPLE FOODS

Some examples are bread, cereal, rice and pasta. The main nutrient found in this group is carbohydrates, which provides the body with energy.
FRUITS AND VEGETABLES

Fruits and vegetables provide vitamins, minerals and fibre - nutrients that prevent some diseases.

FOODS FROM ANIMALS

Foods that come from animals, such as meat, poultry, fish, and dairy products are good sources of protein. Protein is used to build and repair body parts.

LEGUMES

Peas, beans and nuts are examples of legumes. They are a good source of protein but in smaller quantities compared to the protein sources from animals.
FATs

Fatty foods, such as butter and sweets, including candy and cookies, provide few nutrients and should be eaten in tiny amounts.

BALANCED DIET

A meal which contains the right amount of each nutrient is called a balanced diet.

A balanced diet provides the right amount of proteins, carbohydrates, fats, vitamins, minerals, fibre and water required by an individual. A balanced diet helps to keep us healthy and strong.

Activity

Complete the table below:

Give two (2) examples of foods containing each nutrient in the table.

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Foods that contain these nutrients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fats</td>
<td></td>
</tr>
<tr>
<td>Carbohydrates</td>
<td></td>
</tr>
<tr>
<td>Proteins</td>
<td></td>
</tr>
<tr>
<td>Vitamins</td>
<td></td>
</tr>
<tr>
<td>Minerals</td>
<td></td>
</tr>
</tbody>
</table>
What have you learnt?

1. There are _______ kinds of nutrients.
2. Name two food nutrients we get from food.
3. The nutrient we get from food from animals is called _________.
4. A balanced diet contains the right amount of ____________.

DIGESTION

Digestion is the breaking down of food into smaller components or parts so that the body can absorb it easily to provide energy to build and nourish cells.

THE DIGESTIVE SYSTEM

WHAT IS THE DIGESTIVE SYSTEM?

The digestive system is responsible for processing food so that the body can absorb it easily to provide energy and build and nourish cells. Undigested food is removed from the body as faeces.

PARTS OF THE DIGESTIVE SYSTEM

The digestive system is made up of the digestive tract (also called the alimentary canal) and other organs which help in digestion. The digestive tract is really just a long tube from your mouth (the entrance) to your anus (the exit). A diagram of the digestive system is shown on the next page.

The digestive system is therefore responsible for extracting food nutrients. The system is made up of many important organs that work together to digest the food we eat.
HOW IS FOOD DIGESTED?

The main parts of the digestive system are:

1. **The Mouth** - You start to digest food in your mouth where the food is chewed and mixed with saliva.
2. **The Oesophagus /Gullet** – After the food is mixed you swallow it. Your tongue pushes the chewed-up food into your oesophagus which sends the food into your stomach.
3. **The Stomach**

   **What happens in your stomach?**

   Your stomach breaks down the food even more. It is like a bag made of muscles. Liquids called digestive juices pour into your stomach. Your stomach muscles churn the food around to mix it with the juices. The juices break down the food. The food turns into a liquid in your stomach.

   It takes your stomach about four hours to do its job. Your stomach then sends the liquefied food on to your small intestine.
4. The Small intestine

What happens in your small intestine?

The job of digesting gets finished in the small intestine. Your small intestine is a long and narrow, twisty tube. The small intestine is by far the longest part of the digestive system. Muscles surrounding this tube push the liquid along. More juices break the food down even further. The food is now a thin liquid which is absorbed through the walls of the small intestine. Your blood carries this nutrient to every part of your body.

5. The Large intestine

What happens in the large intestine?

Whatever is not absorbed into the small intestine passes on to the large intestine. Your large intestine is shorter and thicker than your small intestine. Your large intestine takes water out of the leftover food. It also takes out some vitamins and minerals. What is left in the large intestine is solid waste.

6. The Anus

The remaining waste material or solid waste from the large intestine is then pushed out of the body through an opening called the anus. This waste material is called faeces.
What have you learnt?

The system responsible for extracting nutrients from the food we eat is the __________ system.

The main parts of the digestive system are the ________, oesophagus, ________, ___________,__________,_________ and the anus.

Digestion starts in the ________ and ends in the ____________.
TEETH

What are teeth?

Teeth are the bony structures in your mouth and in the jaws of most vertebrates. They are the hardest part of the human body. Teeth are hard because they are made mainly of dentine and covered with a thin layer of enamel which is a hard substance.

We use our teeth to bite and chew our food. During our life we have two sets of teeth. We have twenty (20) milk teeth which grow soon after we are born. At around the age of six (6) our milk teeth start to fall out. These are replaced by larger permanent teeth. Adults have thirty two (32) permanent teeth.

TYPES OF TEETH

Have you ever looked at your teeth?

Are they all alike?

The teeth in our mouth perform different functions. That is why your teeth do not all look alike. If your adult teeth have grown in, you have four different kinds of teeth.
Incisors

Your front teeth, or incisors, are flat and sharp.

- You use these teeth like a knife to cut into food.

Canines

- Next to the front teeth are your canine teeth.
- You use these sharp, pointy teeth for tearing and shredding food.

Premolars and Molars

- Beyond the canines are the premolars or bicuspids followed by the molars.
- You use these flatter teeth to crush and grind food.

