

NATURAL SCIENCE AND HEALTH EDUCATION



GRADE 5



Natural Science and Health Education, Grade 5

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Published: Hampton, Virginia: Hampton University Press

ISBN 1-9327888-15-8

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Introduction

Why study Natural Science and Health Education? What's in it for you? After all, you are just a fifth grader with far more important things to consider.

Do you know that as you are reading these words, some scientists around the world are working to find a cure for AIDS? Other scientists are experimenting to discover new ways to improve our environment. Who knows, perhaps after completing your fifth year and studying Natural Science and Health Education, you may begin to think about becoming a scientist too. Namibia's future scientists are sitting in your classroom at this very moment. Consider the possibly.

Natural Science is about you and the world you live in.

Health Education is about you and wellness.

This textbook is written in a way that will encourage you to share your thoughts with your classmates. This is called **collaboration**. Scientists around the world work in collaboration with each other because they understand the need to put as many 'good brains' as possible together when dealing with scientific problems.

When collaborating, it is important to remember several key concepts.

- All ideas are to be valued and considered.
- Think time is important. When collaborating with your classmates in group discussions, allow time for 'personal think time.' Some learners can come up with new ideas very quickly and others need time for reflection. Wait time ensures that each person will be prepared to respond to questions.
- Sometimes a question will be answered with another question. Scientists love this. If it happens during your group discussions, assign a person in your group with the role of recorder. The recorder will write the question down for the group to consider at a later time.
- Make sure everyone in the group participates.
- Make sure your scientific observations are written in your journal.
- Make sure you complete the home assignments so that your parents understand what you are learning.

Each unit is organized using the **K-W-L** Strategy. This strategy is used by learners around the world.

K asks **"What do I already know"** about the topic. So when you begin a new unit look at the first questions and try to answer them. Remember, you are not expected to know all of the information. As a matter of fact, sometimes you will learn that what you thought you knew is not scientifically accurate.

W asks **"What do I want to learn"** about the topic. This strategy will encourage you to be your own 'teacher' while you are learning new information. You should try to answer this question as you work through the unit and learn new ideas. Sometimes, you may have to do independent research to find the information that answers your question. When you do this, you are thinking like a scientist!

L asks **"What did I learn"** about the topic. This question helps you to assess your own learning. Each year in school, you are building a strong knowledge base of new information. If you study well, participate in collaborative learning, you will learn things that your parents and older siblings may not know because of new scientific discoveries. After completing each unit, use this strategy to recognize your new learning!

Good studying, future scientists; Namibia and the world thank you today!

The Natural World is...



Unit 1 • HEALTH EDUCATION

Unit 1 • Chapter 1: Disease

Guiding Question- K: What Do I Already Know?

Think about this question and discuss possible answers with your team mates:

What are the ways we can prevent (stop) the spread of disease and have a healthy lifestyle?

W- What Do I Want To Learn?

In your journal, make a list of topics you would like to know more about. Some of these topics may be discussed in this chapter. You can research these topics on your own or, if your science teacher assigns a research paper, you have several topics already.

Discuss the following with your team mates.

Have you noticed that the word disease is made up of the prefix, **dis-** and the word, - **ease**?

The prefix, *dis-* means **not**. The word - *ease* means **comfort or freedom from difficulty**.

Using these definitions, decide on a meaning for disease that uses the same words and write it in your science journal.

Disease is a condition of the body that causes it not to work properly. A body may become diseased because it is exposed to an unhealthy environment or because its owner (you) treats it badly. In this chapter, you will learn about some common diseases and how to live a healthy lifestyle that will prevent disease.

To better understand the ways to prevent disease, let's look at some common diseases and the ways they are spread. But before we do, let's look at the two types of diseases. They are **infectious diseases** and **non-infectious diseases**.



These are big words but they are really easy to understand. Infectious (in fec tious) diseases are also called **communicable** (com mune ic able) diseases because one person can spread these diseases to another person. The other type of disease is called non-infectious diseases. These diseases happen because people live an unhealthy lifestyle over many years. Unhealthy lifestyles, such as smoking cigarettes, getting too little exercise, and eating unhealthy foods, can cause diseases like heart disease and cancer.



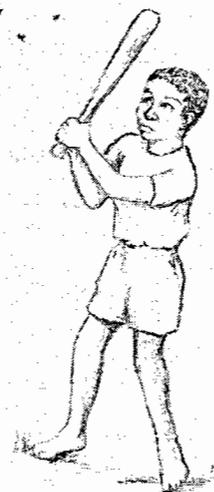
Malaria, TB, STDs and HIV/AIDS

The most common infectious diseases in our area are malaria, TB or **tuberculosis** (tu ber cu lo sis), Sexually Transmitted Diseases (such as genital herpes or warts, gonorrhoea), and HIV/AIDS.

Remember infectious diseases are those diseases that spread from one person to another. Sometimes, when people are sick, they will say that someone else "gave them a bug". Well, in the world of science, that can be a fact. That "*bug*" is real small and scientists call them germs or **pathogens** (path o gens). A person can spread pathogens to other people, without knowing it, through really common things, like sneezing, shaking hands, and using some one's eating utensils. The common cold and tuberculosis are examples of diseases that can be spread in these ways.

All pathogens are not created equal!

Pretty simple right? It is fairly simple if you remember that the pathogen or germ in malaria is different than the one that causes other diseases like TB, STDs or HIV/AIDS. And different pathogens are spread in different ways. The pathogen that causes the disease malaria is spread by the bites of certain kinds of mosquito, while the pathogens that cause STDs and HIV/AIDS are spread by people sharing body fluids.



ACTIVITY

Blow up a dark coloured balloon and tie off the end. Put a thin layer of flour into a tin baking pan or similar container large enough for you to place your hand flat on the bottom. Place each hand into the flour (do not touch anything or clap your hands). Once all of your classmates have put their hands in the flour, pass the balloon to each other using both hands to grab it (do not hit the balloon but touch it with both hands and pass it).

Notice, as each learner touches the balloon, he/she is leaving their hand print on the balloon. This experiment shows how germs can be spread from one person to another.

Reflection

Discuss the following with your team mates.

1. After you have passed the balloon to each team member, do you think the last person has more flour left on his/her hands? Explain why or why not.
2. On what types of surfaces (think mouth, finger and hand prints) could people pass pathogens?
3. How could one of your team mates have stopped the spread of 'flour' in our experiment?

Malaria is caused by certain kinds of mosquito sucking up pathogens from a person infected with malaria and carrying it until it bites an uninfected person. The mosquito bite injects the pathogen into the blood stream. This is how malaria is transmitted from an infected person to a non-infected person.

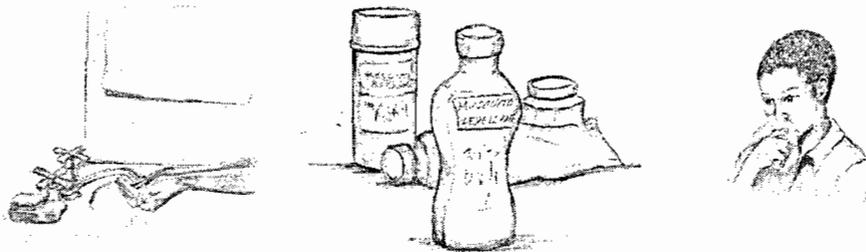
The pathogen that causes tuberculosis is **bacteria** that usually attack the lungs. The symptoms are similar to those of the common cold. This disease is spread from one person to another just like a cold: sneezing, coughing, or sharing the same glass or other eating utensils.

The best way to prevent the spread of malaria is for you to protect yourself from mosquito bites with bed nets, insect repellent with DEET, or avoid walking in mosquito infected areas during dusk or dawn. Spraying heavily infected areas with environmentally friendly insecticides (insecticides) is another way to stop the spread of malaria. Insecticides are poisonous to insects like mosquitoes.



Spraying Insecticide

The same is true for TB. To prevent the spread of TB, stay clear of people who are sneezing and coughing. If someone sneezes and they do not have TB, then there is no reason to be concerned; but, it's hard to tell by looking at someone if they are infected with TB or not. So always be cautious!



HIV (Human Immunodeficiency Virus) is the unique **virus** that causes AIDS (Acquired Immunodeficiency Syndrome). A virus is a special kind of pathogen. People can have HIV in their body for many years and not know it. People who are HIV infected can then spread the disease to others without ever knowing they have it. When people start to get sick and show signs and symptoms on their bodies, they have moved from just having HIV to having AIDS. Because AIDS needs HIV to survive, we often call the disease HIV/AIDS or just AIDS.

HIV/AIDS is spread by one person passing one of three HIV infected body fluids to another person. Two of the three fluids are sexual fluids (semen & vaginal secretions) and the third is blood. Even though these fluids are most often passed during sex any contact with them or with blood is dangerous and must be avoided. There is no cure for HIV at this time. Once you are infected, you carry the virus. Without expensive medications, the HIV will eventually develop into AIDS.

HIV is not the only disease spread by the exchange of bodily fluids, Sexually Transmitted Diseases (STDs) like genital herpes or warts, gonorrhoea, and Chlamydia, are also spread the same way. Some STDs can be cured 100% like gonorrhoea and Chlamydia; while others will flair up and need to be treated for the rest of the person's life. If left untreated though, many STDs may cause the person, man or woman, to not be able to have babies.

Discuss the following with your team mates and list all of your answers.

- What things DO NOT spread the HIV virus?

The virus that causes HIV cannot live outside of the human body. This virus loves being inside a body. Saliva from kissing or spitting does not spread HIV. Touching someone's sweat or tears does not spread the virus. Touching someone with AIDS does not spread HIV, as long as there are no open wounds. Sitting next to someone who is HIV infected or living with someone does not spread it.

ACTIVITY

Fill in the blanks using these terms: pathogen, HIV, AIDS, symptoms, people, fluids, blood, communicable, chronic.

1. HIV + _____ = AIDS
2. HIV is spread by the sharing of _____
3. The _____ that causes HIV/AIDS is a virus
4. Infectious diseases are also called _____
5. Three primary body _____ can transmit HIV from an infected person to a non-infected person.

Think Smart-Live a Long, Healthy Life

When two people who do not have HIV/AIDS have sex, there is no risk of getting HIV/AIDS. When two people have sex and they do not know if the other has HIV/AIDS, then it is very scary. Young people have their whole life to live if they make the smart choices for themselves while they are young. One bad decision could put an end to your life or give you a STD for life.

Discuss with your team mates: What are the best precautions for maintaining a healthy body?



Since no one can tell just by looking whether or not a person has HIV, it is best to use the same precautions with everyone.



Suppose a classmate falls and begins to bleed. Should you wipe the blood off with a tissue? If you answered no, you are correct. If you have a tiny cut on your hand, you risk having their blood enter into your body through your open wound. The best way to help this friend is to give them the tissue and tell them to wipe their blood away. The

same thing is true if your friend suddenly has a nose bleed. Do not touch them, but tell them to pinch their nose and help them walk to the school office.

The nurse in the school office will use **latex gloves** to help your friend. The same is true for adults who are having sex. They can not tell if a person has HIV by just looking at him or her. They need to use a barrier to prevent exchanging body fluids that carry the pathogen. Condoms are a good barrier for adults who are having sex.

The best precautions to prevent the spread of HIV/AIDS, however, are not having sex at all or touching the blood of another person.

Remember, touching blood from other people, even our family and friends, can cause us to become sick. Always provide a barrier between you and the blood.

These steps, avoiding exchanging bodily fluids and touching blood, are called **universal precautions**. Universal precautions mean to ALWAYS do the same thing, the same way with everybody. Even when cleaning up blood off the ground or from objects like chairs or tables, ALWAYS wear latex gloves to provide a barrier to keep the blood from touching your skin.

ACTIVITY

In teams of five, create a short role play using one of the cues provided below. In your role play every person in the group must have a part in the scene. The lead is only the beginning of the role play, so you and your team mates must complete the story and act it out.

Cue #1. Your favorite music star is reported to have AIDS and everyone says he is bad but you find out he got HIV from a blood transfusion long ago.

Cue #2. You read that your favorite actress is saying that people with HIV/AIDS are spreading HIV by kissing people.

Cue #3. A fellow student is rewarded at school for helping someone who was hurt and bleeding while using universal precautions (barriers) to protect against HIV/AIDS.

Cue #4. A good friend is being criticized by other students for saying that HIV/AIDS is spread by unprotected sex and so she is not going to have sex until later in life.

Cue #5 You have heard your older brother/sister saying that sex with a person who has not had sex before (a virgin) is a cure for HIV/AIDS.

ACTIVITY

Complete the following ACTIVITY at home with your family. Put an "M" next to the statements that you think are Myths. Put an "F" next to the statement you think are Facts.

1. ____ a person can get HIV/AIDS from sitting next to a person who has it.
2. ____ a person can get HIV/AIDS by having sex with a prostitute.
3. ____ an unborn child can get HIV/AIDS if his/her mother is infected.
4. ____ household insects such as bedbugs and cockroaches can be HIV/AIDS carriers and give the disease to people.
5. ____ if a mosquito bites a person with HIV/AIDS and then bites someone else, the second person it bites may get HIV/AIDS.
6. ____ women with HIV/AIDS may sexually transmit it to men.
7. ____ you can get HIV/AIDS by using a phone which was just used by someone with HIV/AIDS.
8. ____ you can get HIV/AIDS if a person with HIV/AIDS coughs or sneezes near you.
9. ____ you can get HIV/AIDS from a toilet seat.
10. ____ if you kiss a person with HIV/AIDS on the cheek, you can get the disease.
11. ____ you can get HIV/AIDS by drinking from the same glass as a person who has it.
12. ____ if a person with HIV/AIDS cries and his/her tears touch you, you can get HIV/AIDS.
13. ____ you should avoid having a blood transfusion so that you won't get HIV/AIDS.
14. ____ persons who have sex with many different people are at risk of getting HIV/AIDS.

15. ___you can get HIV/AIDS by eating food which is cooked by someone who has HIV/AIDS.
16. ___you can get HIV/AIDS from swimming pools.
17. ___you are likely to get HIV/AIDS if you sleep in the same bed as someone with HIV/AIDS.
18. ___you can get HIV/AIDS by hugging a person who has it.
19. ___schoolchildren can get HIV/AIDS by sitting next to or playing football with another student who has HIV/AIDS.
20. ___a person can get HIV/AIDS by having sexual intercourse with an infected person.
21. ___brothers and sisters of children with HIV/AIDS usually also get HIV/AIDS.
22. ___doctors and nurses who treat HIV/AIDS patients often get HIV/AIDS too.
23. ___having sex with a person who has never had sex can cure HIV/AIDS.

L – What Did I Learn?

In your journal and without consulting the textbook, list all of the things you have learned. You should write each new fact in a sentence or two, so you will have enough details to help you prepare for a test your teacher might give you.

After you have completed listing what you remember from the chapter, review the chapter and list any facts that you missed under the heading: REMEMBER THIS TOO!

Unit 1 • Chapter 2: Fitness and the Human Body

Guiding Question- K: What Do I Already Know?

Think about the following statement and write a paragraph in your journal. The supporting sentences of your paragraph should include any details you think are accurate.

Adequate rest and physical activities contribute to health in terms of blood circulation, heart diseases, muscles and the skeletal support system.

ACTIVITY

1. Choose a partner.
2. Designate one of you "A" and the other partner "B"
3. If you are A, locate B's pulse at the wrist (two fingers palm side up, thumb under wrist).
4. Once you have found a pulse at the wrist, count the number of beats for 15 seconds. Write the number on the Pulse Rate Recording Form.
5. Multiply that number by 4 for the resting pulse rate.
6. Write the resting pulse rate on the form.
7. Reverse roles: **B** take **A's** pulse.
8. Once you have found a pulse, count the number of beats for 15 seconds. Write that number on the form.
9. **A**, do deep breathing as a way to relax.
10. After **A** has been deep breathing for 15 seconds, **B** take **A's** pulse once again. Write the number on the form in the space provided.
11. Reverse roles again. This time, **B**, run in place.
12. After **B** has exercised for 30 seconds, **A** take **B's** pulse once again. Write the number on the form in the space provided.

The numbers for resting pulse rate, deep breathing rate, and exercise rate will vary in most cases.

After you have completed the experiment, discuss the following questions with your team mates:

- When your pulse goes up, how does your body respond?
- When your pulse goes down, how does your body respond?
- How do fitness activities like running affect the human body?
- How does deep breathing affect the human body?

