



SCIENCE CHAMPION

Hazel T. Victoria • Fatmawaty Munte

4

Student Book

Builds conceptual understanding, reasoning skills, and critical thinking through science learning



Published in Indonesia by:

PT ASTA ILMU SUKSES (member of Mentari Group)

RUKAN Sentra Niaga Puri Indah Block T1-14

West Jakarta 11610



: 0856 9785 6420



: @astailmusukses



: contact@astailmu.com



: www.astailmu.id

First published: January 2023

© 2023 Singapore Asia Publishers Pte. Ltd.

All rights reserved.

This English edition licensed to PT ASTA ILMU SUKSES. No part of this publication may be reproduced or transmitted in any form or by any means, or stored in any retrieval system of any nature without the prior written permission of **PT ASTA ILMU SUKSES**.

Science Champion – Student Book 4

Preface



is a science learning book specially designed to help pupils acquire scientific knowledge and understanding, develop skills, values, and attitudes. The scope of topics discussed at each level is arranged according to the science syllabus at the elementary level.



uses a very systematic learning method through the Inquiry approach that has been tested and proven to be an effective approach at improving student's competences in mastering science. The inquiry approach is used by Singapore to improve students' competences which is proven through their consistency as the top rank at PISA (Program for International Student Assessment) and TIMSS (Trends in Mathematics & Science Studies). The development of material for each topic is arranged in stages, starting from the easiest material to more complex material (spiral progression).



gives special emphasis on developing conceptual understanding and critical thinking skills to build a firm foundation in science. After the introduction of new concepts, students are invited to apply what they have learned in collaborative science activities. This book is equipped with a number of activities that will stimulate students' interest in the topic and consolidate their knowledge and understanding.



makes science learning meaningful and fosters a love of science learning in children with the use of colorful and engaging visuals as well as age-appropriate language.

Be a science champion!

Using This Book



has some special features that guide children to understand science concepts through systematic stages. Use them to help you learn as you use this book.

1

Learning Goal sets the learning objective of each lesson.



2

Explore is designed to access the pupils' prior knowledge.

3

Science Bank presents information that enriches the pupils' knowledge and understanding of the concepts in focus.



4

Science at Work enables the pupils to explore, discover, and acquire knowledge and skills through simple yet stimulating exercises that they can do at home.

Science at Work

Investigating Plants

What You Need

- pot and soil
- magnifying glass

What You Need to Do

1. Go to your school garden or a park near your home.
2. Use the magnifying glass to examine the plants and look for specialised structures that enable the plants to adapt to their habitat.
3. Use the data you have gathered to complete the table below.

Plant	Specialised Structure	What does it help the plant adapt to its environment?

Questions

1. What specialised plant structures were you able to find in the garden or park that you observed?
2. How are these structures important to plant survival?

Lesson 11

5

Looking Over allows the pupils to review the concepts presented in the lesson.

Looking Over

- Plants grow in different **terrestrial** and **aquatic** habitats.
- Terrestrial habitats include forests, grasslands, and deserts.
- Aquatic habitats can be freshwater or saltwater habitats.
- Plants in freshwater habitats have either submerged or floating leaves.
- Saltwater plants are mostly algae and phytoplankton.

Enhance Your Skills

1. Group the plants according to their habitat. Complete the table below.

Forest	Grassland	Desert

2. Group the plants according to their habitat. Complete the table below.

Plants in Freshwater Habitats	Plants in Saltwater Habitats

Lesson 12

6

Enhance Your Skills contains exercises designed to further develop the pupils' science skills.

7

Everyday Science offers simple and practical application of science concepts to the pupils' real-life experiences.



8

Linking Together presents a visual summary of the science concepts presented in the chapter.



9

Chapter Test allows the pupils to evaluate their understanding and mastery of science concepts and processes.



10

Making Connections

presents knowledge and issues, and relates them to the role of science in daily life, society, and the environment.