CARING OF THE TEETH

Why do we need to care for our teeth?

Our body cannot replace our adult teeth if they are damaged or lost. Hard as they are, our teeth can decay if we do not care them. To keep our teeth healthy we must clean them at least twice per day.

Have you ever had a cavity?

A cavity is a hole in a tooth. It develops when bacteria eat away at the enamel and dentine.
How can we care our teeth?

In order to prevent tooth decay we must practice healthy dental care habits. Proper care of the teeth is important for good health. This includes:

- brushing your teeth properly
- brushing your teeth after each meal
- flossing
- eating balanced diets
- avoiding too many sweets and confectioneries
- visiting the dentist regularly.

Activity

Match the teeth below with their functions

- tearing and ripping food
- cutting
- crushing and grinding food
What have you learnt?

1. An adult has ______ types of teeth.

2. Which type of teeth is found at the front of the mouth?

3. Sally must use her ______ to ensure her food is properly crushed.
SUMMARY

• The food groups can be divided according to the nutrients they contain.
• A balanced diet helps to keep us healthy and strong.
• Through the process of digestion the body receives its nutrients.
• There are four types of teeth – incisors, canine, premolars and molars.
• The different types of teeth do different jobs.
• It is very important that we take care our teeth.
Without food animals cannot live.

Animals need food. Do all animals eat the same kinds of food?

We can group animals according to the food that they eat.

Some animals only eat plants while some are flesh eaters. Some animals eat both plants and flesh.

**HERBIVORES**

All animals do not eat the same kind of food.

What do cows and sheep eat?

What does a monkey eat?

Plant eaters eat mainly plants with soft stems and leaves. Plants with soft stems are called herbs. Animals that eat herbs and grass are called **herbivores**.
Can you name some herbivores?

Herbivores may eat the whole plant or parts of the plant.

Caterpillars eat leaves. Parrots eat fruits.

What plant parts do rabbits and pigeons eat?

Look at the pictures of the herbivores below.

What plant parts do they eat?

Look at the pictures. Animals eat different parts of plants.

**Something to do**

1. Observe some plant eaters in your environment.
   
   List their names and the plants or the parts of plants they eat.

2. Try to find a caterpillar. Put it into a jar. Feed it for two days with leaves from the plant on which it was found. Try giving it other leaves. See what happens.
Mouth Parts of Plant Eaters

Let Us Look At Their Teeth

This is a diagram of the head and skull of a cow. Look at its teeth. Have you noticed the two sets of teeth?

Have you noticed the space between the two sets of teeth? All herbivores have this space.

Which set of teeth is used for biting the leaves and stems of plants? What can you say about their shape?

Can you tell which set of teeth is used for cutting and which set is used for grinding?

Notes

Cows have thirty two (32) permanent teeth. They have 8 incisors on the bottom jaw and no teeth on the top front jaw. The incisors are used for cutting. They have six premolars and six molars on both top and bottom jaws for a total of twenty-four molars. These teeth are used mainly for grinding.
Beaks Are Important Too

1. Do birds all have the same beaks?
2. How are they different?
3. Why are they different?
4. Do you know what the birds eat?
5. Have you seen how certain birds devour their food?

Look at the pictures of the beaks of the birds.

All birds do not have the same kind of beak. Plant eating birds have special kinds of beaks. For example, the hummingbird has a beak that is long and slender for sucking up nectar from flowers while the woodpecker has a beak that is long and chisel-like for boring into wood to eat insects. Hens, pigeons and mountain canaries feed on seeds. They have short, pointed beaks. Parrots and macaws have strong, curved beaks for cracking nuts.

SUMMARY

Animals that eat only plants are called herbivores.

Some herbivores are donkeys, elephants, caterpillars, manatees, tapirs, parrots, pigeons and macaws.

The large herbivores have sharp, front teeth cutting, and back teeth with flat tops for grinding.

Plant eating birds have special kinds of beaks. Some have strong, curved beaks for cracking nuts.
Some have short pointed beaks for eating seeds and fruits.

CARNIVORES

Looking at Flesh Eaters

crow  eagle  jaguar

egret  dog

We have learnt that some animals eat only plants. Let us look at the animals above. Are they plant eaters? What do they eat?

Some animals such as the eagle and the jaguar eat only the flesh of other animals. The carrion crow mainly eats the flesh of dead animals. Can you name another animal that does this?

Animals that eat mainly flesh are called carnivores. Some examples of carnivores are dogs, snakes, frogs and jaguars. Can you name some other carnivores?
Something to do

Things you need

- Pictures of animals
- Paste

What to do

1. Look at the pictures. Find the carnivores
2. In your Science notebook write the heading – Carnivores.
3. Collect and paste the pictures of carnivores under the heading.
4. Write the names of the animals.

More about Flesh Eaters

What is the cat in the picture above doing?
What will the cat do with the rat if he catches it?
Have you ever seen a lizard or a frog catching insects?
The cat, lizard and frog hunt other animals for food.
Animals which hunt other animals for food have a special name. They are called predators. Predators hunt and eat the animals they catch. The animal which is
hunted is called the **prey**. Look at the predators below. Name the prey they catch and eat.