Pulse Rate Recording Form

Number of Heart Beats: **Partner A** _____ **Partner B** _____

Resting Pulse Rate (count for 15 seconds X 4)

Partner A _____ **Partner B** _____

Pulse Rate after Deep Breathing

Partner A _____

Pulse Rate after 30 Sec of Exercising

Partner B _____

Partner A

Resting Pulse Rate _____ Relaxing Pulse Rate _____

Difference was _____ beats/per min

Partner B

Resting Pulse Rate _____ Exercising Pulse Rate _____

Difference was _____ beats/ per min

Now look at the following pictures. Ask the same four questions again.

Plenty of rest



Too little rest



Clogged Artery



Open Artery



W – What Do I Want To Learn?

The body you have today is the body you will have for the rest of your life. You have learned that rest and exercise are important. Although you are just in your fifth year at school, what are some things you want to know about keeping your body healthy?

Our bodies are like a combination of machines. Our brains are like computers and, from the neck down, we are like cars. Just as all machines need to be tuned to keep them running properly, the human body needs the proper foods for fuel and regular exercise to be fit.

Exercise helps the body's systems, like respiration and circulation, function efficiently. The clogged artery in the illustration was probably in the body of a person who eats a lot of fatty foods or smokes. The unclogged artery was probably in the body of a person who has a healthy diet and exercises.

Exercising helps the body to strengthen the muscles in and outside of it. Did you know that the heart is a muscle too? Regular exercise improves the heart and lungs, helps burn off body fat, and increases energy.

Your body also needs time to rest. While you are dreaming, your brain is busy filing everything you saw or did during the day. It knows you may need to remember them again! Many of your body's major organs and systems (respiration, circulation, etc.) are hard at work. Your heart, which has been pumping blood throughout your body all day, gets a nap by slowing down. The digestive system is chopping up the food you ate earlier and taking out the **nutrients** the body needs when you wake up.

If you play football, jump rope, run around the playground at school or cycle to school, you are getting a good daily workout.

If you watch a lot of television or play video games, you may not be getting the proper amount of exercise for a person your age. Turn them off and play outside in the warm, wonderful sun. Your body will love you and be good to you for a long, long time.

L – What Did I Learn?

Review the paragraph you wrote before you read this chapter. Now that you have read about the importance of rest and exercise for good health, what would you change or add to your paragraph? Rewrite your paragraph using the new information you have just learned.

Adequate rest and physical activities contribute to health in terms of blood circulation, heart diseases, muscles and the skeletal support system.

Reflection

Discuss the following with your team mates:

Think about a day you came to school and you did not have an adequate night's rest. How did your day go? Were you grouchy? Sleepy? Forgetful?

Unit 1 • Chapter 3: Hygiene

Guiding Question- K: What Do I Already Know?



Use the above pictures to discuss the following:

1. Which person might have difficulty with others at school? Why?
2. Pretend that you are the teacher. What kind of hygiene tips would you give the learner who is obviously not wearing deodorant?

W- What Do I Want To Learn?

What do I need to do to be healthy and attractive?

Good hygiene also helps us to be healthy. Each day, the skin cells on the body die and need to be wiped off. Bathing is one way to rid the body of these dead cells. Scrubbing the skin with a clean rag is another. People can develop skin rashes when dead skin cells build up.

If you want:

- Clean smelling breath
- To look good
- To smell good
- To stay healthy
- To be cool

You should:

- Brush your teeth daily
- Comb your hair
- Shower daily
- Wash hands frequently
- Wear clean clothes

Some types of bacteria live in our mouths. They love the warmth and wetness. The odour you smell before you brush your teeth each morning is evidence of these bacteria. When you do not brush your teeth frequently, these bacteria begin to grow and cause an infection of your gums called **gingivitis**. Gingivitis weakens the bone and muscle around your teeth. If left untreated by a dentist, your teeth could begin to fall out. Brushing and flossing your teeth on a daily basis helps to keep your mouth clean and your gums healthy.

L – What Did I Learn?

Working with your team mates, create a role play about the following situation.

Johann is a fairly new student at school. His uniform is often dirty, his hair, oily and unwashed. On occasion, he has had a distinct body odour. He has a great sense of humour and seems to be a pretty decent guy. What could you do to help him?

Unit 1 • Chapter 4: General and Personal Safety

Guiding Question- K: What Do I Already Know?

ACTIVITY

Ask each member of your family to describe an accident they have had (breaking a drinking glass, dropping the evening meal, etc). List three of those accidents. For each accident, describe what happened and then list the ways each accident could have been prevented.

Accidents usually happen when we are not focusing our attention on what we are doing. Some forms of crimes are just like accidents.



Sometimes bad people come into our neighbourhood and want to harm us. These people wait for times when they feel we are not being alert and watchful. Dark areas and places with few people watching are ideal for crimes to take place. But we can outsmart them by walking in well lighted places, staying in a group of friends, and reporting weird people hanging around the play areas to your family, teachers, or the police.

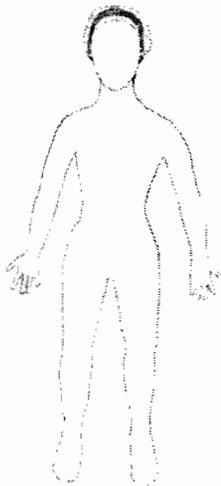
When walking in a city's downtown, stay alert. Sometimes being in a crowd can be more of an advantage for a criminal. Snatching your bag or your necklace is easier to do in a crowd. So when walking in a crowd, know who is around you. For example, if you are with your parent at the ATM machine, look around to make sure no one is watching you. Should you see someone, alert your parent.

W – What Do I Want To Learn?

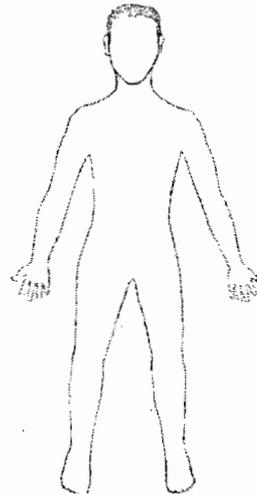
Sometimes you may be unsure what to do if you feel threatened. Can you recognize situations in which you are in danger?

ACTIVITY

Picture outlining a child’s body with sequential numbers at the 1 (head), 2 (neck), 3 (shoulders), 4 (chest), 5 (stomach), 6 (buttock), 7 (genitals), 8 (thigh).



- 1-head
- 2-neck
- 3-shoulders
- 4-chest
- 5-stomach
- 6-buttock
- 7-genitals
- 8-thigh



Where are people allowed to touch you? Place the word good or the word bad next to the number of the body part.

- Family
- 1. _____
 - 2. _____
 - 3. _____
 - 4. _____
 - 5. _____
 - 6. _____
 - 7. _____
 - 8. _____

- Friend
- 1. _____
 - 2. _____
 - 3. _____
 - 4. _____
 - 5. _____
 - 6. _____
 - 7. _____
 - 8. _____

- Teacher
- 1. _____
 - 2. _____
 - 3. _____
 - 4. _____
 - 5. _____
 - 6. _____
 - 7. _____
 - 8. _____

Which areas (numbers) are strangers allowed to touch?

If someone touches you in a bad place what should you do? If you are at home, tell your family right away, even if this person is another family member and they tell you not to tell anyone. If you are at school, tell your teacher right away.

What would you do if a person in a car offered to give you a ride or asked you to approach the car because he/she needed directions?



If you are on the play ground run to the nearest teacher or adult and tell them what happened. What should you do if you were walking home?

L- What Did I Learn?

ACTIVITY

Complete this activity at home with your family.

Share what you have read about in Natural Science and Health Education with one of the adults in your family. Ask them "What should I do if I have been touched in a bad way by someone our family knows and trusts? "



Create a route of 'safe homes' you can go to if you have problems with people while walking home. Safe homes may be the homes of friends or other family members who live along the way to and from school. One of these places may be a store that is close to your home. Add any other topics you want to learn more about or discuss with your family.

Reflection

At home, look at yourself in a mirror. Look at your eyes, your lips, your shoulders, your arms, just look at you. We believe that in the WHOLE universe, no one looks exactly like you. No other person is YOU! Think and then say, "Hey, I *am* going to take care of YOU!

Unit 1 • Chapter 5: Community Health

Guiding Question- K: What Do I Already Know?

Discuss the following with your team mates.

1. Where does your family go for its health care needs?
2. Who are your family's primary health care providers?

As a country, Namibia is concerned about the health care needs of its people. **Primary Health Care (PHC)** is an essential health care made available at a cost the country and community can afford. Everyone in the community should have access to it and everyone should be involved in helping to establish a community network. The role of PHC is to provide the following services:

- Promotion of **good nutrition** and adequate safe water
- **Maternal and child care**
- **Immunization** against major infectious diseases
- **Education and training** of community health workers
- **Community participation** in health and social matters

The strength of PHC is the involvement of members belonging to certain **key organizations**. Key organizations support the PHC by providing volunteers and distributing important information. **Workshops** and **conferences** are held to inform community members about training opportunities and the importance of the program. Volunteering members are trained as **Community Health Workers** to help deliver the PHC program to remote areas.

The **Maternal and Child Health** program is an important part of the PHC program. The aim of the program is to provide information on: nutrition education, immunizations and treatment against common diseases.

Reflection

Write a paragraph that explains why you think the PHC has a special program called the Maternal and Child Health. Use the sentence in the box below as your topic statement. Then write four to five sentences that explain why.

The Maternal and Child Health program is an important part of the PHC program.

Be prepared to read your paragraph to the rest of your team mates. As you listen to your team mates read their paragraphs, listen for explanations that are:

- similar to yours
- different from yours

W – What Do I Want to Learn?

Although you may have seen PHC and other community health workers, you may not have thought about all of the ways in which they help to protect the health of your family and your community. As you complete the activity below, think about why each service is important to you.

ACTIVITY

Part I: Survey your family or nearby neighbours and find out which community health services they use. Make a list of those services to share with your classmates.

Part II: For the next few questions, use your health care experience and your reading to help you answer each one. You may need to research the internet or visit a local community PHC to get brochures to find answers. Write each of your answers in your science journal.

A. Children's Weight

1. Why is it important to weigh children?
2. Does a heavier child necessarily mean he/she is healthier? Explain.

B. Vaccination

1. Why is it important to vaccinate children?
2. Against which common diseases are children vaccinated in Namibia?
3. What will happen to children if they are not vaccinated?
4. Explain, with an example where appropriate, the importance of keeping a child's clinical card.

C. Health Education

1. Describe the information role of PHC program.
2. Why is it important to have community workers as part of PHC initiative?

D. Dirty Water

1. Think of ways that dirty water could be purified for household consumption.
2. Why is important to have clean water for personal use?
3. How can PHC program help improve the provision of clean water?

L- What Did I Learn?

ACTIVITY

You are going to create a written report that will help you summarize the information you have gathered by answering the previous questions. Use the following as an outline to help you write your report. The topic sentence for each paragraph has been provided for you.

Introductory Paragraph

Healthy communities are those with services that support the people who live in them.

Add four to five sentences that name and give one example of specific services needed to have a healthy community.

Paragraph 2

The PHC trains community health care workers.

Add four to five sentences that explain the services of community health care workers.

Paragraph 3

The Maternal and Child Health program helps mothers learn how to care for their children's health.

Add four to five sentences that name specific services needed provided by the Maternal and Child Health program. Be sure to include information about its immunization program.

Concluding Paragraph

Even though we are fifth year learners, we can help promote good health in our school and home communities.

Add four to five sentences that give at least two different ways a learner your age could help good health at school and at home.

Unit 2 • SUNLIGHT

Unit 2 • Chapter 1: Sunlight in Our Daily Life

Guiding Question – K: What Do I Already Know?

Discuss the following with your team mates.

Create a list that you will share with the entire class.

1. Why is sunlight important to all forms of life on Earth?
2. How does the light and heat from the sun reach the Earth?

ACTIVITY

What you need:

1. A box with a small hole in it.
2. A flashlight or an electric bulb.
3. A meter ruler or measuring tape
4. A watch or clock
5. A friend or any other person to help you.

What to do:

- (a) Switch the flashlight on and put it in a box with the small hole facing the wall.
 - What do you see? Write your answer in your book.
- (b) With the help of a friend, measure your height.
 - Go outside in the sun and ask your friend to measure your shadow. Do this at different times of the day (early in the morning, at noon, in the late afternoon).

W- What Do I Want To Learn?

1. What do shadows tell us about time?
2. How does the sun give us energy?

The sun is our Earth's source of light. The Earth **orbits** the sun every 24 hours and, as it does, locations around our world change from morning to night. The direction and the length of the **shadow** depend on the position of the sun in the sky. The shadow is always formed on the side opposite to the position of the sun.

Shadows can be used to indicate time, as people in the villages did in the past. For example, when the shadow is very short, it indicates lunch time in the Oshiwambo homestead. This corresponds to the clock time of 12h00 to 13h00. The change in the direction of the shadow would indicate the difference in morning and afternoon hours.

The sun is a big burning ball of gasses, mostly hydrogen and helium. The sun is really a star and it sends out an enormous amount of energy. The sun's inner core produces energy by **nuclear fusion**. Only a small part of the solar energy (or the sun's energy) that is generated reaches the Earth; this energy passes through the Earth's atmosphere in just eight minutes.

Solar energy travels to Earth at a speed of 186,000 miles per second. This is known as the **speed of light**. Though light is all around us, when we focus light as we did in our first experiment, it travels in a straight line.

ACTIVITY

Obtain a very hard circular cardboard, a short pencil and glue. Glue your pencil at the centre of your cardboard with the sharp point upward so that it stands perfectly straight. Position your setup in the sun where it will not be interfered with anytime of the day. Mark the length of the shadow made by the pencil on a sunny day. Return after every two hours to observe any change in the position and the length of the shadow each time mark its position and record the time. Record your data and report to the class how your setup can be used to tell the time.

What else can be determined from these measurements?

You have just made an instrument called a **sundial**. Sundials are very old instruments, used first by man as a tool while hunting. Man used it to help him know the time to turn back so that the sunset and the darkness could not find him in the forest.

Imagine sundials were like wrist watches to our ancestors!

ACTIVITY

Using the information from your homemade sundial, circle the data closest to the times you go to and return from school.

What does the sun symbolize in the Namibian Flag?

ACTIVITY

What you need:

1. A globe or a ball with stick through it
2. A flash light

What to do:

Ask another team mate to hold the globe or the ball.

1. Ask one team mate to shine the flashlight beam in one direction.
2. Place the globe or the ball in the light while rotating (turning the globe/ball slowly) and (walking around the flashlight) revolving the globe/ball.

Relate your findings to the sun and the Earth and write them in your exercise book. Then, share your findings with the rest of the class.

The Earth revolves around the sun and, at the same time, it rotates around its **axis**. It takes a year (365 days) for the earth to finish one complete revolution around the sun and a day (24 hours) to complete one rotation around its axis. The side of the Earth that is facing the sun during a rotation is in daytime and the one with the shade is in night time.

Also, while the Earth is revolving, it is summer for the part closest to the sun. The complete revolution causes the seasons – spring, summer, fall and winter – to change.

L – What Did I Learn?

You and your team mates will repeat the experiment you just completed. If you are using a ball instead of a globe, assign each team member a continent to draw and stick each one on the ball in the correct place.

1. Rotate (turn the globe slowly) and revolve (walk around the flashlight) the globe while shining the flashlight in one position.
 - a) When it is daylight in North America, what time of day is it in South America?
 - b) When it is night time in Africa, what is happening in Asia?
 - c) When it is day time in Europe, what time of day is it in Africa?

2. As the globe is revolving, if it is summer in North America, what season is it in Africa?
- If it is winter in Europe, what season is it in Asia?
 - If it is summer in Africa, what season is it in Antarctica?

When you have completed your experiments, select one of the questions above and draw a diagram that explains your results.

Reflection

- Is the sun just a big burning ball or is it solid at some point?
- If the sun is just a big burning ball, could it eventually burn itself out?
- What is nuclear fusion?
- Do the seasons change at the North and South poles?
- What causes a desert to form?

Unit 2 • Chapter 2: Heat and Light

Guiding Question – K: What Do I Already Know?

If you place two objects in the sun for the same length of time, will their temperatures differ? Explain why this is or is not so.