Table of Contents

Chapter 1 The Human Body

- 2** Lesson 1 Main Organs of the Human Body
- 20** Lesson 2 Diseases Related to the Main Organs of the Human Body
- 32** Lesson 3 Maintaining a Healthy and Strong Body
- 41** Linking Together
- 42** Chapter Test
- 44** Connections

Chapter 2 Animals and Their Habitats

- 46** Lesson 1 Parts of Animal and Their Functions
- 52** Lesson 2 Habitats of Animals
- 68** Lesson 3 Animals Adaptation in Their Habitats
- 79** Linking Together
- 80** Chapter Test
- 82** Connections



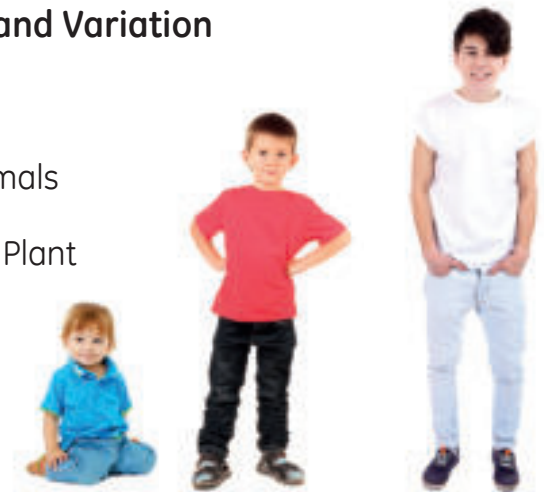
Chapter 3 Plants and Their Habitats

- 84 Lesson 1 Parts of Plant and Their Functions
- 92 Lesson 2 Habitats of Plants
- 104 Lesson 3 Plants Adaptation in Various Habitats
- 115 Linking Together
- 116 Chapter Test
- 118 Connections



Chapter 4 Heredity: Inheritance and Variation

- 120 Lesson 1 Life Cycle of Human
- 128 Lesson 2 Life Cycle of Some Animals
- 141 Lesson 3 Life Cycle of Flowering Plant
- 149 Linking Together
- 150 Chapter Test
- 152 Connections



Chapter 5 Properties of Matter

- 154 Lesson 1 Matter and Water
- 162 Lesson 2 Matter Undergoes Decomposition
- 172 Lesson 3 Useful and Harmful Materials
- 185 Linking Together
- 186 Chapter Test
- 188 Connections



Chapter 6 Changes in Matter

- 190 Lesson 1 Physical and Chemical Changes
- 200 Lesson 2 Useful and Harmful Changes
- 208 Lesson 3 Waste Management
- 217 Linking Together
- 218 Chapter Test
- 220 Connections



Chapter 7 Force and Magnet

- 222 Lesson 1 What Force Can Do?
- 230 Lesson 2 Magnetic Force
- 241 Linking Together
- 242 Chapter Test
- 244 Connections



Chapter 8 Energy

- 246 Lesson 1 Energy and Its Forms
- 254 Lesson 2 Transformation of Energy
- 261 Linking Together
- 262 Chapter Test
- 264 Connections



Chapter 9 Light, Heat, and Sound

- 266 Lesson 1 Light
- 279 Lesson 2 Heat
- 289 Lesson 3 Sound
- 299 Linking Together
- 300 Chapter Test
- 302 Connections



Chapter 10 Earth's Water Forms and Landforms

- 304 Lesson 1 Earth's Water Forms
- 317 Lesson 2 Earth's Landforms
- 328 Lesson 3 Earth Natural Resources
- 342 Linking Together
- 343 Chapter Test
- 346 Connections



Chapter 11 Weather

- 348** Lesson 1 Weather's Elements
- 358** Lesson 2 Different Types of Weather
- 365** Linking Together
- 366** Chapter Test
- 368** Connections





CHAPTER 1

The Human Body

In order for your body to work properly, the various parts perform different functions. Your brain controls your body's functions. Your heart and lungs help in blood circulation and respiration, respectively. Your stomach, intestines, liver, and kidneys help in digestion and excretion. Your bones and muscles allow you to move and perform various activities.