Name some other predators and the animals they hunt.
Something to do

Things you need

- Cards with names of animals
- Paper clips or safety pins
- Pictures of animals

What to do

1. Match pictures of predators with animals they hunt.
2. A game to play
   Choose a card with the name of an animal. Pin it on your back. If you are a predator hunt an animal.

Teeth and Claws

Look at a cat’s teeth. Look at its claws. What are they used for? Name other animals with teeth and claws like those of the cat. Otters, jaguars, dogs and cats have sharp, pointed teeth, and claws for gripping and killing the animals they hunt and eat.
Beaks and Claws

Let us look at the shape of the beak and claws of the eagle. Do you notice that they are curved, sharp and pointed? What are they used for? Name some other birds with beaks and claws like those of the eagle. Look again at the teeth and claws of the cat. How are they similar to the beaks and claws of the eagle?

Why is the anteater able to trap the ants with its tongue?
Name another animal that uses its tongue to catch food.

Something to do

Let’s do a group project

Materials

- Pictures of carnivores
- Sheet of cardboard
- Paste
What to do

1. Make a chart as shown below.
2. Paste pictures in the correct columns.
3. Write the name of each animal next to its picture.

<table>
<thead>
<tr>
<th>Sharp pointed teeth</th>
<th>Sharp, curved beak</th>
<th>Sticky tongue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SUMMARY

- Animals that eat mainly the flesh of other animals are called **carnivores**.
- Carnivores have special teeth, claws and beaks. These are used for gripping and tearing the flesh of the animals they eat. Some carnivores have sticky tongues which help them to catch the animal they eat.
- Some carnivores are lions, tigers, eagles, lizard, frogs, gauldings, and carrion crows.
- Carnivores that hunt other animals for food are called **predators**, and the animals they hunt are called the **prey**.
- Some carnivores have pointed teeth and sharp claws and others have sharp, curved beaks and sharp claws. These are used for gripping and tearing the flesh of animals they eat.
- The sticky tongues of the anteater, frog and lizard help them to catch the animals they eat.
OMNIVORES

Looking at Plant and Flesh Eaters

We already know that there are some animals which eat mainly plants. We also know that some animals eat mainly flesh.

Do you know that there are some animals that eat both plants and flesh?

Name some animals that eat both plants and flesh.

Birds eat worms and seeds.

What do crabs and pigs eat?

Animals like the hen, crab and pig eat both plants and flesh. These animals have a special name. They are called omnivores. Omnivores are animals that eat both plants and the flesh of other animals.
Do people eat foods that come from both plants and animals? The family in the picture is eating bread, eggs and sausages. They are also drinking orange juice and hot cocoa. These foods come from both plants and animals.

Think about what you eat. Do you eat both plants and flesh?

Most people are omnivores. Some plant foods that people eat are calalu, bora, pigeon peas and rice. Some foods from animals that people eat are beef, fish and crab. Name other plants and flesh that people eat.
List all the foods the boy in the picture eats. Where do these foods come from?

<table>
<thead>
<tr>
<th>Food</th>
<th>Source</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plant</td>
<td>Animal</td>
</tr>
<tr>
<td>Rice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banana</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cherry Juice</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The boy eats no flesh.

His lunch is made up of foods that come only from plants. He is called a vegetarian. Vegetarians are people who eat only foods that come from plants.

**SOLID AND LIQUID FOODS**

Some foods are solid while others are liquid. Animals which eat solid food are called solid feeders. Animals which feed on liquid food are called liquid feeders.
Look at these pictures. Which of these are solid foods and which are liquid foods?

This is a solid food

The monkey is eating a banana.

This is a liquid food

The cat is lapping milk.

The hen is eating grains.

What does a mosquito eat? This mosquito is sucking blood.

The caterpillar is eating a leaf.

The calf is sucking milk from its mother.
Foods we eat are called solid foods. Some solid foods are banana, corn and ochro. Foods we drink are called liquid foods. Some liquid foods are milk, fruit juices and soup.

Try to name other solid and liquid foods. What kind of food does your pet eat?

**Something to do**

1. Collect pictures of six animals. Paste them into your Science scrap books and write the names of foods that they eat.
2. Cut out pictures of foods that you like to eat and drink and paste them into your Science scrap book.
3. Observe how your pet eats solid and liquid foods.
4. Visit the zoo or a farm and look carefully at the way in which animals feed on solid and liquid foods.
What kind of food do these animals eat?

Observe how a bird eats seeds. What does it use to crack the seed?

How does the boy drink his juice?

He lifts the glass to his mouth then drinks it. What other method can he use to drink the juice?

Do animals which eat solid foods have the same mouth parts as animals which use liquid foods? Let us look at these pictures and observe the parts.

<table>
<thead>
<tr>
<th>Solid Feeders</th>
<th>Liquid Feeders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dog</td>
<td>Housefly</td>
</tr>
<tr>
<td>Cow</td>
<td>Mosquito</td>
</tr>
</tbody>
</table>

Solid feeders have special mouth parts.

Animals that feed mainly on solids have special mouth parts. Some have special beaks to crack seeds. Dogs have special teeth to crack bones and bite meat. Can you think of other animals which eat solid foods and have special mouth parts?
Liquid feeders also have special mouth parts. Insects such as bees and mosquitoes have mouth parts which are like long sucking tubes. They use the tubes to suck up their food.