ACTIVITY

What you need:

1. Two laboratory thermometers
2. A black and white paint or one black paper and one white paper.
3. Two plastic cups

What to do:

- Paint one cup black and the other white.
- Fill the cups with equal quantities of water
- Cover the black cup with the black paper and the white cup with the white paper
- Insert a thermometer into each cup
- Put the two cups in the sunlight for 30 minutes

Questions

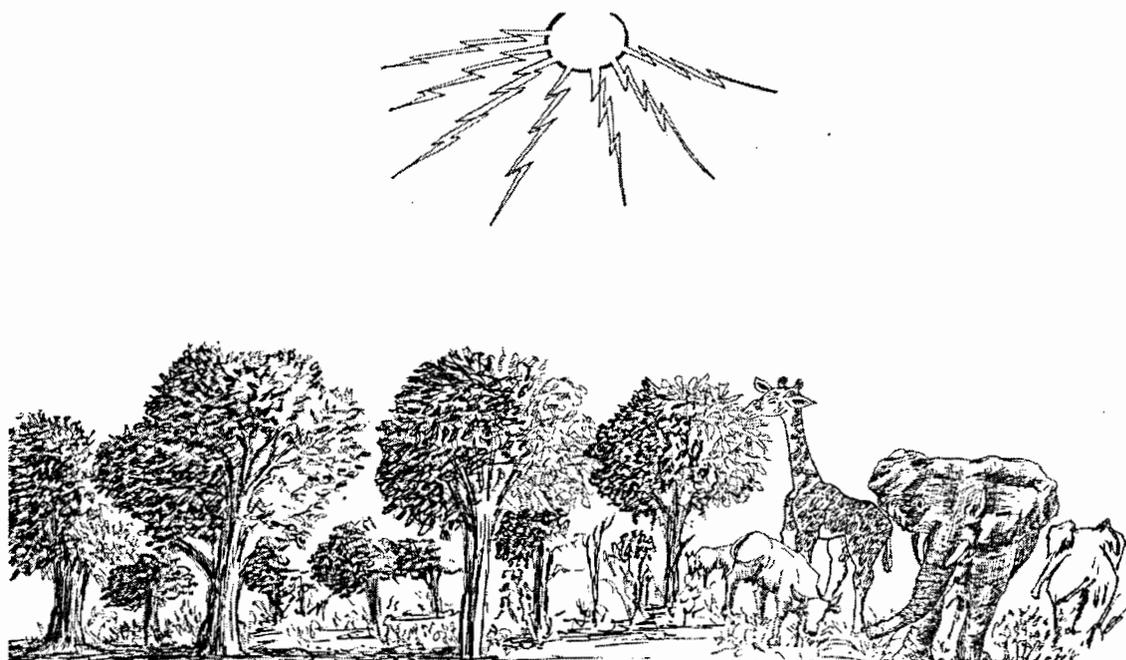
1. Which cup had the highest temperature? Suggest the reason for your answer.
2. Which cup absorbed the heat energy from the sun the best?

The black cup has the highest temperature; therefore the black cup absorbed the heat energy the best. The two cups received the same heat energy from the sun but the white cup **reflected** the heat it did not **absorb** it. Based on this information, what do you think would happen if you repeated the same experiment with a pink cup and a brown cup?

W – What Do I Want To Learn?

The sun provides both heat and light. How do the sun's heat and light impact our environment?

The sunlight provides enough energy to cause **evaporation** of water, but it can be too hot for grazing animals. Grazing animals stand under tree shadows when it is too hot until the sun goes down. All humans must be careful of overexposing our skin to sun. Too much sun is not good for our skin and **ultraviolet radiation** may cause **skin cancer**. Looking directly to the sun is also dangerous and could cause **blindness**.



Discuss these questions in groups and your group leader should report back to the class.

1. Hang washed clothes in the sun to _____ by the heat from the sun.
2. Why do animals stand under the trees when the sun is very hot?
3. What happens to the plants if the sunlight becomes too much for them?
4. What effect does too much sunlight have on human and animals?

Reflection

Sunlight is both a good thing and a bad thing for all living forms on Earth.

Using the information you have learned in this unit, write a paragraph that explains the statement above and give examples that support the statement. It is o.k. to use the statement as your topic sentence.

Research Topic

You can research this question in a science book, an encyclopaedia, or on the Internet. Find information that will help you answer the following questions:

1. What use do green plants have for sunlight?
2. How is this helpful to humans?

ACTIVITY

You need:

- A fresh leaf
- A steel spoon
- Ice Cubes in a metal cup.
- A metal cup of wet sand or soil.
- A candle or a hot plate.

What to do:

1. Hold the fresh leaf a few centimetres above the candle or a hot plate for a few minutes. Make sure the leaf does not burn. Note what happens to the leaf.
2. Hold the spoon at the same position as the leaf. Note what happens to the spoon.
3. Hold the cup with ice cube in it and the one with the wet sandy soil in it above the candle or place them on top of the hot plate for a few minutes. What happens to the ice and the sand?

When a fresh leaf and the wet sandy soil are heated for some time, they lose the water in them through the process of **evaporation**. Evaporation, or the removal of water, causes the object to dry. If the leaf is kept in a lot of heat for a long time, it burns.

The steel spoon on the other hand becomes hot until you are not able to touch it any more. It absorbs the heat. When the ice cubes are heated they **melt** to form water. Different substances behave differently to heat.

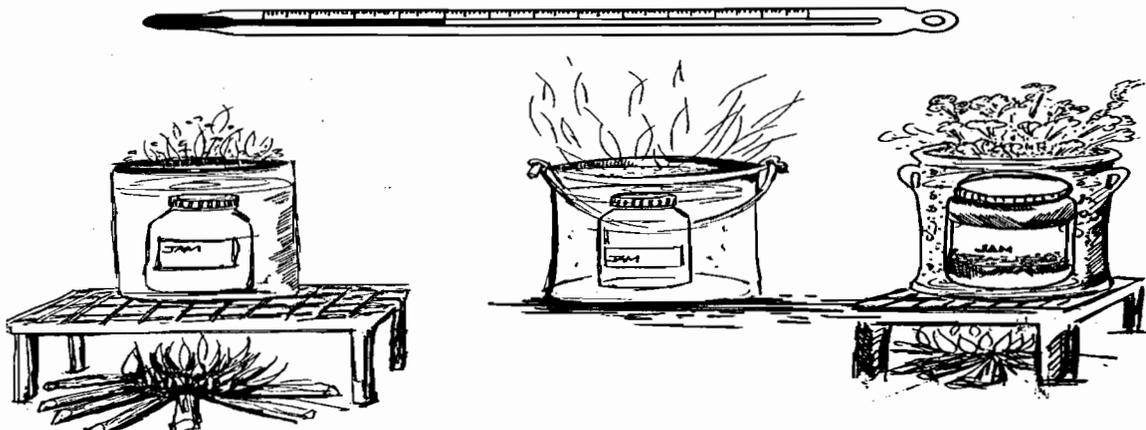
Reflection

1. What do you think would happen to the water in a cup if the cup remained on the hot plate for a long time?
2. What effect does the heat from the sun have on your environment?
3. Make a list of all the sources of heat and light that you use at home.

ACTIVITY

With the help of the experimental results, discuss how the heat from the sun effects our environment, emphasizing its effect to plants and animals.

Substances **expand** when heated and **contract** when cooled. When these substances are heated, their **particles** move about very fast requiring more space as they expand. If a spray can is put into the fire, the gas in the can will expand and the can will explode. The liquid in a thermometer expands when heated indicating a rise in temperature. The liquid will contract when cooled indicating the decrease in temperature. The tightly closed jar's lid will expand when put in hot water, making it easy to remove it.



W – What Did I Learn?

Complete these questions at home and share your answers with your family.

Questions

1. Why is it dangerous to put a spray can into the fire? What should you do with spray cans when you have finished using what is inside?
2. How does the thermometer work?
3. Hot water is used to open the jam jar easily. What does the hot water do to the lid of the jar? When at home, how can you safely remove a tight lid using hot water?

Unit 2 • Chapter 3: The Source of Heat and Light

Guiding Question – K: What Do I Already Know?

Discuss with your team mates: how is the energy made by plants taken up by different animals?



W – What Do I Want To Learn?

1. How is the fuel used in our homes as a source of heat and light linked to the sunlight energy taken up by plants?
2. How do green plants use sunlight?

The sun is the main source of energy. Life on earth would not be possible without sunlight. Plants, in the process of **photosynthesis**, change light into chemical energy called **glucose**. As in humans, glucose is food for the plant. And just like humans, plants need food for growth and energy.

Although the sun is the main source of energy on Earth, it takes a long time before the energy become useful. It takes millions of years before the **carbohydrates** in plants are changed into **fossil fuel** (oil, coal and natural gas).

Think about this, we are using more of the Earth's fossil fuels than our ancestors. Is it possible that we could use up more fossil fuels than the Earth can make?

L- What Did I Learn?

ACTIVITY

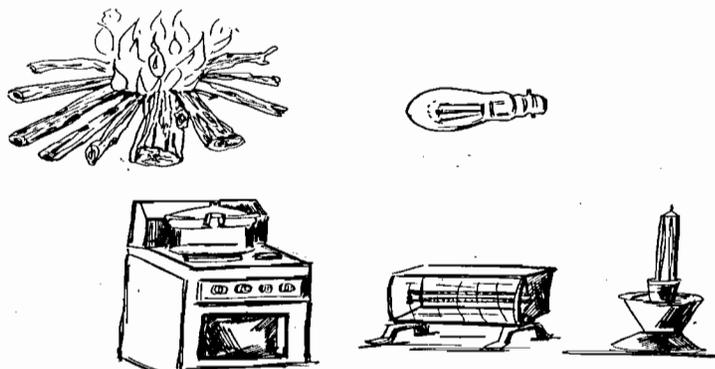
In this exercise, fill in the blanks to create scientific facts. Try not to look back in the unit for answers until you have completed all of the sentences. When you have completed the activity, review the information in the unit to self-correct.

Use these terms to fill in the blanks.

photosynthesis	expand	absorb
energy	plants	evaporate
sunlight	removal	contract
cool	glucose	reflects

1. Sunlight provides enough _____ to cause _____.
2. Ultraviolet rays may cause skin _____.
3. Light clothing _____ heat energy while _____ clothing _____ heat energy.
4. Evaporation is the _____ of water.
5. Different substances _____ when heated and _____ and when _____.
6. _____ is the process _____ use to change _____ into the chemical energy _____.

ACTIVITY



1. From the pictures, identify sources of heat and light that you use at home or at school.
2. What are other sources of heat and light that are used in your community? Discuss ways that they are related to the sun's energy.

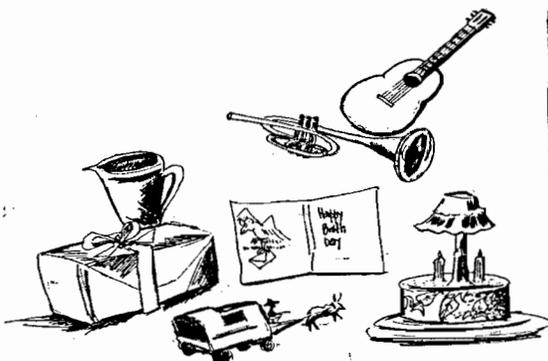
Unit 3 • MATTER

Unit 3 • Chapter 1: States of Matter

Guiding Question – K: What Do I Already Know?

What are living and non-living things made of?

Matter is the stuff that makes up all material things. You see matter, matter, and matter every where. All matter, living and nonliving is made of elements. There are three states of matter: solids, liquids and gases.

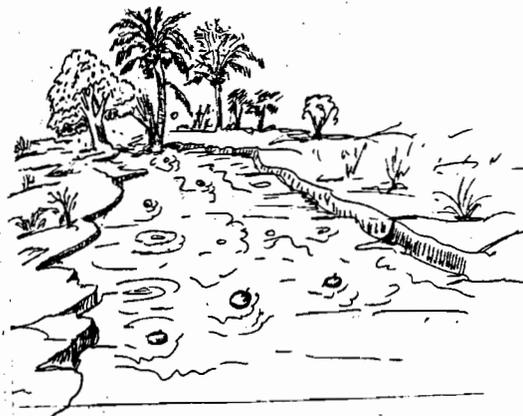


Solid objects generally maintain their shape and **volume**, regardless of their location. Volume is the amount of a substance. **Liquids** assume the shape of their location. Like solids, liquids maintain a fairly constant **volume**. Unlike solids, liquids flow readily. **Gases** maintain neither shape nor volume. They expand to fill completely any container one

puts them in and can be easily compressed. For example, oxygen can be compressed into a steel tank for many minutes and used to help divers breathe underwater.

Try this.

Look around your classroom and with your team mates, make a list of the matter that you see. You have two minutes to complete this task.



After you have completed your list, describe each item as a type of matter: solid, liquid, or gas. Which state of matter did you find most often? Which state of matter did you find the least?

Discuss these questions with your team mates.

1. Why was each type of matter identified as frequently or infrequently as it was?
2. Why is it difficult to find examples of gases in your classroom?

If your team listed books as a type of matter that is solid, you are correct. Water is matter also. It is a liquid. It may have been harder to find a gas in your room because this form of matter is hard to see. But the very air that we breathe is matter the form of gases.

W - What Do I Want to Learn?

Why does matter change its form?

Matter can change form. Heat and cold effect matter. When you blow your breath on a mirror, the air in your breath is a gas. Your breath produces small drops of water that cover the mirror. A gas that turns into a liquid is **condensation**. Can you describe other examples of condensation?

Discuss the following with your team mates.

Elizabeth told her younger brother she could make water disappear. Her younger brother watched as she filled up a glass of water and placed it on a ledge in the sun. Elizabeth's younger brother laughed when the water did not disappear but Elizabeth only smiled at him and said, "You must be patient for this trick." The brother waited patiently. The water began to disappear.

How did the water in the glass begin to 'disappear'? How long do you suppose it took?

Can you explain to your team mates what happened the way a scientist would?

Use some of the scientific language you learned in the chapter on sunlight.

Hint: You will need to use the new vocabulary that you learned: evaporation and vapour.

Remember, water is a type of matter. It can exist in all three states: solid, liquid or gas. Can you design an experiment that proves the above statement? Discuss your plan with your team mates and create one experiment using all of the group's ideas. Draw a picture of your experiment and label the steps of your experiment.

When water is heated slowly by the sun, it evaporates. What happens when water is heated quickly on a hot plate or stove?

When water is heated quickly, it boils. Boiling water changes into steam. **Steam** is also a form of gas.

L- What Did I Learn?

List other substances that can change into two or all three forms of matter.

Unit 3 • Chapter 2: All Materials Have Mass

Guiding Question – K: What Do I Already Know?

When matter is in a solid state, how does it occupy space?

All matter occupies **space** and has **mass and weight**.

W – What Do I Want to Learn?

How does mass differ from weight? How is mass measured?

The amount of matter in a substance is called its **mass**. The amount of mass in a substance determines how much it weighs. However, its weight could be different depending on whether there is gravity or not. **Weight** is the amount of pull gravity exerts on an object.

At one time for scientists, the words "mass" and "weight" were used as though they meant the same thing. However, when they began to explore outer space, scientists learned that mass and weight are not the same. For example, the mass of an **astronaut** on the moon and earth is the same because the matter that makes up the astronaut does not change. However, on the moon, the weight of an astronaut is not the same. If the astronaut weighed 82 kilograms (kg.) on earth, she weighed 14 kg. on the moon. Thus scientists learned that, although weight changes with gravity, mass does not. Mass tells how much matter is in an object. Weight tells how the object is affected by gravity.

How much matter do you have in you?

L – What Did I Learn?

1. If air is matter, it occupies space and has mass. Create an experiment that proves that statement.
2. If an astronaut weighs 7 kg. on the moon, how much does he weigh on Earth?

Unit 3 • Chapter 3: Where Does Matter Go?

Guiding Question – K: What Do I Already Know?

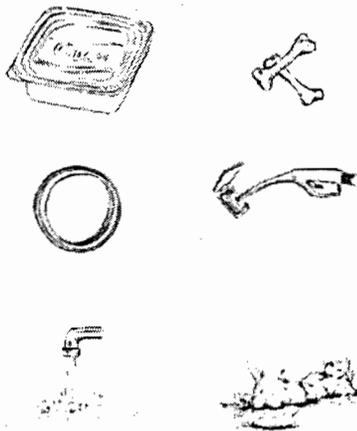
Matter does not stay the same. Some matter only lasts a few days and some lasts for many years. Where does matter go?

W: What Do I Want to Learn?