Learning Goals

- Name the main organs of the human body
- Explain the main function of each organ of the human body
- Describe how these organs work together to make the human body function properly

Main Organs of the Human Body

An **organ** is a group of tissues that has a particular form and function in the body.

The main organs of your body include the **brain, heart, lungs, stomach, intestines, liver, kidneys, bones, muscles, and skin.**

These organs work together to keep you alive. Some of these organs protect your body from harmful substances.

In this lesson, you will learn about the major organs of your body. You will learn about their functions and how they work together in performing various tasks for the body.



Explore!

What are the main organs of the human body?





Science Bank

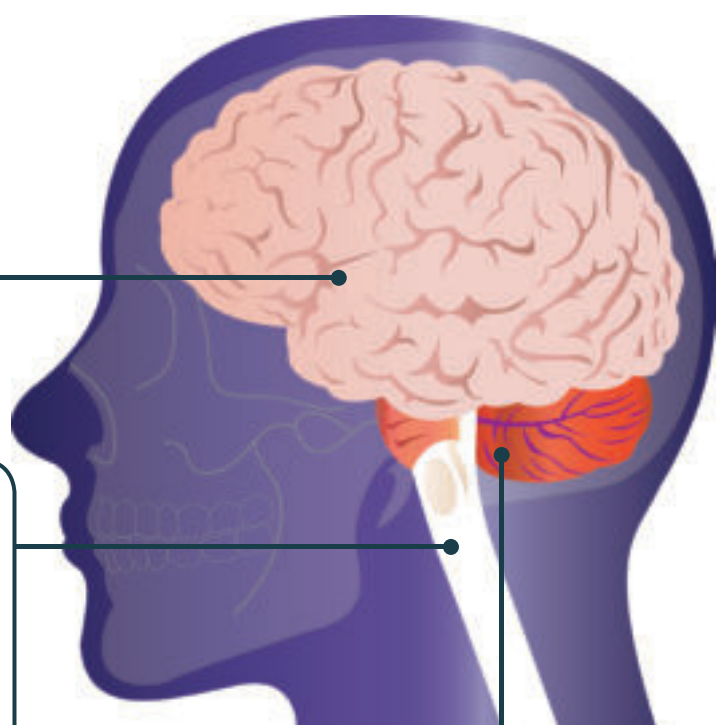
The spinal cord is the main pathway for information connecting the brain and various other parts. It is protected by the backbone.

Brain

The brain is part of a group of organs called the **nervous system**. The nervous system is composed of the **brain**, **spinal cord**, and **nerves**. The brain and the spinal cord make up the **central nervous system**. The brain is protected inside the skull. It controls all the functions of the body by sending and receiving messages through the nerves, which make up the **peripheral nervous system**. A nerve is made up of nerve cells or **neurons** that are joined together. They carry messages to and from the brain.

What are the main parts of the brain?

The brain has three main parts, namely, the **cerebrum**, **cerebellum**, and **brain stem**.



The **cerebrum** is the largest part of the brain. It controls thinking, speaking, and learning. Also, it receives and processes information from the senses, namely, seeing, smelling, hearing, tasting, and feeling or touching.

The **brain stem** is located beneath the cerebrum. It connects the brain to the spinal cord. The brain stem controls all the functions that your body needs to stay alive. These functions include breathing air, digesting food, and circulating blood.

The **cerebellum** is located at the back of the brain. It controls balance, movement, and coordination of the body.



Science Bank



The heart beats about 60 to 100 times per minute. It beats faster during strenuous activities like running and swimming.