**Something to do**

1. Put a spider in a bottle and cover it with a piece of material which has tiny holes to allow air to enter the bottle.
2. Catch a live fly every two days and feed the spider with it.
3. Observe the way the spider traps the fly and sucks the fly.

**SUMMARY**

- Animals eat different kinds of food. The food can be solid, liquid or both.
- Some solid foods are bones, meats, fruits, vegetables, peas, corn.
- Some liquid foods are milk, fruit juices, water, soup, blood.
- Animals that eat solid foods have beaks or teeth.
- Animals that feed on liquid foods only have special tube-like mouth parts for sucking up their food e.g. mosquitoes.
VERTEBRATES AND INVERTEBRATES

Who has a backbone?
Place your finger on the centre of your back. Do you feel something hard there? That is the **backbone**, one of the most important bones in your skeleton. Animals with backbones are called **vertebrates**. You are a vertebrate. Your backbone is also called your spine.

**Which of the animals below do you think have backbones?**

Vertebrates

- Animals that have a backbone are called vertebrates.
- Vertebrates are divided into two types, cold-blooded and warm-blooded animals.
- Vertebrates are divided into five groups - mammals, birds, reptiles, amphibians, and fish are vertebrates.
Mammals

The dog is an example of a mammal.
All mammals have backbones. Horses, snakes, cows, dogs, monkeys, cats, sheep, and goats all have backbones. All mammals are warm blooded. Mammals suckle their young. Their bodies are covered with hair.

Birds

- Birds have backbones.
- They have wings and beaks.
- Their bodies are covered with feathers.
- They lay eggs.
Reptiles

An example of a reptile is the snake.

- Reptiles have backbones.
- Their bodies are covered with dry scales.
- They lay eggs.

Amphibians

An example of an amphibian is the frog.

- Amphibians have backbones.
- They live on land and in water.
- They lay eggs.

Fish

- Fishes have backbones.
- They live in water.
- Their bodies are covered with scales.
- They lay eggs.
Invertebrates

- Animals that do not have backbones are called invertebrates.
- Invertebrates are by far the most numerous animals on Earth.

The animals shown below do not have backbones.

Ant  Butterfly  Spider
SUMMARY

- Some animals have backbones while others do not. Animals can be grouped into those that have backbones, and those that do not.
- Mammals, birds, frogs, toads, snakes, lizards and fish all have backbones.
- Invertebrates are animals without backbones.
- Some examples of invertebrates are ants, butterflies, crabs and worms.

Look at the chart below.

What have we learnt?
Put the animals in the table below into their right group by putting a tick (√)

<table>
<thead>
<tr>
<th>Animal</th>
<th>Invertebrate</th>
<th>Vertebrate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
FUNCTION OF MAIN PARTS OF A PLANT

The plant is made up of five main parts: roots, stems, leaves, fruits and flowers. Each of these parts has a special function. The functions are as follows:

**Root** – anchors the plant in the soil or water. Roots absorb water and minerals from the soil or water. Roots are generally found underground and grow downwards.

**Stem** – Stems usually are above ground towards the light. Leaves are usually attached to the stem.

**Leaf** – Leaves are usually flattened blades attached to the stem of a plant. They absorb light energy from the sun to make food for the plant.

**Fruit** – produces a seed or seeds. The seed usually produces a new plant.

**Flower** – produces a fruit.
GERMINATION

Seeds are important because they grow into young plants. A seed germinates into a seedling or young plant. For this to happen the seed needs water, air and warmth.

**Something to do**

1. Place three bean seeds on a wet piece of cotton wool.
2. Put the cotton wool with the seeds into a jam jar.
3. Observe and record any changes you notice in the seeds the next day.

Did you notice that the seeds became bigger? Take one of the seeds, hold it and squeeze it gently.

Observe and record what happens.

Do the same with a dry seed.

Seeds that are soaked take in water through a tiny hole.

Take another of the soaked seeds and see if you can find the tiny hole. The picture below will help you.
We know that plants are living things. What do you think they need to be alive? Let us find out.

**Something to do**
What do plants need to germinate?

**For this Activity you will need:** small plastic trays, sheets of kitchen paper, grass, seeds.

**What to do**
Lay the paper in the trays and sprinkle it with seeds.
Set up the experiment as shown below

Record observations after five (5) days.
Answer the questions below.

Do seeds need light to germinate?
Do seeds need water to germinate?
Do seeds need warmth to germinate?

Something to do

1. Have three healthy potted plants and label them A, B and C as shown in the picture above.
2. Water plant A everyday from the tray but do not water plant B.
3. Cover plant C tightly with a piece of plastic so that air will not get into it. Water it every day from the tray at the bottom.
4. Place these plants where they can get sunlight.
5. Observe the plants after one week. Record what happened.

For plants to grow they need water, warmth and air. If they do not get water, warmth and air they will die.
SOME LIFE PROCESSES OF PLANTS.

Stages of germination

The diagram above shows how a seed grows into a plant. This process is called **germination** and happens in different stages.