Think about this question and discuss possible answers with your team mates:

1. Since not all matter is biodegradable, it is important that we produce less waste. Why?
2. Is there a bio-degradable plastic? Are scientists working to develop a bio-degradable plastic?
3. Are gases more dangerous than solids? Explain using details to clarify your answer.
4. How does your community get rid of toxic wastes?

Look at the different examples of matter in the picture. All matter occupies space and has mass that can be weighed. Some of them are **biodegradable** and others are **non-biodegradable**.



Biodegradable means the matter can be broken down by small animals like maggots or bacteria in the soil. We also call this rotting. When matter breaks down in soil, it provides nutrients to the earth. Scientists also call this process **decaying**.

Look at the pictures of matter again. Some matter rots (decays) faster than other matter. Which matter rots?

Which matter rots quickly?

Look at the pictures again, which examples of matter can not decay or rot. Non-biodegradable matter can not be broken down by small animals or bacteria/fungi. Non-biodegradable matter is not good for the environment and



* **Recycle** as much as possible, which includes buying products with recycled content.

Reduce. Source reduction is really waste prevention. It means using an item more and throwing away less. For example, if you take a cloth bag to the grocery store when you shop, you will not need to use the plastic bags to bring your groceries home. Source reduction includes purchasing durable, long-lasting goods and seeking products and packaging that are as free of toxic materials as possible. Source reduction actually prevents the making of waste in the first place. It is the most preferable method of waste management and goes a long way toward protecting the environment.

Reuse. Items can be reused by repairing them, giving them to other families or community groups, and by selling them. Using a product more than once, like Coke bottles, either for the same purpose or for different purposes is called reusing. Reusing, when possible, is preferable to recycling because the item does not need to be reprocessed before it can be used again. If your parents give the clothes you have outgrown for your younger brothers or sisters, please let them know this is a good example of reusing and helpful for our global environment!

Recycle. Many countries around the world have started recycling programs. Recycling turns materials that would otherwise become waste into valuable resources, creating environmental, financial, and social benefits. Materials like glass, metal, and paper are collected and then separated. Recycled paper can be made into paper again. Metal objects can be melted down and also reused. In Namibia, Collect-A-Can is a nongovernmental organization that recycles steel cans. Recycling is one of the best environmental success stories of the late 20th century.

Reflection

The Benefits of Recycling are:

- * Conserves resources for the future.
- * Saves energy.
- * Can supply valuable raw materials to industry.
- * Creates jobs.
- * Reduces the need for places to store or burn waste.

Composting

Another form of recycling, **composting**, is good for your garden. If your family maintains a vegetable garden or flower beds, you can help the plants in your garden

grow by putting old leaves, rotting vegetables or fruits in the soil. Composting is nature's way of recycling **organic** wastes into new fertile soil. Organic materials are those things that decay or rot quickly. Good materials for composting include egg shells, old vegetables and fruit, and the peels of vegetables and fruits.

Household Hazardous Waste

Not all materials make good compost. Bad materials for composting include meats, dairy products, oils, or salted or sugar items. Common household items such as paints, cleaners, oils, batteries, and chemical pesticides contain substances that are bad for our environment.

One way to help determine if your household waste is bad for the environment is to read the labels on products. Labels that read *danger, warning, caution, toxic, corrosive, flammable, or poison* identify products that might contain bad materials. Leftover portions of these products are called **household hazardous waste (HHW)**. These products, if mishandled, can be dangerous to your health and the environment.

How do you make sure your little brother or sister can not get to these products in your home.

Reflection

Benefits of Composting

- Creates uses for organic wastes.
- Provides nutrients to the soil.
- Increases soil organisms (e.g., worms and centipedes) that are good.
- Reduces the need for chemical fertilizers and pesticides that are not environmentally friendly.
- Protects soils from erosion.

L – What Did I Learn?

Discuss and complete with your team mates.

1. Look around your classroom Think about ways to practice source reduction in your classroom (don't forget to include your school supplies).
2. What do you do with your old toys or toys you no longer play with?
3. How much notebook paper do you waste when completing an assignment at home? What are some ways you can reduce this amount?

Unit 4 • WATER

Unit 4 • Chapter 1: The Water Cycle

Guiding Question – K: What Do I Already Know?

Namibia is the driest country in sub-Saharan Africa!!! So where does Namibia get its water?

How old is the water we use at home or at school?

Water is a valuable commodity for humans, animals and plant life all over the world. In Namibia, a semi-arid country, water is scarce and difficult to find from community to community and, in most rural communities, water is very difficult to transport and store. It usually rains between November and May in Namibia, but the rest of the time is very hot and sunny, which increases the rates of **evaporation** of surface water and **transpiration** of plant water, causing **drought**.

W – What Do I Want To Learn?

1. Where do you get water to use at home?
2. If it does not come from the tap at home, how is it transported to your home?
3. Is your water supply the same through out the year?
4. List the water resources throughout Namibia that are used during the wet seasons and during the dry season.

Research project

Ask people of different communities and tribes in Namibia (Herero, Damara>Nama, Wambo, Caprivian, Kavango, San, etc) how water was transported from different resources in their villages from the 19th Century to today.

Write a report describing at least two of these methods and share with your class.

ACTIVITY

What you need:

1. Glass of ice cubes
2. Pot with warm water
3. A cold plate.
4. Hotplate

What you do:

With the help of your teacher or your parent,

1. Put the glass of ice cubes in the pot of warm water for a few seconds, what happens to the ice?
2. Take the glass out of the pot and put the pot with water on a hot plate until the water is boiling.
3. When the water is boiling cover the pot with a cold plate for two seconds.
4. Remove the plate.

Questions

- What did you see when the water started boiling?
- What do you see on the plate when you removed it?
- What do you think would happen if the plate had stayed on the pot for a long time?
- Suggest what would happen if you collected the water on the plate and cooled it to 0°C.

The cloudy vapour you saw when the water started boiling is called **steam**. Steam is **water vapour** being released because there is too much heat. When there is little heat, the water vapour is released slowly and will not be visible like the steam. Liquid water **evaporates** when heated, forming water vapour. When the vapour from the boiling water hits the cold plate, it forms water droplets. This is called **condensation**.

When water is placed in a very cold container, it freezes. In its frozen state, water (ice) is a solid. When ice is heated, it **melts** to become a liquid (water) giving off vapours again.

This process shows how our water cycle works.

L – What did I learn?

With the help of your experimental results, provide an explanation how the water you use at home or at school reaches you.

Unit 4 • Chapter 2: Where Does Water Go?

Guiding Question – K: What Do I Already Know?

Water never stays in place, whether in the reservoir, oshanas, or human body. It may go quickly or slowly, but it always goes. Where?

W- What Do I Want To Learn?

Where does water go?

Elizabeth was able to show her brother that when water is heated slowly, it evaporates into the atmosphere. This experiment explains what happens to large bodies of water like the ocean, the oshanas and reservoirs.

When the sun heats the water in the rivers, water reservoirs, flood pans water canals, lakes and oceans, the water turns into vapour and goes into the air (**evaporation**). This process is also helped by the wind; the wind blows away the vapour. Evaporated water goes into the atmosphere and forms clouds. Clouds are a visible mass of water particles made by the condensation of large bodies of water.

The earth has a certain amount of water, which keeps circulating in what we have mentioned as a water cycle. The water cycle is made up of a few processes;

- Evaporation, which includes **transpiration**.
- Condensation, the formation of clouds
- Precipitation (**rain, dew, frost and snow**)
- Collection of water in the water bodies example; lake, oceans, rivers etc.

The bodies of humans and animals contain water. Since they lose water through urine, breathing and sweating, it needs to be replaced by drinking more water. Did you know the brain needs water to function properly? So make sure you get plenty of water during your school day.

L- What Did I Learn?

Do plants sweat?

Yes. Plants lose water just as humans and animals, but the sweating in plant is called **Transpiration**. Research the Internet or an encyclopaedia and find out how plants sweat.

Unit 4 • Chapter 3: Clean Water Is Important

Guiding Question – K: What Do I Already Know?

1. Why is water important to plants and animals?
2. How is water used at home and at school? List the different uses in your journal.

Remember that all living things have some water in their composition. Therefore, all living things need water to survive. When humans or animals do not get enough water, they become **dehydrated** and can die. The same thing happens to plants when they do not get enough water; they wither or dry up and die. Dehydrate means to remove water.

W- What Do I Want To Learn?

- Is there water in the desert? If yes, where is it?
- When taking a road trip through the desert, what are some of the safety precautions that your parents should use?
- Could the world eventually run out of water?
- When can we say water is clean? Why is clean water important to us?
- Why should we not drink contaminated water?
- What should be done to reduce water pollution in urban and rural areas?

The Importance of Clean Water

Water has a good quality (clean) when it is safe to drink. This means that it is free of smell, free of insoluble solids, free of harmful bacteria and harmful chemicals. It does not have to be **pure**.

All of the harmful chemicals that we use at home and at school, when mixed with water, make it unfit to drink. Chemicals **pollute or contaminate** water. All substances that pollute water are called **pollutants or contaminants**.

ACTIVITY

List all substances that you use at home and at school that could pollute the water. Compare your list with those of your classmates.

1. Which pollutants are mentioned most often?
2. How does your family get rid of containers of these pollutants?

Water Purification

Bilharzia, cholera, dysentery and typhoid are examples of diseases that are caused by contaminated water. They are called **water borne** diseases. Drinking contaminated water can kill humans, animals and plants. **Water purification** is the process of cleaning water so that it is safe for use by humans, animals and plants.

When water has solid insoluble materials, simple **filtration** is enough to clear them out. But clear water is not always safe to drink. Bacteria are too small for filtration; they pass through the little holes of the materials being used to **filter** the water. Bacteria are dangerous to our health so they should be killed first, before the water becomes safe to drink. Boiling the water kills the bacteria in it. Boiling and filtering are two ways to clean and purify water.

ACTIVITY

You need:

1. a glass of dirty water
2. a piece of clothe or a filter paper
3. a filter funnel
4. a beaker or any other empty container.

What to do:

Sets up your apparatus as shown in the diagram

Pour the dirty water in the filter funnel with the filter paper or piece of cloth in it.

Let the water drip slowly in the beaker or any other empty container.

- How does the water in the container look?
- What do you see on the cloth?
- Is the water in the container safe to drink? If the water is not safe, what should you do to the water to make it safe? Discuss the answers with the class.

L – What Did I Learn?

1. Kuura and her parents are going to visit their relatives in Sossasvlei by car. Kuura notices that no water is being packed along with the other items the family is taking. Prepare a persuasive reason for Kuura to use with her father, who keeps telling her that there is no need to worry about water; this trip is only five hours. Use details you have learned so far in this unit.
2. If you boil two cups of pond water, will you have two cups of water to filter? Explain your answer using scientific facts you have learned so far.
3. The people of Omulamba village get their water from one **pond**. One day when Tuyeni was going to fetch water, she found animals drinking in the pond. They had also made the water very muddy. Tuyeni fetched the muddy water and went home.
 - What should Tuyeni do to the water to make sure that her water is free of the mud and bacteria before her family uses it?
 - What materials from her home could she use if she did not have handy filters or an electric hot plate?

Unit 4 • Chapter 4: Water Conservation and Storage

Guiding Question – K: What Do I Already Know?

1. Do we need to store water?
2. Why should we not waste water?

Namibia is one of the driest countries on the Earth. A large portion of our country is desert. We have a rainy season and a dry season. Conserving water is very important to us.

W – What Do I Want To Learn?

1. Can the earth ever run out of water?
2. How long does it take for the process of the water cycle on the earth's surface to work?
3. What would I do if I became lost for 72 hours in the desert?
4. Why do some countries have rainy season and dry season?

During the rainy season, water is collected and stored in large reservoirs for use during the dry season. Imagine if there was no water stored in the dams or water reservoirs. Where would the water we use at home and at school come from during dry season?

In rural communities of Namibia, people have water storage containers that are used to store water for a day or two mainly because the water source is very far from the village.

L – What Did I Learn?

ACTIVITY

Discuss the following with your team mates and family.

1. How is the water stored in your town or at home?
2. What is the importance of storing water at home or at school?

Reflection

Science Fiction is a type of story that is based on a scientific truth but the events in the story are not real. Take a scientific fact you have learned in this unit and write a Science Fiction short story. For example:

Water is important for survival. Write a short story about a time when the water supply in Namibia was very, very low.

Unit 5 • SOILS

Unit 5 • Chapter 1: Types of Soils in Namibia

Guiding Questions -- K: What Do I Already Know?

1. What is soil?
2. How is soil made?
3. Why is soil important?

ACTIVITY

Form a team of four to five students. Each team member should fill a jar or transparent container (with a lid) half way with soil from her/his yard. Bring your soil sample to school.

W – What Do I Want To Learn?

What are types and characteristics of soil in Namibia?

Soil is the loose upper layer of the earth in which plants grow. It is made up of **organic** material, **inorganic** material, **air**, **humus** and **water**. The formation of soil is caused by organisms, climate, topography, parent rock and time. Organic and inorganic material means soil is composed of living and non-living things. The dead remains of plants and animals decompose and become organic matter in the soil. Rocks become the inorganic material in sand.

Over time, certain types of rocks break down and become sand. The parent rock means the materials from which soil is formed. For example, soil could be formed by bedrock or from a deposit from glaciers. It takes hundreds or thousands of years to develop soil. In Namibia, most of the soil is sandy because our topography is mostly desert. In other areas, soils on slopes or at the bottom of hills are not sandy because they get more water than soils in drier areas. Soils in wetter areas tend to be muddier or thicker than the sandy soils.

Soil settles into layers or **horizons** that can be observed. Scientists also call soil horizons **soil profiles** because it is like looking at the side view or profile of a person's face.

The following items describe some important features of a soil:

1. composition
2. colour
3. texture
4. structure

The commonly known soil types are: sand, silt, clay, and loam. Soil types are characterized by the amount of sand, silt and clay that they contain. **Texture** refers to the size of the individual soil particle present in each soil type. Classification of soil is based on colour and texture.

Sand. Sand is the largest particle/grain in soil and is coarse and rough (gritty) to touch. Separate particles are easily seen with the naked eyes. The grains of sand don't hold together when moist but fall apart as separate grains. Sand holds little water or minerals and it is hard to grow things in it. Sandy soil drains easily after rains because of its coarse texture. Sand is easily worked and warms up quickly.

Silt. The particles in silt are between sand and clay. Silt is smooth and slippery to touch when wet, but it is not sticky. The individual particles are much smaller than those of sand. Silt can hold high amounts of water and it is easier for growing crops than sand.

Clay. Clay is composed of the smallest particles. Clay is thick and sticky when wet. When hard and dry, it is difficult to crush. Clay is rich in organic matter but doesn't let air and water through due to its particle size. Clay has the advantage of holding high amounts of moisture and nutrient, but it is still hard to grow crops in it.

Loam. Loam contains a considerable amount of sand, silt, organic material and clay. Loam feels sandy. Crops grow best in this type of soil because it has all of the advantages of sand, silt and clay soils.

Damaged Soil

Soil can become damaged. When soil is damaged it is in poor condition and is not fertile for gardening or grazing cattle. Soil can be damaged by poor drainage, contamination, or erosion. When soil has poor drainage, its chemical and moisture balance may become unhealthy for vegetation.

Soil can become contaminated when people do not properly dispose of waste products. Chemicals in these products may leak into the soil. Erosion also damages soil. Soil can be washed away by running water or blown away by wind. Erosion can deplete the organic matter in soil, reducing its fertility and lowering its ability to retain moisture.

L – What Did I Learn?

Review your answers for the guiding questions at the beginning of this unit on soils. Now that you have read the information, fill in missing details with scientific information.

Unit 5 • Chapter 2: Importance of Soil

Guiding Question – K: What Do I Already Know?

1. Why is soil important to us?
2. Write a short paragraph to explain how soil has been used.



W – What Do I Want To Learn?

What is the relationship between soil and plants?
How are crops affected by various types of soil?

Plants depend on soil as their foundation and source of nutrients. Soil provides water and minerals for plants to grow and reproduce. It is the growing medium for most of the earth's food eaten by people and animals. Food from plants is the source of energy for all humans and animals. Soil and plant materials grown in soil are also used by all animals to build shelters for protection.

Soil is important to plants as it anchors plants in soil, stores nutrients and provides support to them. Soil is also a home for many animals. Ants, earthworms, and mole rats can be seen, yet there are smaller organisms, like bacteria and fungi, that also live in soils. Humans use soil as a support medium for building bridges, constructing buildings and roads. Soil is also used to make cement and brick for houses.

L – What Did I Learn?