Heart

The **heart** is located between the lungs and above the diaphragm. It is located in the center of the chest inside the chest cavity with a slight tilt to the left. The human heart is about the size of a closed fist and is shaped like an upside-down pear. It is made of strong muscles and pumps blood throughout the body.

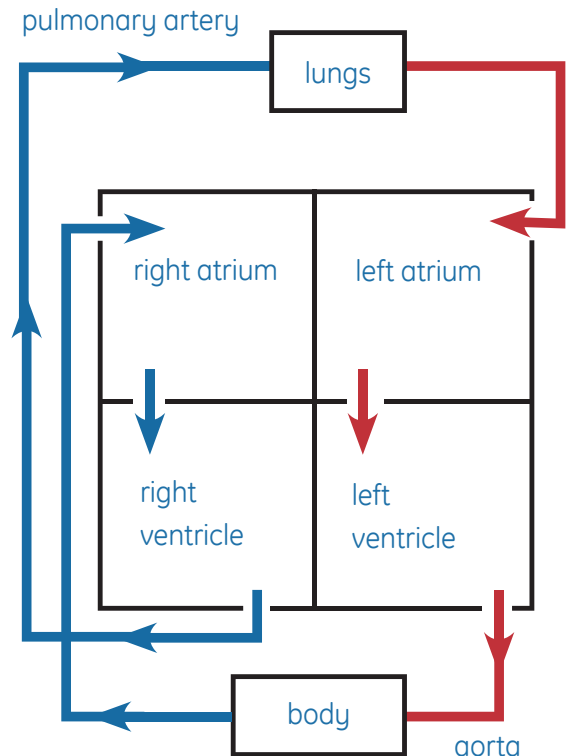