**Activity**

**Germinate a Bean**

**You will need:** the cut bottom of a plastic bottle, blotting paper/cotton wool, beans seeds, water, ruler/measuring tape

**What to do:**

Set up the experiment as shown in the diagram below.
Seedlings grow into mature plants. As this happens the seedlings develop more leaves. They will later produce flowers which will develop into fruits containing one or more seeds. In some cases new plants are grown from stems or other plant parts such as leaves and roots.

**WHAT A PLANT NEEDS TO GROW**

**Plants Need the Sun’s Light**

Plants are living things. They need food to live and grow. How do you think they get their food? Plants make their own food. The green leaves in plants make their food. They need air, sunlight and water.

**Something to do**

Does sunlight keep plants alive? Let’s find out.

1. Get two young potted plants about seven days old. Label them A and B.

2. Put A in the open where it can get air and sunlight. Water it every day.
3. Put B in a dark cupboard where sunlight cannot enter but there is air.
4. Water it every day.
5. About seven days later, compare the two plants. Record what you have observed. What happened to the leaves of the plant in pot B?

---

Observe the bean seed as it germinates.

Using a ruler or measuring tape, measure the length of the shoot once per week. Record your measurements and prepare a graph as shown in the diagram.
**What have we learnt?**

Plants need the sun’s light to make food. If they do not get enough sunlight the leaves become yellow and fall off. The plant will die. Plants and animals also need air for survival. Air is made up of several gases. All living things need oxygen. This is one of the gases found in air. Plants use up carbon dioxide (another gas found in air), water and sunlight to make food. Plants release oxygen into the air. Animals breathe in air and use the oxygen from the air to stay alive.

There is a special gas in the air that all living organisms need to keep them alive. This gas is called oxygen.

Plants are living things so they, too, need air to keep them alive. How can we tell?

**Something to do**

1. Take two potted plants and label them A and B.

   ![A and B plants](image)

2. Put both plants outside in the open yard.
3. Cover plant B tightly with a plastic bag so that air cannot get in.
4. Water both plants everyday. Leave them for about seven days then record your observations.
Answer the following questions.

a) What have you noticed about the plants?
b) What has happened to the plant in pot B?
   Have the leaves fallen off?
   Have they changed colour?
   Has the plant gotten bigger?
c) Why do you think these things have happened?

Plants also need air to make their food. They use carbon dioxide from the air to make their food. Oxygen is used to help them get energy.

SUMMARY

Plants make their own food. They need the sun’s light to make food. Air is a mixture of gases. Two important gases found in the air are oxygen and carbon dioxide. Animals and plants need oxygen from the air to keep them alive.

Plants also need carbon dioxide. They use the carbon dioxide to make their food.

What have you learnt?

1. Name two gases found in air.
2. Which gas found in air does a plant need to make food?
Do plants and animals have different homes?

Plants and animals live in different homes or environments. Some live in water while some live on land.

Termites (wood ants) live in a mound. Birds live in a nest.

The water lily, water lettuce and water hyacinth live only in water. The bird vine lives only on plants.
ANIMALS

Fishes such as the hassar and tilapia live only in water. Ants, millipedes and termites live on land.

Match the animals with their habitats

<table>
<thead>
<tr>
<th>Animal</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>rabbit</td>
<td>nest</td>
</tr>
<tr>
<td>bird</td>
<td>burrow</td>
</tr>
</tbody>
</table>
ALL ANIMALS DEPEND ON PLANTS

What do you think would happen to animals if there were no plants?

Both herbivores and omnivores use plants as food.

The cow eats grass. The rabbit eats carrots.

The caterpillar eats leaves. People eat vegetables such as bora, pumpkin and fruits.

Which animals use the cow as its food? Do you know which animals eat the caterpillar? Carnivores use other animals as food.

Omnivores use plants and animals as food. We also find that the animals they eat use plants as their food. Plants then are very important.

Let’s look at the pictures.

Which animal eats the leaf?

Which animal eats the caterpillar?

Which animal eats the bird?
You have learnt that plants need sunlight. Without sunlight, plants cannot make food. Without plants animals cannot get food.

Grass is eaten by the grasshopper. The grasshopper is eaten by the frog. The frog is eaten by the snake.

Grass is eaten by the grasshopper. The grasshopper is eaten by the frog. The frog is eaten by the snake.

The grass, the grasshopper, the frog and the snake are each part of a food chain. A food chain is a way of showing the feeding habits of the animals in a particular community. It is formed when animals which eat plants are eaten by other animals.

Food chains can also be shown by arrows. (→)
Grass → Grasshopper → frog → snake

A food chain can also be represented by a diagram as shown below. Try to complete it.
Something to do

1. Write the names or paste pictures of plants and animals on cards.
2. Punch a hole at the end of each card.
3. Make as many food chains as you can.
4. Use twine to join the cards in each food chain.
5. Display your food chains in the class and discuss with your classmates and teacher.

Sing or recite:

I know an old woman who swallowed a fly
I don't know why she swallowed the fly
Perhaps she'll die.
I know an old woman who swallowed a spider
That wriggled and jiggled and tickled inside her
She swallowed the spider to catch the fly
I don't know why she swallowed the fly
Perhaps she'll die.
I know an old woman who swallowed a bird
How absurd, to swallow a bird
She swallowed the bird to catch the spider
That wriggled and jiggled and tickled inside her
She swallowed the spider to catch the fly
I don't know why she swallowed the fly
Perhaps she'll die.