List examples of uses of soil that show how important soil is for humans and animals.

Unit 5 • Chapter 3: Fertile Soil

Guiding Question – K: What Do I Already Know?

Plants do not grow well in all soils. What about the soil determines how well plants grow?

Soil must have specific qualities in order for vegetation to grow well:

- Water must be able to drain (run off) without causing erosion. Soil erosion occurs when the soil is washed away with the water.
- Excess water should drain through the soil. Draining off the excess water allows air to go through the soil. The muddy soil in the water pans in the northern Namibia is not fertile; it allows water to settle on top of it for a long time.
- Soil must hold small pockets of water for plants to use. The sandy soil in sand dunes does not keep water for plants to use. This is the reason why the sand dunes in the coastal Namibia do not have vegetation.
- Soil needs a limited amount of minerals (salts). Too much salt is bad for plant growth.

The soil with these qualities is called **fertile** soil. Hardly any soil in Namibia has these qualities. The mahangu and maize fields in the northern and north eastern Namibia have some of these qualities.

W – What Do I Want To Learn?

ACTIVITY

You need:

- Three samples of soil
 - Half a cup of sandy soil
 - Half a cup of clay soil
 - Half a cup of good vegetation/garden (loamy) soil
- Three pieces of cloth, wide enough to cover the top of the cups.

What to do:

- Fill the cups with water. Observe each cup carefully and explain the differences in the way the soils behave.
- Stir the mixtures.

- Cover the cups with the pieces of clothes then turn each cup upside down, allowing the water to drain through the cloth. What did you notice? Describe the soil that remains in the cup. Is it dry, moist or wet?
- Decide which cup of soil has the best qualities? Explain why.

The quality and quantity of soil in Namibia decreases as you move from the northeast to the southwest. The largest part of Namibia is **soil less**. The soil less part of the country has a thin covering of broken rocks.

Fertile soil is composed of blends of humus, minerals, air and water. **Humus** is the organic portion of soil. Similar to composting, when plants and animals decompose in sand, it forms humus. The process of forming humus is called **humification** (hum e fi ca tion). Humus is a very important ingredient in soil because it:

- *increases the soil's ability to hold and store moisture*
- *reduces the leaching of nutrients*
- *is an important source of carbon and nitrogen required by plants*
- *improves soil structure for plant growth*

Minerals, like salt or sulphur, are inorganic materials found in soil. Air allows water to get to the roots of plants. Remember, clay soil has little air so it does not allow water to pass through it quickly.

L – What Did I Learn?

The Mupetami family live in the desert, yet they have a big vegetable and fruit garden. How do you suppose they were able to achieve this?

Based on the information you have read, how would you classify the soil sample that your team mates brought to school?

Explore your neighbourhood. Can you find samples of different soils? If you can, bring these samples to class to share with your team mates. Can classify the types of soil you have?

Unit 5 • Chapter 4: Health Tips for Soil**Guiding Question – K: What Do I Already Know?**

Do you think that soil is plentiful in Namibia? Why should we be concerned about the soil less areas in Namibia?

W – What Do I Want To Learn?

1. What is conservation?
2. Why is it important to conserve soil?

Soil is the medium by which most plants grow. Plants provide food and air for other living things. When nutrients are not put back into soil, it becomes **sterile**, which means nothing can grow in it. Or, if humans build on too much of the areas where there is soil, we lose land where animals graze or live. Therefore, it is necessary to conserve these areas. Conservation is the planned management of a natural resource.

Planting trees is one way to conserve soil. The roots of the trees hold the soil together, preventing soil erosion. The leaves from the trees provide a protective layer to keep the soil moist and reduce the amount of dry soil that blows away (dust). When the leaves decompose, they fertilize the soil. Another way to conserve soil is to control grazing. Grazing animals eat and trample the grass. When too many animals graze in an area, the grass dies.

L – What Did I Learn?

What are the soil conservation practices in your local environment? List your answers in your journal.

Unit 6 • Air

Unit 6 • Chapter 1: The Air around Us

Guiding Questions: K- What Do I Already Know?

1. What kind of matter is air?
2. Do all living things need air?
3. What can we do to keep our air clean?

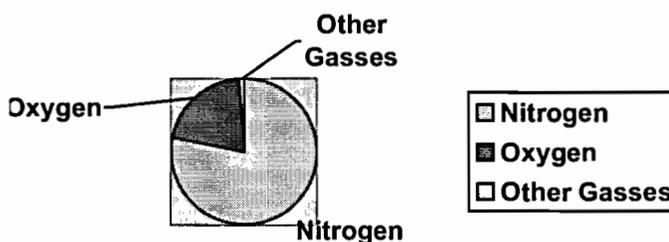
Can you see air? Can you smell air? Write your answers to the Guiding Questions and the first two questions in this paragraph before reading further.

W – What Do I Want To Learn?

What are the characteristics of air?

Air is a mixture of **gases**. It takes up **space** (volume), has **mass**, and you can **compress** it. The **atmosphere** is a thin layer of **gases** that surrounds the solid earth. It protects the Earth by absorbing **radiation** from the sun and moderating the differences between temperatures at night and during the day. A sample of pure, dry air is colourless, odourless, formless or shapeless, and composed mostly of the molecules of the gases **nitrogen (N₂)**, 78%; **oxygen (O₂)**, 21%; **argon (Ar) and other gasses**, 1%; **carbon dioxide (CO₂)**, .03%; and water vapour. **Oxygen** is very important for the survival of life on the planet Earth. Humans and animals breathe in oxygen and change it to carbon dioxide. Plants on land and under the sea absorb carbon dioxide and change it to oxygen. Therefore, humans, animals and plants are **interdependent**.

Atmospheric Gasses



Have you noticed that sometimes you can feel air and hear it move? Though you cannot see air, you can see how air affects things, like a flag hanging outdoors or observing trees on a windy day. Also, air is odourless. You can smell things in the air, like your favourite food being cooked. You can smell how odours affect air.

L – What Did I Learn?

ACTIVITY

Based on what you have just read about the relationship between humans, animals and plants, what do you think the word interdependent means? Write a brief explanation of your answer. Remember to include enough details to support your answer.

Unit 6 • Chapter 2: Wind

Guiding Question – K: What Do I Already Know?

Since you can't see it, how do you know that wind exists?

Moving **air** is called **wind**. You can see wind when it pushes on things. Wind causes things to move. If you walk through the wind you can feel wind push against you. The wind could make it difficult to walk in a normal way.

ACTIVITY

Discuss the following with your team mates: What happens to umbrellas on a very windy and rainy day?

Do a mime (act without saying words) of how a person looks when walking through a bad wind storm.

W – What Do I Want To Learn?

Wind can be a powerful force of nature. How does wind affect the Earth and its inhabitants?

Sometimes you can see papers, twigs, leaves, and other small objects move when wind blows. Winds can move slowly or quickly. Winds that move slowly are called **light winds**. Winds that move quickly are called **strong winds**. Sometimes you may have seen storms whose winds are very strong and can blow trees down or the roofs off of buildings, etc. Have you ever seen film of a hurricane? Hurricanes are storms where the wind can be as strong as 100 miles per hour or stronger! Wind can be an awesome demonstration of nature.

You can also tell which direction the wind is blowing. Wind comes from different directions. Wind coming from south is called a **south wind**. Wind coming from east is called an **east wind**.

Can you now **tell** what is a wind from **north** and **west** called?

Visualize the windsock at the airport. The windsock is made of a light fabric so that it is able to blow with the slightest wind. It also blows to show the direction of the wind. Why do you suppose there is a windsock at the airport?

ACTIVITY

You can make your own windsock. Cut strips of paper, string or a similar light material and attach them firmly to a pencil or something similar. Use your windsock to measure the amount and direction of the wind over the next weekend. Measure the wind in the early morning, at noon, and around your regular dinner time. Write your observations to share with your team mates.

Share your observations with team mates. Use these questions to guide the discussion.

1. What was the wind doing on Saturday and Sunday at early morning, noon, and dinner time? As you share your data, discuss the where the neighbourhoods are.
2. For learners whose data is similar, are their houses in the same area? If not, what are the similarities about where each person lives
3. For learners whose data is different, are there any similarities to account for

Air is all around the Earth. There is air even in **soil** and **water**. Living micro-organisms in the soil need the same air. Fish and other organisms that live under water also need air. They absorb the oxygen that is in water. The air outside is always changing and it can be warm or cold. It may feel dry or wet. How and when does air feel dry or cold?

Did you notice that whenever wind blows it affects living and non-living things in your local environment? The birds cry, clouds appear to be flying in the sky, soil and dust blows away, and seeds from trees are everywhere. What are other ways that winds affect living and non-living things like water, sailboats, rocks, people's health, etc.? Make a list to share with your team mates.

ACTIVITY

Based on the above information, write a list of what happens when light winds, strong winds, and very strong winds blow near your home? When are winds strongest and weakest in Namibia? Discuss this with your team mates.

Pollution

Sometimes air we breathe becomes dirty or **polluted**. Air can be polluted whether you are indoors or out. **Pollutants**, substances released into the air, can cause problems for people, plants, and animals.

How do you think people are affected when they breathe polluted air?

There are different types of pollution and different causes for each. One kind of pollution is **particulate** (par ti cu late) **matter**. Particulate matter is released into the air by burning fuel, such as diesel. Some gasses, such as carbon monoxide, sulfur and chemical vapours, are pollutants. Indoors, smoke from tobacco, heating, and cooking can cause pollution.

One of the best ways to fight air pollution is through prevention. Pay attention to the way that you interact with the environment. For example, you can follow the directions for using and disposing of household products, like cleansers and batteries. Another way that you can reduce pollution is by not smoking cigarettes.

Importance of Clean Air

All living things need **clean air** for survival. The exhaust from cars, trucks, scooters, and airplanes can make air dirty. Smoke from fires or factories also make our air dirty. Dirty air is called **polluted air**. Pollution is a problem all over the globe. Pollution can actually make people sick because it affects the respiratory system.

ACTIVITY

Knowing that some pollution is caused by modern technology, what can we do to stop the pollution?

Use a computer or an encyclopaedia to research the following questions:

- How pollution is affecting the Earth?
- What are the major causes of the worst pollution?
- What are some organizations doing about this global problem?
- What is the government of Namibia doing to help clean the Earth?

L – What Did I Learn?**ACTIVITY**

Try completing this ACTIVITY without looking back through the Unit.

Draw a line to connect each word with its definition.

- | | |
|-------------------|-----------------------------------|
| 1. air | to depend or rely on each other |
| 2. north wind | mixture of nitrogen, oxygen, etc. |
| 3. hurricane | caused by changes in air |
| 4. weather | wind blowing from the north |
| 5. pollution | strong wind and rain |
| 6. interdependent | dirty air |

ACTIVITY

Working with your team mates, research the Internet or old newspaper articles and find information about each topic. Be ready to report what you learn to the class.

1. During the summer, 2003, the countries in the Caribbean and the south-eastern portion of the United States experienced a record number of hurricanes. Write five facts about these hurricanes.
2. Find information about the effects of strong winds in deserts and the types of storms they create.
3. Find information about how the dunes along Namibia's coastline were formed.

Unit 6 • Chapter 3: Air under Pressure

Guiding Question – K: What Do I Already Know?

What happens when air is pressurized?

When you blow up a balloon until it pops, you have just demonstrated what happens to air when it is under pressure. When air is put into a container and the air overflows (too much air), it pops or explodes.

W- What Do I Want To Learn?

ACTIVITY

Blow up a balloon slowly. At each stage, observe how the outside of the balloon feels and looks. Continue to blow up your balloon until it looks as though it is ready to pop. What does the outside of the balloon feel and look like at this point? Write your observations.

At what point can you make sounds with the balloon? What makes this possible?

L – What Did I Learn?

The air in the tire of a car or bicycle is also under pressure. When a tire loses air, the air must be replaced in order for the car or bicycle to operate efficiently. However, if more air than what is needed is put into the tire or bicycle tube, they will explode too.

Interview a person who works at a gas station. Ask this person about how he/she puts the right amount of air into a tire that is going flat. Is it possible the person can fill the tire with too much or too little air?

Unit 6 • Chapter 4: Air Is Matter

Guiding Question – K: What Do I Already Know?

Air cannot be seen. Does it have the same characteristics as other forms of matter?

Air is matter. You can observe air when it moves things, weigh air, and demonstrate that air has mass.

W – What Do I Want To Learn?

How can I show that air has mass?

Which characteristic of air allows it to influence weather?

ACTIVITY

Blow up a balloon and tie it to keep the air inside. Because of the balloon, you have basically 'captured' a small amount of air. You have demonstrated its weight and mass also. You can feel the weight of the balloon in your hand. Okay, so it's hard to feel the weight of the balloon in your hand. What happens when you throw the balloon into the air? Gravity pulls at its weight and it sinks to the floor.

Untie the balloon or blow up another one and do not tie its end. Let the balloon go. What happens? Compressed air, air that has been contained, pushes against the air in the atmosphere and the balloon is propelled forward. This is same basic principle that enables planes to move.

Remember that air takes up **space** much like water. If you poured water into a container, you could see it displacing space as it fills up the container. But since you can not see air, you can not witness air displacing space.

But try this.

ACTIVITY

Use a bottle with a funnel sealed to the glass with a piece of clay or tape. Rapidly pour water into the bottle. Why doesn't the water flow into the glass as quickly? Now, stick a straw in the funnel and pour water quickly into the funnel. Why does the water flow when a straw is inserted into the funnel? Write your observations in your journal.

The water flows because the air is allowed to escape.

After you have written your observations about the experiment you just completed, rewrite them in paragraph form as though you have to explain the procedure to someone in the fourth year.

Changes, like heat and cold, in the air cause **weather**. Weather is always changing because air is always changing.

Imagine riding down the highway on a very hot day. When you look ahead it may appear that shimmery water is on the road. Or right above the road the air looks thick and wavy. What's happening?

The heat from the sun causes the asphalt to get very hot. The air closest to the asphalt gets warmer. The combination of heat and air creates a **mirage**. The mirage is caused by the hot air rising from the ground. Warm air rises. Remember that when air moves, there is wind.

L – What Did I Learn?

Changes in air temperature cause changes in wind and weather. It is the because of the qualities of matter that air can have this effect.

Unit 6 • Chapter 5: Air Transmits Sound

Guiding Question – K: What Do I Already Know?

It seems like there are always be sounds around. Where does sound go? Do people hear sound?

You know that there are many ways to make sound. One way is using your voice to talk. Sounds can be made in many other ways. You can make sound when you blow air into a hollow hole, like a flute.

W- What Do I Want To Learn?

How does sound move? Would there be sound without air? Why can I hear it?

Sound needs matter to travel. Air is an example of matter that helps sound to travel. Did you know that most of the sounds you hear move through air by **vibration**? Vibration means the air moves back and forth very quickly. Say the sounds, "mmmmmm". Can you feel your lips vibrating? When you ring a bell, the bell vibrates. The air around the bell vibrates too. As the sound moves through the air, some of the vibrations reach your ears. The vibrations causes air inside your ears to vibrate and you hear the sound.

Drum your fingers on the desk. The movement of your fingers on the desk causes vibrations in the air. Your 'drumming' causes the air to move or vibrate and the sound travels to your ear. Inventions like the telephone began with this simple scientific principle. Sound travels faster in liquid than in air or solid matter like telephone lines. Water can transmit sound. Dolphins talk and sing to each other all of the time.

Imagine if there was no air, people could not hear each other!

L – What Did I Learn?

Air not only transmits sound, it also affects the type of sound. Try these activities.

ACTIVITY

Bring an empty soda bottle to school. Fill your team's bottles with varying amounts of water. When everyone's bottle is filled, blow into the top of your bottle until a tone is produced.

Notice that there are many different tones.

What level of water produces the lowest tones? The highest tones?

See if you and your team mates can create a song.

Sound All Around

Sounds surround us. Stop what you are doing right now and listen for two full minutes. List the sounds that you heard in those two minutes. Share your list with your team mates.

Here is a list of sounds we all hear. Discuss with your team mates how you think air transmits those sounds.