The main function of the heart is to provide the different parts of the body with oxygen-rich blood.

How does blood flow in and out of the heart?

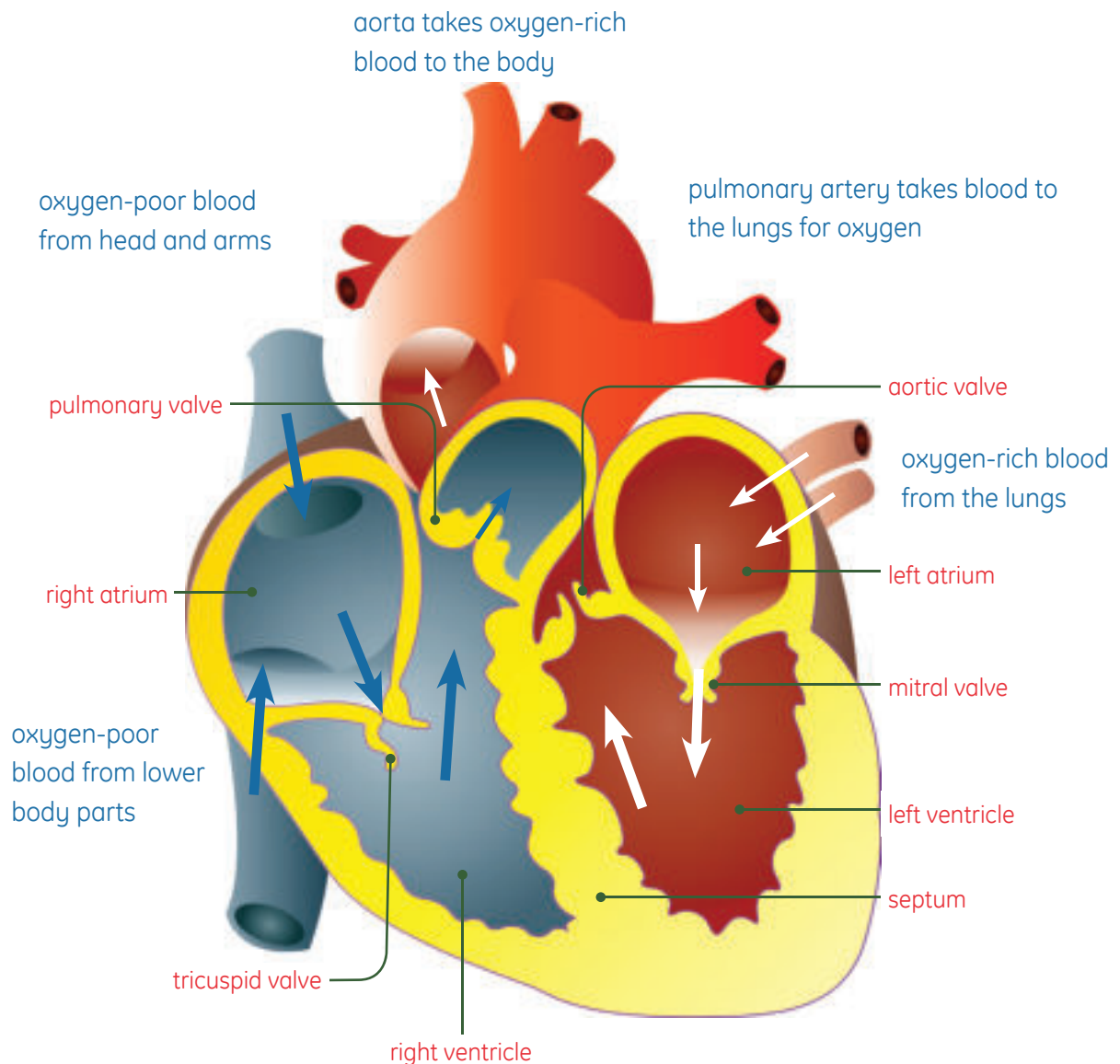
The heart is made up of four chambers, the **left** and **right atria** (singular: atrium) and the **left** and **right ventricles**. The atria collect blood from the lungs and other parts of the body, while the ventricles pump the blood out of the heart.