You may finish the song.

Do the words of this song remind you of a food chain?
OTHER USES OF PLANTS

Plant materials are sometimes used to make homes and shelters.

Look at the pictures above.
What are the men doing?
What is the bird doing?
Houses and nests are homes.
What things are being used to build these homes?

Something to do
1. Collect samples of wood used for building.
2. Find out their names. Label and display them.
PLANTS DEPEND ON ANIMALS

Look at this picture. Can you say how plants depend on animals?

What is the boy doing? What is the woman doing?

What would happen to the plants if they are not cared for?

Animals also help to scatter the seed of plants.

Birds and other animals eat fruits with seeds. These seeds are sometimes dropped far from the parent plant.

Do you help to scatter plant seeds too?
Which of these can you grow in a kitchen garden? Which other plants can grow in a kitchen garden?

**Something to do**

1. Collect seeds of plants for a kitchen garden.
2. Collect some old containers. Punch holes at the bottom of the containers. Fill the containers with soil. Plant some of the seeds.

**SUMMARY**

All animals depend on plants for food.

Food chains are formed when animals which eat plants are eaten by other animals.

Leaf → caterpillar → bird → cat

Grass → cow → man

Plants are also used for building homes, for decorating and for medicine.

Some plants depend on animals to scatter their seeds.

Some plants can be grown in our backyard - pepper, calalu, tomato, lettuce, pea, bora, squash and pumpkin.

Name some other plants that can be grown in our backyard.
CHAPTER 5 WEATHER

Can you remember the types of weather? Look outside.

What type of weather do we have? Is it raining? Is it cloudy?

Did you know that we can measure weather conditions?

What is weather?
Weather is the condition of the atmosphere at a particular time and place for short periods of time.

What is Climate?
Climate is the general weather conditions usually over a longer period of time.

Can you tell what the difference between weather and climate is?
Do weather conditions change daily?

MEASURING AND RECORDING WEATHER CONDITIONS

Weather and climate describe the same conditions of the atmosphere. These conditions are temperature, rainfall, and wind at any given place. Did you know that these conditions can be measured?

There are specialized scientists who measure and record lots of different aspects of the weather, including temperature, rainfall and wind speed and direction. By doing this and carefully studying the weather, it is possible to forecast how it will change in the future.
Finding out

We can measure weather conditions by using simple tools. Let us find out how we measure rainfall. A rain gauge tells us how much rain fell. Let us make one.

1. Cut a bleach bottle into two as shown below.

2. Mark the bottom part in centimeters.

3. Use the top part as a funnel over the bottom.

4. Use your rain gauge to find out how much rain fell in your area.
Finding wind direction

A wind vane shows us from where the wind blows.
Let us make one. You will need cardboard, a straw and a pencil with eraser.

1. Cut these shapes from the cardboard.

2. Paste them on both ends of the straw.

3. Push a pin through the middle of the straw.

4. Stick the pin into the eraser of the pencil.

5. Now hold it in the wind.

Can you say in which direction the wind is blowing?
Something to do

Recording the weather conditions
1. Measure the number of hours of sunlight each day for two weeks.
2. Measure the amount of rainfall each day for two weeks.
3. Observe the wind direction each day for two weeks.
4. Record information in the table below.
5. Discuss the information with your group.

<table>
<thead>
<tr>
<th>Day</th>
<th>Hours of Sunlight</th>
<th>Rainfall (mm)</th>
<th>Wind direction</th>
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From the information in the table above, plot a graph of hours of sunshine information (y-/vertical axis = hours of sunshine, x-/horizontal axis = days) on graph paper.

Plot a graph of rainfall information (y-/vertical axis = rainfall, x-/horizontal axis = days) on graph paper.
Answer the questions below:

(a) Which day was the sunniest?
(b) Which day was the wettest?
(c) Was the weather same in both weeks?
(d) How can you best describe week 1 and week 2?

SUMMARY

- There are different types of weather.
- We can measure weather conditions by using simple instruments.
- The rain gauge is used to measure rainfall.
- The wind vane is used to identify wind direction.
- Weather conditions can be recorded.

WHAT HAVE YOU LEARNT?

1. (a) How many types of weather conditions do we experience in Guyana?
   (b) Name them.
2. A rain gauge is used to measure _________.
3. It is very windy today. How can we tell in which direction the wind is blowing?
4. Collect information on the weather for a month and record it on a table.
A CLOSER LOOK AT WATER

Water can exist in the three states of matter on earth.

Sources of water that are solids are:

Snow: A large part of the earth’s surface is covered with snow (water in the solid form).
The earth’s surface also has water in its liquid form.

River

Lake

Water as a gas is water vapour.
CHAPTER 6 MATERIALS

PROPERTIES OF STATES OF MATTER

Look around your class. Look outside, too. What things do you see? Is everything the same?
SOLIDS

Pick up some of the things around you. How do they feel?

Can you pick up water in the same way that you have picked up a stone, a piece of wood, a leaf or even some sugar?

The things which you can pick up and hold in your hands are solids.