- Drums
- Bells
- Buzz of alarm clock
- Car horn
- Teacher's voice
- Mosquito buzz

Unit 7 • LIVING ORGANISMS

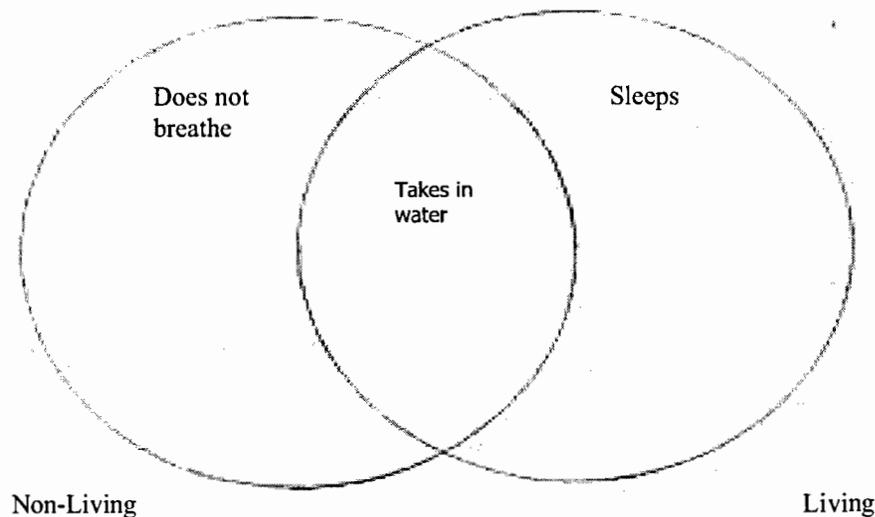
Unit 7 • Chapter 1: Characteristics of Living Organisms

Guiding Question – K: What Do I Already Know?

Discuss this question with your classmates: What are the similarities and differences between living and non-living things?

ACTIVITY

Use the Venn diagram below to answer the above questions. In the two large circles labelled 'living' and 'non-living', write the ways living and non-living things are different (contrast). In the area where the two circles overlap, write the ways living and non-living things are similar (compare). When everyone in your team has finished, compare your answers.



Living things are called **organisms**. Organisms or living things can be as small as a bacterium or as large as an elephant. Namibia is the home of some of the largest organisms on the planet. As you discovered when completing your Venn diagram, living things have the same seven characteristics. Four of those characteristics are growing, eating, reproducing (having babies), breathing, producing waste, and moving about. Also, all organisms have what is called a **cycle of biological organization**.

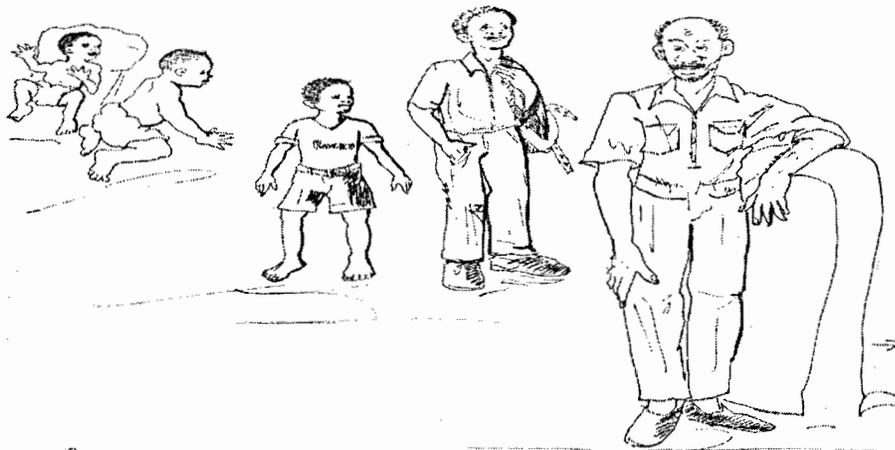
W – What Do I Want to Learn?

ACTIVITY

Now that you know some of the characteristics of living things, list examples that show why these characteristics are important.

<u>Characteristic</u>	<u>Importance</u>
Growing	
Eating	
Reproducing	
Moving About	
Breathing	
Produce Waste	

You are a miracle!!



Living things begin their life cycles very small. Plants begin as seeds. Humans begin as a single cell that is smaller than a dot made by the sharpest pencil you own. In order to survive and create another generation, living things must grow or **mature**. Living things are able to mature by providing their bodies with the proper nutrients through food. When living things are mature and healthy, they are capable of **reproducing** or having babies. Healthy babies begin the life cycle again.

It is important that living things are able to get food or flee to safety. Being able to move is essential for some living things to survive.

L- What Did I Learn?

ACTIVITY

Using a Venn diagram, compare and contrast the biological organization of each pair listed below:

- reptile and human
- arachnid and bird
- tree and human
- bird and reptile
- arachnid and reptile

If there are five people on your team, each person can complete at least one Venn diagram.

Unit 7 • Chapter 2: Plants

Guiding Question – K: What Do I Already Know?

Plants need water and sunlight to make their food.

Plants also have levels of biological organization. They grow, eat, reproduce and move. Wait a second, how does a plant move? That is not the question. The question is when does a plant move? Plants move at the very start of their life cycles. The fruits and seeds of plants are moved from one place to another by wind, water, and other animals.



How does your garden grow?

Plants use **carbon dioxide**, water, and sunlight to make their own food. The leaf of the plant contains two substances that work together to make food. The green substance is called **chlorophyll** and the yellow substance is called **carotene**. The rays of the sun help leaves to make these two substances. Chlorophyll and carotene make sugars (glucose) that the plant uses for food.

W – What Do I Want To Learn?

How do plants grow in places where there isn't a lot of sun, like Alaska and the northern areas of Scandinavian countries?

Are the reptiles and arachnids found in Namibia the same as the ones in Alaska and the northern areas of Scandinavia?

How does your garden grow?

Plants use **carbon dioxide**, water, and sunlight to make their own food. The leaf of the plant contains two substances that work together to make food. The green substance is called **chlorophyll** and the yellow substance is called **carotene**. The rays

of the sun help leaves to make these two substances. Chlorophyll and carotene make sugars (glucose) that the plant uses for food.

Plants and trees send roots into the soil to collect nutrients to help it grow. Soil and water help the roots get the nutrients to the plant.

Plants grow more quickly during the spring and summer seasons. This is the time of year when the sun shines for longer periods of time and there is more rain. During the fall and winter, plants grow slowly. The leaves of many plants change their colour as the green chlorophyll breaks down. These trees actually lose their leaves during the winter season.

Carbon dioxide is one of the gases humans exhale. Green plants and trees absorb carbon dioxide and give off oxygen as they go through their life cycle.

Dispersion of Seeds and Fruits

The **dispersion** (dis per sion) or spread of seed and fruit is one of the ways in which plants move from place to place. In addition to being carried by humans, animals carry, drip, and drop seeds and fruit as they graze or walk past. Some seeds travel many kilometers when the wind blows them from the branches of the plant; others may be carried along by water in streams or runoff after the rains. The new plants may have to adapt to conditions that are very different from those of the parent plant.

L – What Did I Learn?

Discuss the following questions with your team mates. When you have completed the discussion, write your answers in your journal. Be warned, for the last two questions, there are no "right" or "wrong" answers, but write the best answer based on the scientific information you know.

1. How are humans and plants interdependent?
2. What would happen if there were too few trees compared to the human population?
3. What would happen if there were too few humans compared to the tree population?

Unit 7 • Chapter 3: Animals

Guiding Question – K: What Do I Already Know?

Namibia has many different kinds of animals. Compare and contrast the types of animals that live in your region of Namibia. What do the different animals have in common?

There are many different kinds of animals. Animals can be sorted according to how they are alike and how they differ. For example, animals with scales are called **reptiles** (rep tiles); **birds** have feathers; and, **mammals** have fur or hair. Animals are able to live in many different environments because they learn and adjust to their surroundings. Another unique characteristic of animals is that their bodies include a nervous system and sense organs.

W – What Do I Want To Learn?

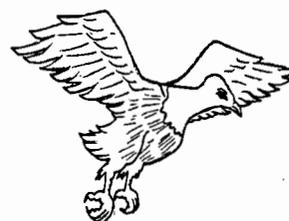
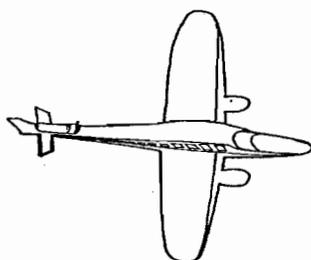
How do animals differ?

Are the birds, mammals, and reptiles found in Namibia the same as the ones in Alaska and the northern areas of Scandinavia?

Birds

Each year thousands of tourists from all over the world come to our country with one purpose in mind. They want to go on a safari or bird watching. Namibia is the home of about 620 bird species and some of the largest mammals on the planet. All of these animals **inhabit** different kinds of environments.

Birds are warm-blooded animals with a skeletal system like humans. They have wings, feathers, and beaks. Look at the diagram of the airplane and the bird. Discuss with your team mates their similarities and how their structures enable them to fly.

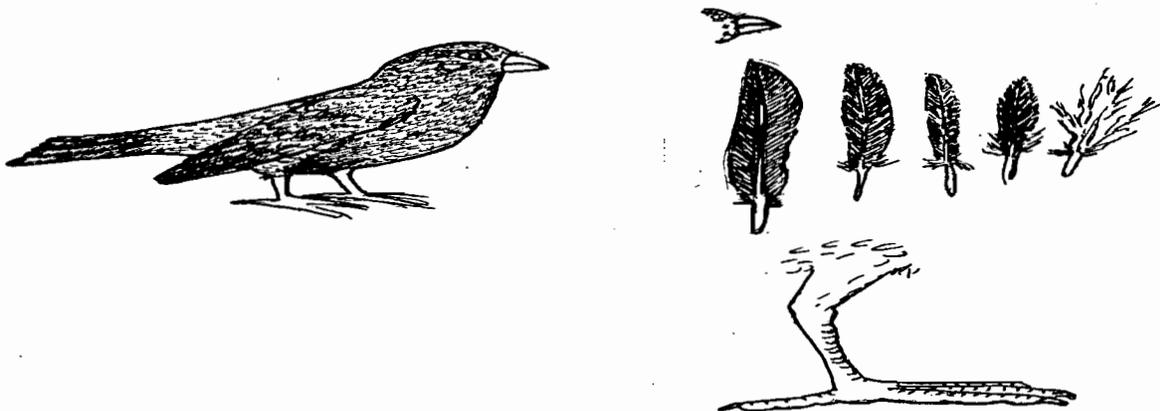


You and your team mates have probably noted the similarities between the shapes of the wings of a plane and a bird. Both are built to help with lifting off the ground. The plane is powered by an engine while the bird gets its energy from a strong heart and food. Flying birds are excellent hunters. Flying helps birds to flee predators and change environments.

The Bird Engine

Birds have two small lungs with sacs around them. The air sacs keep the lungs inflated even when the bird is exhaling. Our lungs fill and empty. A bird's respiratory system allows it to inhale and exhale while keeping oxygenated air in its lungs.

Bird movements vary. Some birds fly, while others run well, like the ostrich; other birds swim, like the penguin. Not all flying animals are birds and not all birds fly. Birds' feathers are modified scales. There are different types of feathers that have different uses. Feathers are used for flying, warmth, and courtship.



- Are penguins birds?
- Why do some birds fly to warmer climates?
- Do birds have knees?

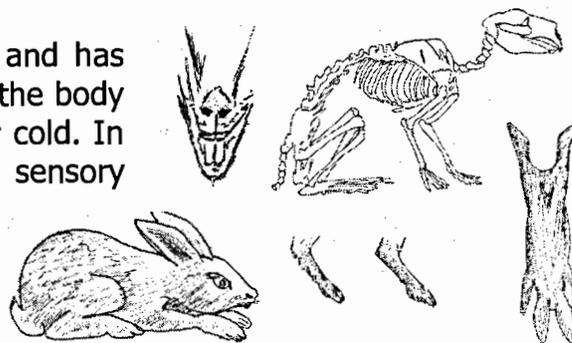
Yes, birds have knees and their knees bend the same way ours bend. Birds also can bend their legs backward at the ankle.

Now, does your team know whether penguins are birds and why some birds fly to warmer climates? Are penguins birds?

Mammals

There are about 5,000 species of mammals in the world. Mammals share three characteristics that are not found in other animals: hair, three middle ear bones and the ability to produce milk.

Hair is made of a substance called **keratin** and has four functions. Hair helps to keep heat inside the body and provides some protection against heat or cold. In some mammals, hair, like whiskers, has a sensory function and helps to determine how close things are. Some mammals can change their hair colour and pattern to protect them from predators.



Reflection

- Why do humans have different textures of hair?
- Did you know that the quills on porcupines are considered its hair?

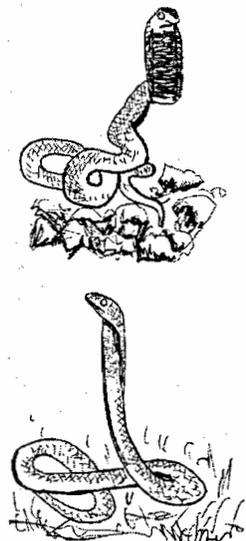
The **malleus**, **incus**, and **stapes** are the three middle ear bones that help mammals hear. The ability to hear helps mammals to communicate with each other and flee predators. Female mammals feed their newborn with milk that is rich in fats and protein.

ACTIVITY

With your team mates, compare bird and mammal systems.

Reptiles

Reptiles have been on Earth for over 300 million years. They have protective skins and differ in size, shape, color, and lifestyle. Some also have toes with claws. Crocodiles, lizards and snakes are reptiles. Reptiles have **vertebrae** (ver te bre). Vertebrae are also so called skeletons. Reptiles, even snakes are considered **tetrapods** (tet ra pods) and **amniotes** (am ni otes). A tetrapod is an animal that has four legs or whose ancestors had four legs. Amniotes lay eggs with a waterproof shell. Many reptiles are also **cold-blooded**, that is, they use their environment to regulate their body temperature.



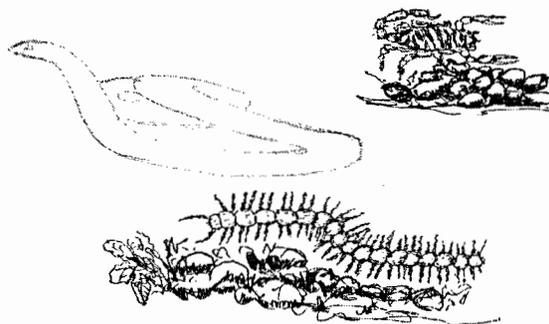
Watch Out!

As a child growing up in Namibia, you have probably heard the adults in your family talk or warn you about animals that are dangerous to humans. Complete the 'Dangerous Animal' chart. Work alone first, then check your list against those of your classmates. Are there any animals that all of you identified as dangerous? Are there any animals that only one or two people noted? Are the majority of your classmates unsure of some facts? Which? Research each questionable fact for accuracy.

Dangerous Animal Chart	
Name of Dangerous Animal	Danger it poses to humans

Any animal may be a threat to another animal. For example, if you and your family were out in the desert and a scorpion began to crawl toward your baby brother, what would your parents do?

Animals react to threats because they want to protect themselves. Animals will kill another animal because they need food. Remember, in a lion's eye, you're a piece of chicken. Therefore, before you visit an area that is not inhabited by humans, you need to know about the environment in order to avoid dangerous situations.



Unit 7 • Chapter 4: Nutrition

Guiding Question – K: What Do I Already Know?

What purpose does food serve for the human body?

Food provides us with the fuel or energy we need to be able to play, work, and live healthy lives. The fuel we get from eating food is called **nutrients**. No one food has all the nutrients we need for energy or to be healthy. Different foods provide different nutrients. You need to eat a variety of foods to get all of the important nutrients. When we eat the proper foods we not only have a lot of energy, but we are feeding our bodies what it really, really likes to eat.

W - What Do I Want To Learn?

What is the best way to be sure that I get all of the nutrients that your body needs each day?

ACTIVITY

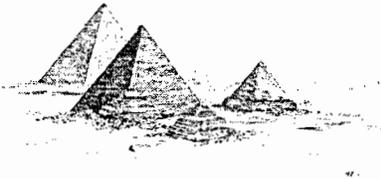
Complete this activity below and you will have started your list of foods good for your body. Put the food sources in the box below into the correct Food Source box.