Oxygen-rich blood from the lungs enters the heart through the left atrium and is pushed toward the left ventricle. The left ventricle pumps the blood out to the aorta and to the different parts of the body. These parts absorb the oxygen.

The oxygen-poor blood is carried back to the heart and enters through the right atrium. The blood is then pushed to the right ventricle. The right ventricle pushes the blood further to the pulmonary artery and back to the lungs. Here, the blood is replenished with oxygen.



The diagram below shows clearly the flow of blood in the human heart.

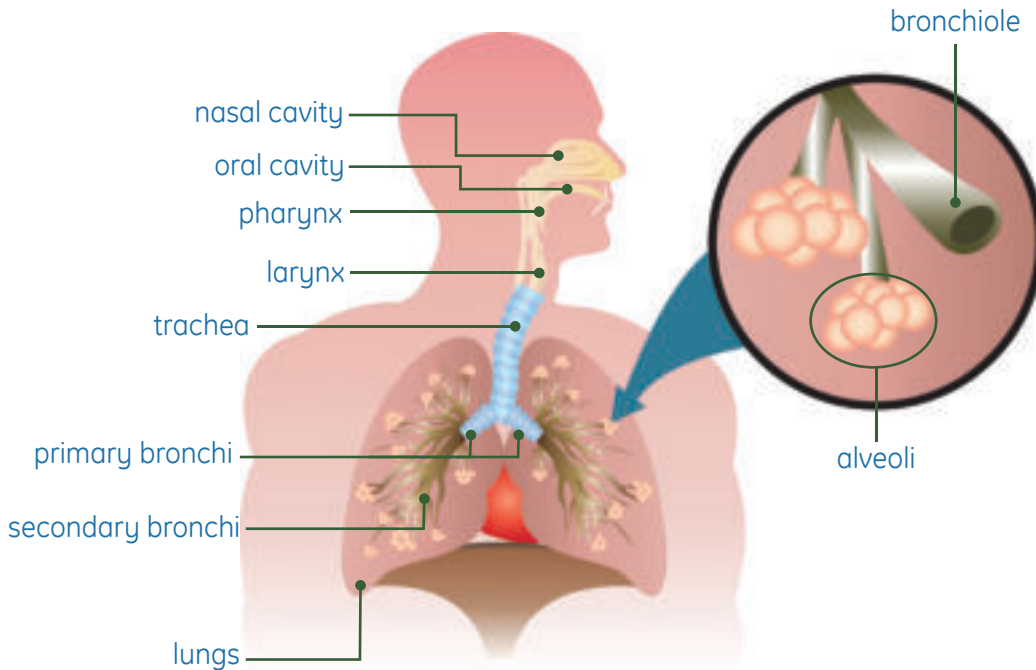


Lungs

The **lungs** are a pair of spongy organs that are located in the chest cavity.

The main functions of the lungs are to supply your bloodstream with oxygen from the air that you breathe in and remove carbon dioxide, which is released into the air when you exhale or breathe out.

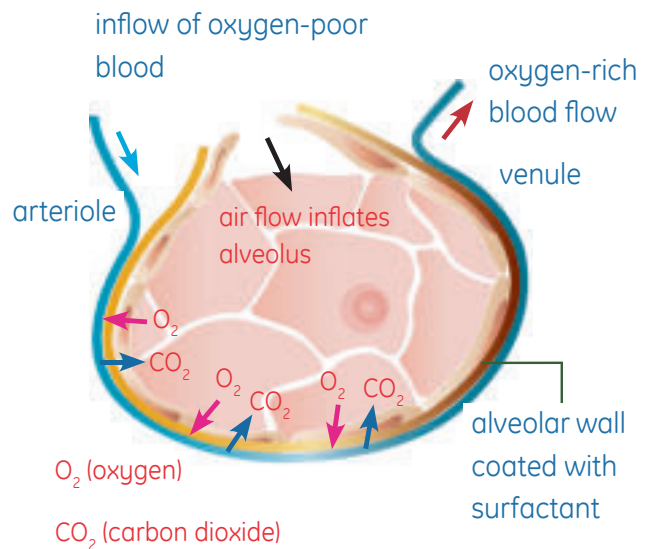
The diagram that follows shows the body parts that are connected to the lungs.



When you inhale or breathe in through your nose, very small hairs called **cilia** in your nasal cavity and trachea cleanse the air of dust particles. The diaphragm contracts to let the air go through the bronchi and bronchioles and fill up the alveoli, or air sacs.

The oxygen from the air goes through the walls of the alveoli and into the capillaries where it is absorbed by the red blood cells in the bloodstream. This blood enters the heart and is pumped into the different parts of the body.