**Something to do**

1. Collect as many solids as you can and put them into a box
2. Take out some of these solids and put them into containers that have different shapes

Is there any difference in the shape of these solids?

What then can you say about the shape of solids?

Solids can be picked up and have a definite shape.
A closer look at solids
There are many solids around us. They are different from each other in many ways. Most of them are useful to us.

- Scotch tape
- cotton wool
- rock
- mirror
- glass
- feather
- spoon of sugar
- stone
- butter
- paper

Make a list of other solid materials that are useful to you and say how they are used.
LIQUIDS

You have noticed that some things cannot be picked up like solids. Liquids cannot be picked up like solids. They do not have a definite shape. Here are a few of them. They are liquids.

Something to do

Things you need

- Five containers with different shapes
- Disinfectant
- Methylated spirits
- Drink
- Water
- Kerosene oil

1. Line up the empty containers on the desk.
2. Pour the contents of one bottle containing a liquid substance into an empty container.
3. Repeat the activity until you have poured the same amount of all the substances into the different bottles.

What is happening? Why?

What can you say then, about liquids?

Liquids move and spread out easily. They take the shape of the containers into which they are poured. We can pour liquids because they flow.
A Closer Look At Liquids

Liquids are also different from each other. Let us look at some of the differences:

Some liquids are greasy
Some liquids are watery
Some liquids are sticky
Some are even thick

GASES

You have already learnt that some things around us are solids and some are liquids. You have learnt, too, that there are things around us which we cannot see. Have you ever felt something but did not see it, or have you ever seen what that thing does? Some of the things which we cannot see are called gases. The air is a mixture of many gases.
Look at the picture and talk about it.

We cannot see many gases but we can feel them and see the work they can do.

“Soilds, liquids and gases are the three states of matter.”

Everything around us is a solid, a liquid, a gas or a combination.

Matter is anything that has mass and occupies or takes up space.
Take a look at the picture above. When the solid ice melts, it changes into the liquid water. When water is further heated it changes into steam or water vapour. When liquid water changes into water vapour, we say that the water has evaporated.

When water is placed in a freezer ice is formed. When this happens we say that the water freezes.
Do you know what happens to a candle when it is lit?

The candle wax changes from a solid to liquid. We say the wax melts. Chocolate often melts when it is left out of the refrigerator.

**SUMMARY**

**Matter**

- Matter is anything which has mass and takes up space.
- The three states of matter are solid, liquid and gas.
- Everything around us is a solid, a liquid, a gas or a combination.

**Solids**

- They have a fixed shape. There are many different types of solid shapes.
- Some solids are hard, some are soft, some are smooth and some are rough.
- We can pick up solid things.
Liquids

• Liquids can be poured into containers and they can spread out easily.

• Liquids take the shape of the containers into which they are poured.

• Liquids can be different from each other. Some are sticky, some are thick, some are oily and some are even watery.

Gases

• We cannot see some gases.

• The air is a mixture of many gases.

What have you learnt?

1. Which of these is a solid – vinegar, rum or wood?
2. Which of these is hard - sponge, glass or cloth?
3. A solid has a definite ______________.
4. Classify these substances as either sticky, rough or smooth.

   sponge, lard, paste, grater, cotton wool, vaseline, fur

<table>
<thead>
<tr>
<th>Sticky</th>
<th>Rough</th>
<th>Smooth</th>
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</table>

5. Name three liquids which are watery.
6. Which of these is sticky - olive oil, vinegar, paint?
7. Solid, liquid and ______________ are three states of matter.
8. We cannot see some substances but we can feel them. They are called ____________.
9. Anything which has mass and takes up space is called ______________.
10. Classify these substances as solid, liquid or gas.

banana, essence, leaf, soap, disinfectant, cooking oil, yeast, brick, wind, mango, potato, egg, kerosene oil, mouth wash, oxygen

<table>
<thead>
<tr>
<th>Solid</th>
<th>Liquid</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

11. Which of these substances will change their state of matter when cooled or heated?

olive oil, plastic, metal (coin), wax, ice, banana, sugar, salt, water
CHAPTER 8 EARTH AND SPACE

SPINNING OF THE EARTH/ROTATION

The earth spins or rotates from west to east about an imaginary line called its **axis**. The axis runs from the North Pole to the South Pole through the centre of the earth. It takes 24 hours (one day) for the earth to make one complete rotation. When the earth is spinning, one side will always face the sun and the other side will be facing away from the sun. The part that faces the sun is having day time and the part that is facing away from the sun is having night time.

MOVEMENT OF THE EARTH AROUND THE SUN/REVOLUTION

As the earth rotates, it also travels around the sun. The movement of the earth around the sun is called revolution. One revolution of the earth around the sun takes one year or 365¾ days.
MOVEMENT OF THE MOON AROUND THE EARTH

As the Earth rotates and revolves around the sun, the moon revolves around the Earth.

The moon takes 29½ days to travel once around the Earth. This time is called one lunar month.
CHAPTER 9 ENERGY

LIGHT

Where does light come from

Look at these objects.

What do they all have in common?

Many things can give us light. The sun gives us great light. The sun provides light for the Earth. The sun is a star which is very far from the Earth. We get light from the stars and we get light from fire.

From what other objects do we get light?