THE NUTRITION CHART		
cattle corn apples	goats flour cooking oil	chickens carrots candy
wheat peas lard		
FOOD GROUPS	FOODS SOURCES	NUTRIENTS
Breads, rice, maize, & potatoes		These are called carbohydrates
Fruits & vegetables		These provide vitamins and minerals
Meat, fish, eggs, milk cheese, dry beans		These are called protein
Butter, oils, margarine		These are called fats
<p>With your team mates, discuss the importance of the food types for human health.</p>		

To acquire all of the necessary nutrients to be healthy, we need to eat foods from all the different FOOD GROUPS. Some foods provide more nutrients than others to keep us healthy and give us energy. We need to eat more foods from some groups and less from others. *A balanced diet is a diet containing all the necessary foods substances (nutrients) in the right amounts.*

Not eating enough food to acquire the nutrients for a balanced diet can cause health problems. Two health problems which are caused by a lack of nutrients are **goitre** and **marasmus**. A goitre is a large swelling in the throat and it is caused by a lack of iodine. Iodine can be acquired by eating the proper amount of iodized salt. Marasmus is a condition in infants and young children caused by malnutrition. Marasmus is caused by not eating enough food, especially protein. People with marasmus tend to look very thin, have dry skin, poor muscle development, and are irritable. They also lack energy and appear sleepy. However, once people with these conditions ingest enough nutrients, these conditions will reverse. Eating a balanced diet will prevent these and other nutrition related problems.

ACTIVITY



One of the strongest structures in the world is the pyramid. The strongest point of the pyramid is the bottom or the foundation. If you were to place the different kinds of foods listed in the Nutrition Chart into a pyramid with the most important foods at the foundation and the least important foods at the top, how would you stack them?

L – What Did I Learn?

ACTIVITY

Based on what you already know, discuss the following with your team mates:

Describe the effects of poor eating habits in relation to lack of food.

Create a group list to share with the entire class.

If you have a brother or sister who is between the ages of 12 – 14, you have noticed their bodies are beginning to look more like an adult. They are between childhood and adulthood and, you are right, their bodies are going through some serious changes. Research the Internet or in an encyclopaedia to find what nutrients their bodies need most during this time of change.

Unit 7 • Chapter 5: The Human Body**Guiding Question – K: What Do I Already Know?**

The body is like a combination of machines. The brain is like a computer and the rest of the body is like a car.

How are the systems of the body like a car?

There are many different systems in the Human Body. These systems are important for us to live a healthy life and they need to be understood better and cared for properly.

The systems of the human body include the **digestive system, respiratory system, excretory system, circulatory system, reproductive system, support or skeletal system, and the nervous system**. Each of these systems must do their individual functions or jobs properly for us to be able to live normally. When one of these systems does not function properly, disease and illness sets in.

W – What Do I Want to Learn?

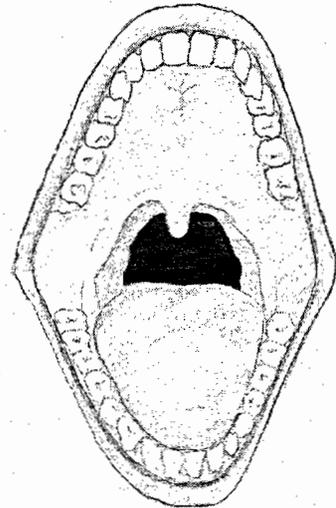
How does each system work to protect the body from illnesses and diseases?

Systems Ready?

Let's take a look at the **digestive system**. The digestive system's job is to change food from its raw form (the way we eat it) into a substance that can enter our blood stream. Therefore, an important part of this system is the mouth and teeth. In the mouth, the first part of digestion starts with the food being chewed so that it can be digested easier in the stomach and intestines. If teeth are missing or they are damaged, then chewing can become difficult. Foods that require more chewing, like meat or hard fruits and vegetables, will not be eaten. Not eating these important foods can cause people to get sick because they lack the important nutrients that those foods provide. So, one way to properly care for the digestive system is to keep your teeth healthy.

At home, get a mirror and look at all of your teeth. You will see that you have many different looking teeth in your mouth. As a matter of fact, there are four different types of teeth. Although teeth help us grind up food, each type of tooth is designed to do something different. Let's look at the different types of teeth and their function.

The four types of teeth are the incisors (in si zors), cuspids (cus pids), bicuspid (bi cus pids), and molars (mo lars). **Incisors** are the eight front teeth, (four on top, four on bottom) that are used for cutting and biting. These teeth work like scissors to cut food like scissors cut paper. **Cuspids** are the four teeth located on either side of the incisors (two on top, two on bottom) that are shaped for tearing food. These teeth tear food like someone tearing paper into strips. **Bicuspid** are the eight teeth located behind the cuspids (four on top, four on bottom) that are shaped for crushing food. These teeth crush food much like someone would crush nuts or dry cereal. Molars are the last teeth towards the back of your mouth. They are much bigger than the bicuspid and have larger, flatter chewing surfaces because their job is to chew and grind the food into smaller pieces. These teeth chew and grind food much like someone would crush grain or nuts between wood blocks and grind it into powder.



ACTIVITY



Now you know the functions of the four types of teeth. Discuss this with your team mates and make a list of the foods you would NOT be able to eat if these teeth were missing.

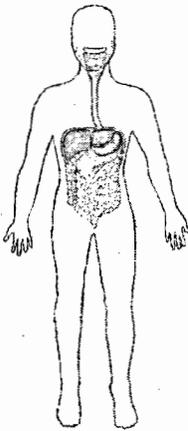
Caring for Your Teeth

1. Brushing your teeth after each meal helps keep teeth healthy and bright.
2. Brush your teeth before you go to bed and when you wake up in the morning.
3. Rinse your mouth out with when you can't brush
4. Eat foods without a lot of sugar



Once the foods we eat are changed to basic nutrients so that the body can absorb them, the **excretory system** also helps the body eliminate what it doesn't need from the foods we eat. This is what we call *waste*.

In the **stomach** the food is mixed with fluids that continue to break the food down into nutrients. After about four hours, the food, now a thick paste is pushed into the **small intestine** (in test tin) where the nutrients are absorbed into the body. The remaining undigested food moves into the **large intestine** or colon where it awaits elimination through the **rectum** (rec tum).



Our **Respiratory system** provides us with the ability to breathe in oxygen and to exhale carbon dioxide. Take a deep breath and follow the inhaled oxygen as it travels through the system. First the oxygen enters through the mouth and nose. Next it travels to the back of the mouth where it enters the **pharynx** (fair inks) which is commonly called the throat. Then the oxygen makes its way through the **epiglottis** (e pig lot is) which is a flap that opens to direct oxygen down to the **trachea** (tray key a).

When the epiglottis is closed, it directs food we have just chewed down another path to the stomach.

The oxygen you have inhaled then travels through the trachea to the two lungs by way of the two **bronchi**. From the bronchi the oxygen moves deeper and deeper into the lungs all the way to the tiny **alveoli** (al vee o lie). In the alveoli the oxygen is passed into the blood and carbon dioxide is passed out of the blood. Now, exhale and the system changes direction sending the carbon dioxide out of your mouth into the air.

Don't talk with food in your mouth? Your parents are wise people. Have you ever choked on food? If you have, it is because the epiglottis was confused and remained opened. Instead of your food going down the tube toward your stomach, it was headed to your lungs through your trachea. Besides, it looks yucky when you talk with a mouth full of food. Eeeeeeeew!

ACTIVITY

In and Out Jeopardy

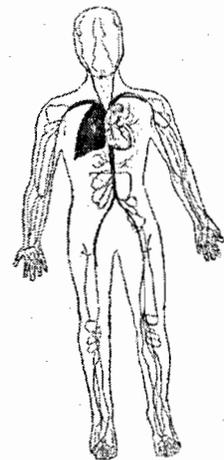
Listen to the teacher read a statement about the digestive, excretory, and respiratory systems. Then discuss possible answers with your team mates during a 'wait time'. When the team has agreed on one answer, the Team Leader can raise a hand to be recognized. The teacher will call on the first group raising hands and ask for their response. The Team Leader will put the answer in the form of a question- What is the _____?

Example: Food is broken down mechanically by chewing. (What is the mouth?)

Statements:

1. Tube that allows food to travel from the mouth to the stomach.
2. Food continues to be broken down into substance for the small intestines.
3. These break down foods first before being swallowed.
4. Go one way and you're at the stomach. Go another way and you are in the lungs.
5. Can sound like a washing machine if you do not feed it. Hurts if you stuff it.
6. Food probably screams, "Wheeeeeeeee" as it slides down this tube on the way to the stomach.
7. On the outside of this, you can wear a necklace.
8. Exchanges oxygen and carbon dioxide in your blood.
9. Just give me about four hours and lots of fluids and you won't recognize that piece of corn.
10. When you inhale, we fill up like balloons. Love that oxygen! I love it when you blow out carbon dioxide.
11. If you checked out our picture, we look like a pile of noodles.
12. Without us, you're eating baby food.
13. It's lights out for you if you inhale me. You are not a tree. One false move and I'll choke you.

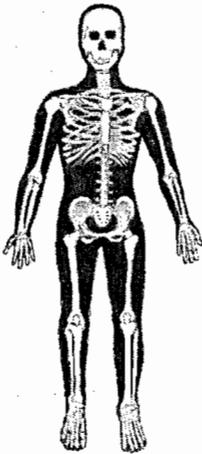
Think of the **cardiovascular system** as the body's highway or transportation system. This system includes blood, blood vessels, and the heart. Each adult has about 4.7 litres of **blood** in their bodies. Blood is very important because it carries nutrients, waste from cells, oxygen, and most importantly the cells that make up our immune system. The blood cells in our immune system are used to fight pathogens. **Blood vessels** carry the blood to and from the heart. The blood vessels that carry blood away from the heart are called **arteries** and the ones that carry blood to the heart are called **veins**. Where the arteries and veins come together are called **capillaries**. With each breath you take, the oxygen you inhaled travels all the way to the alveoli where it is passed to the blood! From the alveoli, the blood travels to the heart where it is pumped to the whole body through the arteries. At the capillaries, the oxygen is unloaded for the cells to use and the carbon dioxide or waste is loaded for the trip back to the heart through the veins.



When HIV turns into AIDS, a person has difficulty producing **white blood cells**. White blood cells help the body fight off infections. When the body cannot fight off infections, pathogens can thrive and grow. HIV affects the body's immune system. Your white blood cells are your own personal army. When you are healthy, your white blood cells will fight infections for you. You keep your white blood cells happy and they will take care of you.

The **reproductive systems** for males and females share some similarities. They both are controlled by hormones and both are made of similar tissues. The male reproductive system shares some of its parts with the **excretory system** whereas, in the female reproductive system, the reproductive system and the excretory system are separate.

The support or skeletal system is the back bone of the body, no kidding! It not only consists of all the body's 206 **bones** but the skeletal system also includes the **ligaments and cartilage**. Ligaments are the tough fibres that bind **joints** together. **Cartilage** is the soft tissue between bones and gives a smooth surface for bones to fit on each other. A joint is where two bones meet and where you will find cartilage and ligaments.



The skeletal system performs four terrific functions:

1. it holds up all the other systems
2. it protects important body parts like the spinal cord with the spinal vertebrae and the heart and lungs with the rib cage
3. it works with the muscles so we can move around
4. it produces red blood cells in the centre of the bone called the **bone marrow**.

ACTIVITY

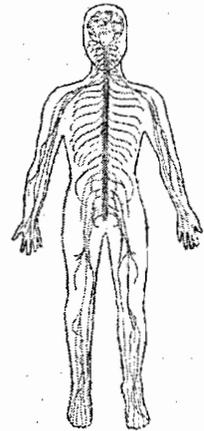
Super Support Highway Jeopardy

Listen to the teacher read a statement about the cardiovascular, reproductive and skeletal system. They will then discuss possible answers during a 'wait time'. Then discuss possible answers with your team mates during a 'wait time'. When the team has agreed on one answer, the Team Leader can raise a hand to be recognized. The teacher will call on the first group raising hands and ask for their response. The Team Leader will put the answer in the form of a question- What is the _____?

1. Bend me, jump with me, but please don't break any of the 206 of my family.
2. There is a boy version and a girl version of this system.
3. I am needed to hold your bones together.
4. Attention! Our body fell. Run to the battle and do not let any pathogens come in! I am warm, red and oh so smooth. Why do people panic when they see me flowing?
5. Soft, cushiony, helps your bones fit like puzzle pieces.
6. Without me, your guts would be floating around in your skin.
7. The HIV pathogen weakens me. In this condition, I can't even fight off a cold for you. Sorry!

8. Look out; we're carrying blood away from the heart.
9. Ok, but stay on your own side, we're carrying blood to the heart.
10. Oh well, the two of us will can meet here anyway.
11. I am where you find ligament and cartilage meeting.
12. I am where red blood cells are made.

You've got a lot of nerve. As a matter of fact, you have billions of them. Our **Nervous system** constantly transports information to and from the **brain** and the **spinal cord** to every part of the body. This system uses nerve cells which are separated into two separate, but linked parts called the **central nervous system or CNS** and the peripheral **nervous system or PNS**. It sounds complicated but it's easy to understand.



Think of the CNS as only the brain and the spinal cord. The PNS is all the branches, like those of a tree, off the central nervous system. The PNS take messages from the brain (CNS) to the muscles, skin, internal organs, and glands.

ACTIVITY

Look at the illustration. This person has just burned his/her finger on the stove. Think about the sensations this person is feeling when their finger touches the hot object. Discuss with your team mates how long it takes the PNS to get this message back to the CNS.

Here is what the body experiences when a finger gets burned. The **neurons** or nerves in your finger sense the heat and then the burn and sends the information through the PNS to the CNS. The brain takes the information (how hot was the fire, how big an area is burnt, how long was the finger in the fire) and decides on the best action. The brain sends its response back through the CNS to the PNS to the muscles of the arm which instantly pull back away from the fire. Aren't you glad this all happens in the blink of an eye! Is that incredible or what! The brain is only about 1.35 kg but it has incredible power.

The spinal cord runs down your back and is protected by the **vertebrae** of your spinal column. The neurons are located all over your body and send messages through each other in a fraction of a second. Next time you burn your finger think of how cool the nervous system is!

And remember, you are a miracle.

Create a role play that demonstrates how the PNS talks to the CNS about touching a hot plate. Include in this role play how the CNS responds after it has touched the hot plate. Be prepared to share your skit before your classmates or perhaps you can perform it before the little ones in the first and second year.



Our **Endocrine system** produces **hormones** from **glands** or organs in our body. Hormones from different glands and organs are carried throughout the body by the blood. One of the most important glands is the **pituitary** gland. The hormones it produces not only control growth, daily energy production, and reproductive functions, but also control the functions of other glands. This is why it is called "the master gland."

Two other important glands or organs that produce hormones are the **testes** in males and **ovaries** in females. Hormones from these glands impact the development of secondary sex characteristics in males and females.

Discuss the following with your team mates: The pituitary gland is called the 'master' gland. Based on what you have read so far, what could happen to the body if it does not work properly?

ACTIVITY

Draw a line connecting each system with the correct body parts.

Human Body Matching Game

System

- Respiration
- Digestive
- Reproductive
- Nervous
- Endocrine
- Cardiovascular
- Support

Body Parts

- heart, arteries, veins and blood
- sweet glands, nerves and sense organs
- bones, ligaments, cartilages
- hormones
- male and female sex organs
- oxygen, lungs, and nasal cavity
- mouth, tongue, small and large intestine

ACTIVITY

Discuss these questions with your team mates then answer each in your journal:

- List the foods and things a child does to take care of his/her teeth.
- List the ways in which you take care of your support system.

Reflections

- How does the brain keep track of all the body's systems?
- Scientists can perform heart transplants, but will we ever be able to perform a brain transplant?
- What is artificial intelligence?

Unit 7 • Chapter 5: Human Development

Guiding Question – K: What Do I Already Know?

As we get older, our bodies mature, but what actually happens during puberty?

As children get older and grow, they change or mature in many ways. As children **mature, physical changes** or the changes to their bodies are very easy to see. These rapid physical changes are called **puberty** and happen during **adolescence**. Adolescence is when you are no longer a child but you are not an adult either.

W – What Do I Want To Learn?

ACTIVITY

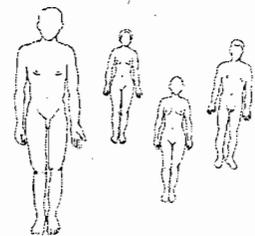
Having a healthy diet during puberty is essential.

1. Research the 'best diet during puberty'. Make a list of which foods are best and why.
2. Repeat the same research and make a list of 'worst diet during puberty' foods and why.

What skills are needed for developing effective social relationships?

Physical Development

The physical changes that occur during puberty are different for boys and girls and, oftentimes, happen in girls at an earlier age than in boys. While many of the changes are very easy to see, others, occurring inside their bodies, are less noticeable. Let's look at the outward physical changes to both boys and girls.



During puberty, it is common to feel really good and then to feel really sad; these are called **mood swings**. Mood swings can happen because of an increase in substances being produced in your body called **hormones**. These hormones are very important because they control the important physical changes taking place. Two very important physical changes are the production of sperm and ejaculation in

males and the start of menstruation in females. These two changes mark the beginning of the ability to have children.

Mood swings can also occur because we are uncomfortable with the many rapid physical changes taking place. Being **self-conscious** about our changing body is very normal. Sometimes our friends begin puberty earlier or later than us and this too can make us feel self-conscious. Some girls begin menstruation earlier or later than others while some girls show more breast development than others. Remember, because every human being is different we each grow at our own pace.

ACTIVITY

Having a healthy diet during puberty is essential.

3. Research the 'best diet during puberty'. Make a list of which foods are best and why.
4. Repeat the same research and make a list of 'worst diet during puberty' foods and why.

Remember, this is the only body you have. Treat it well and it will do well for you.

Social Development

Are there some things you really enjoy doing? Do you enjoy the same things now that you did three or four years ago? Can you remember when you were a young man or woman, say about the age of 6 or 7, what kind of things did you enjoy doing then? Let's take a look at the things you enjoyed doing then and now.

ACTIVITY

Make a Venn diagram showing the things you liked doing when you were 7 and the things you like doing now. If there are things that you liked doing at 7 and still like to do now, you write those things put them in the area where the circles overlap.

ACTIVITY

Did you have a favourite blanket or toy when you were little? Did your parents save any clothes from your infancy or toddling period? Do you have pictures? Or is there a family story your parents like to tell about something you did or said when you were much younger. Create a "Baby Day" poster with pictures and bring something your family saved to school to share with your classmates. Be sure you ask for permission first and take care of those memories.



Self-Esteem

A part of your self-esteem is called self-concept. **Self-concept** is the way you imagine and see yourself as a person. Someone who has a positive self-concept can not be persuaded to do something that is clearly wrong simply because someone else is doing it. People with a positive self-concept feel good about themselves. They make their own decisions and no amount of peer pressure will change their minds.

Sometimes kids do things because they want to be accepted by other kids. It's normal to want to be accepted. But sometimes a few bad kids try to get other kids to do bad things by threatening them or making fun of them. This is called **intimidation or bullying**. When kids are intimidated they might do bad things even though they know it's not the right thing to do. This is called "**peer pressure**" because your friends and the people who are your same age are your peers. The pressure you may feel coming from your peers is strongest during adolescence. Peer pressure is really powerful when our **self-esteem** is low. Self-esteem is a measure of how much you value, respect, and feel confident about yourself. In other words, it's how you feel about yourself.

ACTIVITY

Ben and Penda have lived next door to each other since they were both little children. They spent so much time in each other's homes, they each began to call each other's parents- uncle and auntie. Ben and Penda even attended the same school. One day Ben asked his friend if he wanted to smoke a cigarette that he had stolen from his dad.

Work with your team mates to make up a play that tells the ending of this story.

Reflection

Self-esteem is a very important concept. Stop and really think about how you feel about the person you are now. What do you really really love about yourself? If you could change some things, what would they be? How do you think other people in your class think about you? You will not share this list with your classmates so be as honest as you can as you answer these questions in your journal.

ACTIVITY

Discuss the following with your team mates.

Have you ever seen learners tease a classmate or someone who goes to your school? As you watched, what were your feelings? Did you do anything? What? If you could witness this again, what would you do differently?

Can peer pressure be positive? What are some ways peer pressure can be positive? List as many ideas as you and your team mates can think of.

Elizabeth gets together every week with a group of friends to listen to music. The 8 girls in their group are really into the music and dancing, but one of Elizabeth's friends is worrying her. Her friend's body is changing more rapidly than Elizabeth's and the other girls and she looks more like a 16 year old than a 10 year old. Elizabeth's friend always wants to talk about boys and walk around areas where older boys are playing football. She likes the way the boys look at her.

One day Elizabeth decides to have a 'doll' party, something none of the girls have played with for a long time. After all, they are in their fifth year. Each girl has to bring her favourite doll and share stories about how important this doll was to them. The girls end up giggling and even playing with their dolls as they did when they were much younger. In the end, one of the girls began a conversation about being glad they could still play like girls. It was the friend who was trying to act older than she was.

This was an example of Elizabeth and her friends using positive **peer pressure**.

Avoiding Trouble and Keeping Your Friends

Working with your team mates, create a list of answers to this question:

Why should you think of ways to avoid negative peer pressure *before* you are actually in the situation?

Refusal skills are pre-planned responses to negative pressure situations. For example, when peers say "let's not go home right after school today", you say "I can't. My mom calls everyday to make sure I have arrived safely." Refusal skills are great ways to get out of a negative peer pressure situation. You need to think of things to say before you have to use refusal skills. That way, you will sound natural when you have to use them.

1. Name the trouble and Say no. Try Using your sense of humor.

"If I go home smelling like smoke, it will take my mom 4 months to stop screaming!"

"That is shoplifting. If we get caught my parents would not only be angry, they would be hurt and ashamed. The police would be called in too!"

2. Offer an alternative.

"No, I can't go home smelling like cigarette smoke. Anybody interested in a game of football?"

3. Stand your ground.

"Ok, if no one wants to play football, want to listen to some music at my house?"

4. Walk away.

"I'm heading to the playground to see if there is a football game going on. See you later!"

5. Plan ahead.

When a friend asks you to go with him/her someplace, ask questions so you will know what you are getting yourself into.

6. Have a support system. Find the people in your crowd who think most like you.

Go and hang out with other people. Talk about negative peer pressure and how the two or three of you will respond when it happens.

HOME ACTIVITY

With your family, describe the responses you would use to the following story. These responses can be memorized and used as refusal skills to respond to situations of peer pressure. Remember to be clear and choose your words carefully.

Pat and Kim have been friends for only a short period of time. Pat having just moved to the new school where he and Kim became friends. Kim seems like a great person, popular with the cool girls and guys alike. One week end Kim asks Pat if he wants to go to the schools football game, Pat accepts. At halftime Kim suggests that they leave the game to go meet some friends. Kim has never been anything but a nice person and good friend, however, when they meet the other people, Kim starts to act really bad, talking trash and trying to be all cool. It becomes apparent to Pat that Kim is trying to impress everyone by acting "cool." As Pat is meeting everyone, one of Kims friends offers him a pull on a cigarette.

ACTIVITY

Working with your team mates: Think of a role play that shows how someone your age uses refusal skills to avoid trouble. Remember to name the trouble specifically and keep it real. In other words, don't use 'robbing a bank' as a possible negative situation. Write your situation in paragraph form. Trade with another team and have them act out your role play.

The New Namibia

As Namibia begins to make economic progress in today's global economy and deals with the devastation of the AIDS pandemic, it needs all of its resources, especially human resources.

There was a time when we believed that men and women could only do certain jobs. This is called gender role or sex role stereotyping. As a country, how could we slow our progress if we thought that only women could be nurses or that the best teachers are always men?

ACTIVITY

Look at the chart labelled **ROLE SURVEY**. Put an 'X' in the gender box if you think most people still consider this a job that **ONLY** males or **ONLY** females can do. If it is a job that most people think both men and women can do, mark an X in both boxes.

Take the list home. Talk with some of your family members of about the role survey and mark their answers on your chart, the same as you did your answers. Circle their X's to tell their answers from yours. Discuss any differences between your answers with your family and note any interesting comments. Compare your list with those of your classmates.

ROLE SURVEY

	Male	Female	Comments
Nurse			
Hockey Player			
Pilot			
Typist			
Soldier			
Bus Driver			
Miner			
Elementary Teacher			
Telephone Operator			
Homemaker			
Boxer			
Senator			
Hair Stylist			
Plumber			
Artist			
Judge			
Model			
Gymnast			
Scientist			
Explorer			
Football Player			
File Clerk			
Airline Attendant			
Race Driver			
Doctor			

Reflection

Discuss jobs that interest you with your family. List the jobs that you think would make an interesting career when you grow up.

1. Are they jobs that used to be only for men, or only for women?
2. If you are a girl and you want to be a plumber, do you think your parents will understand and support your wishes?
3. If you are a boy and want to be airplane attendant, do you think your parents will understand and support your wishes?
4. What jobs still discriminate against women or men?

L – What Did I Learn?

What does life hold for me? What will I do?

1. What jobs will still be needed when you are an adult?
 - Are these jobs one your list?
2. What jobs do you think we will need in the future?
 - Are these jobs one your list?

How will making wise decisions now help me in the future?

Unit 8 Environment

Unit 8 • Chapter 1 Ecosystems

Guiding Question- K – What Do I Already Know?

In an ecosystem, all organisms are important to the system's survival. What impact do I have on my ecosystem?



Victoria lives in the Southern part of Namibia. She grows cabbage and tomatoes in her garden. The southern part of Namibia is known for its scorching sun and dry winds. Victoria has to water her garden regularly. The vegetables in her garden grow fast and are ready to be harvest.

Victoria and her family are not the only ones who enjoy the vegetables. **Caterpillars** eat the leaves of cabbage. If she lived in the north, she could grow maize, but the **stalk borer** would make holes in the maize stalks. Other animals help Victoria to control the **pests** in her garden. **Birds** find the caterpillars tasty and lizards find the beetles delicious. Bees, butterflies and ants play an important role in **pollination**.

Victoria's garden is an example of a human community and how its environment works together. Victoria's garden is an example of an **ecosystem**.

ACTIVITY

Working with your team mates, brainstorm a list of ways humans, animals, and plants work together in their environment.

1. List the **living things** that might be found in Victoria's garden.
2. List the **non-living things** that might be found in Victoria's garden.

Victoria's garden is an example of an ecosystem! An ecosystem includes the non-living and living things in an area. When you study an ecosystem, you study how living and non-living things interact with each other.

W – What Do I Want to Learn?

Review the information you learned in Unit 7 about living organisms.

1. What is an organism?
2. How do living and nonliving things contribute to the ecosystem?

In an ecosystem, all **organisms** within a **habitat** play a role in the **food chain**. A habitat is the place where living and nonliving things are located. The food chain describes how all organisms depend upon each other for food. Organisms in the food chain may be producers, **consumers** or **decomposers**. A food chain is a path way showing how energy is transferred from one organism to the other.

Plan and complete with your team mates:

An aquarium is a good example of an ecosystem. Create a diagram of an aquarium ecosystem. Be sure that your ecosystem includes both living and nonliving things. Show examples of living and nonliving things which are producers, consumers, or decomposers. You can research this on the internet or find a book about making an aquarium.

In an ecosystem, producers make their own food and are food sources for other animals. Plants are producers. Organisms that need outside food sources to live are called consumers. In an ecosystem, humans are consumers. Decomposers keep ecosystems 'clean' by acting like garbage collectors and recyclers. Decomposers feed on all the stuff producers and consumers don't use. Decomposers are things like bacteria. Producers, consumers, and decomposers balance the ecosystem.

L – What Did I Learn?

ACTIVITY

Find examples for the following words in Victoria's garden. Write your answers in your science journal.

1. Organism
2. Food chain
3. Habitat
4. Producer
5. Consumer
6. Decomposer

Unit 8 • Chapter 2: Animals Depend on Plants

Guiding Questions -- K: What Do I Already Know?

The organisms within an ecosystem are interdependent.

Animals get their energy by eating. Plants are one of the building blocks for the transfer of energy through the ecosystem. One way that energy in an ecosystem is transferred is through the food chain. Plants and plant products are eaten by **herbivores** (her bi vors). Herbivores are eaten by **carnivores** (car ni vors). **Detritivores** (de tri ti vors) eat the waste products of all organisms and dead organic matter.

In Unit 3, Biodegradable and Non biodegradable Matter, we learned that the breakdown of organic matter provides nutrients to the soil. The decay or breakdown of dead organic matter is also a way of providing organic energy to the ecosystem. The chemicals from the decaying organism fertilize the soil and are taken by plants as nutrients. The plants grow and provide food and shelter for animals.

W- What Do I Want To Learn?

Think about this question; then discuss your answers with your team mates: In what ways do humans depend on plants?

Humans use plants for food, housing, and fibres. **Fossil fuels** originate with plant life. Fossil fuels are used to power cars, homes, and industries.

ACTIVITY

List 5 herbivores that live in your community.

List 5 carnivores; at least 3 must live in your community.

What would happen to these animals if all the plants disappeared?

L- What Did I Learn?

Use the information you learned in Unit 7, Living Organisms, and Unit 8, Environments, to answer the question "how are animals dependent on plants?" Write your answer in your science journal and then share your response with your team mates.

Unit 8 • Chapter 3: Plants Depend on Animals

Guiding Question- K: What Do I Already Know?

Think about this question and discuss possible answers with your team mates:
How do plants contribute to the cycling of energy through an ecosystem?

W- What Do I Want To Learn?

ACTIVITY

Use the diagram of Victoria's garden to answer each of the following. Write your answer in your science journal. When you have completed this, compare your answer with your team mates.

1. Discuss and describe which plants are dependent on animals.
2. Why is this relationship important?

Plants form the basis of the food chain in most ecosystems. Yet plants also rely on animals. Animals provide transportation for plants and their seed. Plants and seeds that are eaten by animals may be carried to other areas on the coats of animals or deposited in other areas through the processes of digestion and elimination, in their original form or as fertilizer. Feeding, grazing, trampling, home building, and defecation are ways that animals can help to harvest, disperse, and recycle plants.

L- What Did I Learn?

ACTIVITY

How is a jar of honey a good example of plant dependency on animals?

1. Write your ideas in your science journal and then share them with your team mates.
2. Work backwards and recreate how the jar of honey is made. Draw illustrations of this process.

Unit 8 • Chapter 4: Overgrazing and Deforestation

Guiding Questions -- K: What Do I Already Know?

People, by their presence and use of the land, can change the nature of their ecosystem.

People change the ecology in many ways, just to provide a way to live. Two significant ways in which humans have brought about changes in the ecology are through overgrazing and deforestation.

W- What Do I Want to Learn?

1. How do people help the desert to grow?

Overgrazing

When animals feed on vegetation, it is called grazing. If too many animals feed in the same area or if the animals feed too long in the same area without giving the plants time to recover, **overgrazing** results. When an area is overgrazed, plant growth is reduced and there are fewer leaves to provide protection from sunlight. Plants may become weak and less able to survive dry weather.

Overgrazing impacts the environment in other ways. In arid or dry regions, overgrazing can lead to **desertification** (des er ti fi ca tion). In desertification, the savannah becomes desert. The pounding of the soil by animal hooves packs the soil and increases the amounts of fine soil. This contributes to **erosion** (e ro sion). Erosion is the displacement of soil by wind or water. Grazing can also reduce the number of plants that are available to help to bind the soil.

Deforestation

The cutting down, burning, or damaging of forests is called deforestation. There are various ways that deforestation can occur. Farmers may chop down trees to graze cattle or to plant crops. Government and industry may destroy trees to build roads or factories. Or, the wood from the trees could be needed for fuel or for construction.

Trees help to remove carbon dioxide from the air. When trees are cut, the rotting wood releases carbon dioxide back into the air. The same thing happens when wood is

burned. Deforestation also contributes to erosion. The leaves of the trees provide a buffering effect when it rains. This helps to reduce soil run off and the leaching of nutrients from the soil.

Trees also provide homes for many organisms. When the trees are destroyed, so are their homes or **habitats** (ha bi tats). Destruction of these habitats reduces the diversity of animal life in an area.

Plants are important. They influence climate, form soil and keep it in place, and aid the environmental balance by producing oxygen. In some parts of the world, plants, through agriculture, support the national economy.

People change the ecosystem by building cities and towns, farming and grazing animals, and through industry. The numbers and types of plants and animals in an ecosystem are affected and some may become **extinct** (ex tinct) or die out.

L- What Did I Learn?

ACTIVITY

Working with your team mates, write a report to share with your classmates about the changes in your community ecosystem.

First, interview a person in your family or community who is 30 years old or older. Write their answers to share with your team mates. Ask these questions:

1. How is the community different now from when you were a child?
2. What animals lived here when you were a child? Do they still live here? What new animals live here now?
3. Were there different plants here when you were a child? Which? Which plants that are found here today were not here when you were growing up?

Second, compare the answers from your interviews with those of your team mates. Suggest why some of the answers may differ. Be ready to report your findings to the class.

ISBN 1-9327888-15-8