The sun’s light helps us to see during the day. In the night we sometimes have moon-light. The stars are however too far away for us to see clearly with their light at night. We use electric bulbs or lamps to get light in the night.
HOW LIGHT TRAVELS

Light travels in a straight line from the source to the observer or the object. Light always travels away from its source.

Something to do

Name, draw and colour three (3) objects from which we get light.

Things you need

- Three pieces of cardboard about 28 centimetres square
- Candle
- Matches
- Dark space to work in

What to do

1. Cut a hole in each piece of cardboard.
2. Make a fold 3 centimetres at the bottom and line up the three pieces.
3. Use a weight (a piece of rock, or a piece of wood) to keep each piece from falling over.
   - The holes must be in a straight line.
4. Put a lighted candle at one end and look through the holes.
What have you observed?

Move the middle cardboard about 3 cm away to the side.

Can you see the candle flame? Why?

Do the same with the first or last piece of cardboard. Observe and record your observations.
FORMATION OF SHADOWS

I follow you around in the light, I say good bye to you in the night? Who am I?

Shadow

How is a shadow formed?

An object from which no light can pass through is called opaque. An example is our body. Since light cannot pass through it creates a dark area around the object called a shadow. Opaque objects create clear dark shadows.

Example:

Pictures showing shadows
Do all objects form shadows?

When light passes through an object a shadow cannot be formed. These objects are called **transparent objects**.

**Example:**

![Pictures of transparent objects](image)

### For you to do

Rewrite the following sentences correctly.

1. when light occur a source shadows an blocks light object from
2. that object through called not opaque let does an light is
3. do allow materials light some pass them to through
Reflection of light

Reflection occurs when light bounces off of an object.

All objects reflect light. If they did not, we would not be able to see them.

Activity

1. Look into a piece of flat mirror and observe the image of your face.
2. In class discussion, explain why you were able to see the image in the mirror.
3. Look again in the mirror.
4. Touch the right ear and observe which ear of the image is touched.
5. Repeat by touching the left ear.
6. Make and record observations and discuss this with your class teacher.
We all look at ourselves in the mirror.

What do we see?

Can you say what you see in the picture above?

We can see ourselves in a mirror because light bounces from us to the mirror and then from the mirror into our eyes. Any smooth surface that can reflect an image will behave like a mirror.
Summary

• Light is a form of energy.

• Light travels in a straight line away from its source.

• A shadow is formed when light does not pass through an object.

• Transparent objects allow light to pass through them.

• A mirror is a smooth surface that reflects an image.
CHAPTER 10 FORCES

MAGNETISM

What is a magnet?
A magnet is an object which will attract other objects that are made of iron or steel.

What is magnetism?
Magnetism is a force that can cause some objects to move.
Magnetic materials are those objects attracted by a magnet.

**Example:**

- nails
- paper clips
- safety pins and needles

Are all materials attracted by magnets?

Can you name some materials not attracted by magnets?

Materials not attracted by magnets are said to be non-magnetic.

**Example:**

- Wooden box
- Glass Shoe
- Rubber gloves
- Leaf
Something to do

Things you need

- Magnet
- Pins
- Pieces of paper
- Brick
- Shells
- Cloth
- Rubber
- Nails
- Iron filings
- Pieces of wood
- Erasers
- Tamarind seeds
- A leaf

1. Put the magnet near to each item like this

![Magnet](image)

2. Put the objects into two groups as shown below

<table>
<thead>
<tr>
<th>Picked up by magnet</th>
<th>Not picked up by magnet</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
Magnets attract magnetic substances towards them.

**What happens when the poles of magnets are placed near each other?**

**Something to do**

**Things you need**

- Bar magnets

1. Mark the north and the south poles of two magnets.
2. Put any two poles together.
3. Observe carefully what happens.
4. Repeat this with two other poles.
Every magnet has two ends called **poles**. One end is called the **North Pole** and the other is called the **South Pole**. This drawing shows how magnets attract and stick to other magnets when their opposite poles are facing each other. But two of the same poles will repel, or push away, each other.

**Activity**

**Things you need**

- Pencil
- Piece of string
- Bar magnet

a) Tie a magnet at its centre with a piece of string, the other end must be tied to a pencil.

b) Suspend the magnet by holding the pencil.

c) To the north-pointing pole of the suspended magnet, bring the north pole of the other magnet close to it and observe what happens.

d) Repeat c) using the south-pointing pole of the suspended magnet.

e) Make and record observations and discuss with class teacher.
The Earth behaves like a large magnet.

A suspended magnet will align itself in a north to south direction.

Law of magnetism

The law of magnetism states that like poles repel and unlike poles attract.
SUMMARY

- A magnet is an object which will attract other objects that are made of iron or steel.
- A magnet has two poles – north and south.
- Poles of a magnet exert more force than any other part of a magnet.
- The force that exists between two like poles of a magnet is called repulsion.
- The force that exists between two unlike poles of a magnet is called attraction.
‘Science Around Us’

is a series of six pupil’s books

with corresponding teachers’ manuals.

This series helps pupils to develop and apply process and content skills

as they explore and come to understand their environment.

Each pupil's book contains review exercises which

can be used to evaluate

pupil’s progress.

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