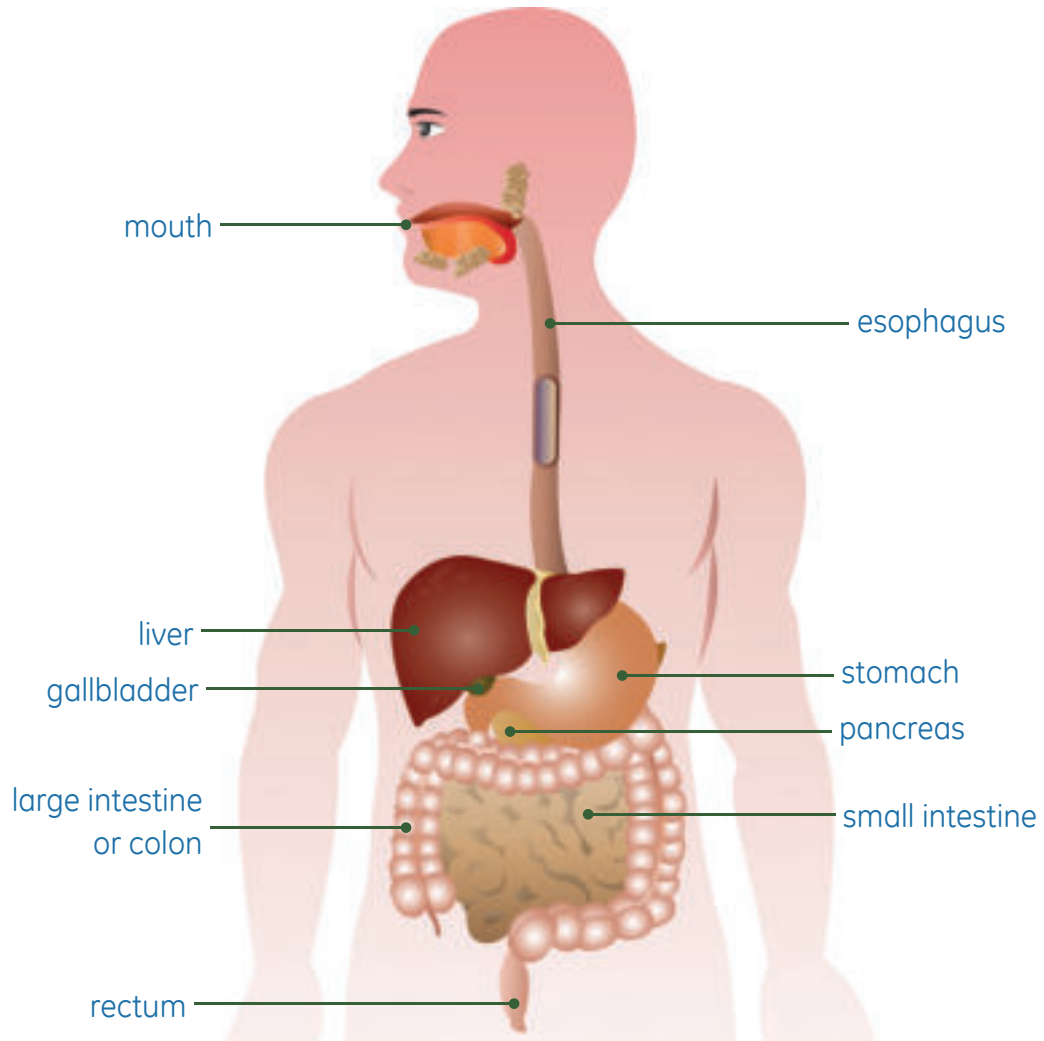
The body absorbs the oxygen from the blood. The blood picks up carbon dioxide from the body and carries it back to the lungs where it is expelled out of the body during exhalation.



Stomach and Intestines

Some organs of the body help digest food, absorb nutrients from food, and dispose of waste. These organs include the **stomach** and **intestines**.

The diagram below shows the organs involved in processing the food we eat.



The stomach has three important functions:

1. to store the food you have eaten;
2. to break down the food to a liquid mixture; and
3. to slowly empty the liquid mixture into the small intestine.



Science Bank

The food that you eat is digested by your body within 4 to 12 hours. Fruits are the fastest travelers in the digestive tract. On the other hand, oversized pieces of meat stay 2 to 3 days.

The **small intestine** breaks down the food mixture even more so your body can absorb the vitamins, minerals, proteins, carbohydrates, and fats. The **large intestine**, on the other hand, helps absorb water and salts from the food material that has not been digested, and dispose any waste products.

How does the body digest food, absorb nutrients, and remove waste?

The process by which food is broken down into smaller pieces that can be absorbed by the body is called **digestion**.

The process of digestion begins in your **mouth**. You chew your food and grind them to smaller pieces with your teeth. Your saliva, the liquid in your mouth, helps soften the food.

When you swallow the food, it goes down the **esophagus**, which transports it to the stomach. The **stomach** is the J-shaped organ where further digestion happens. The food changes into much smaller pieces and mixes with the gastric juice in the stomach.

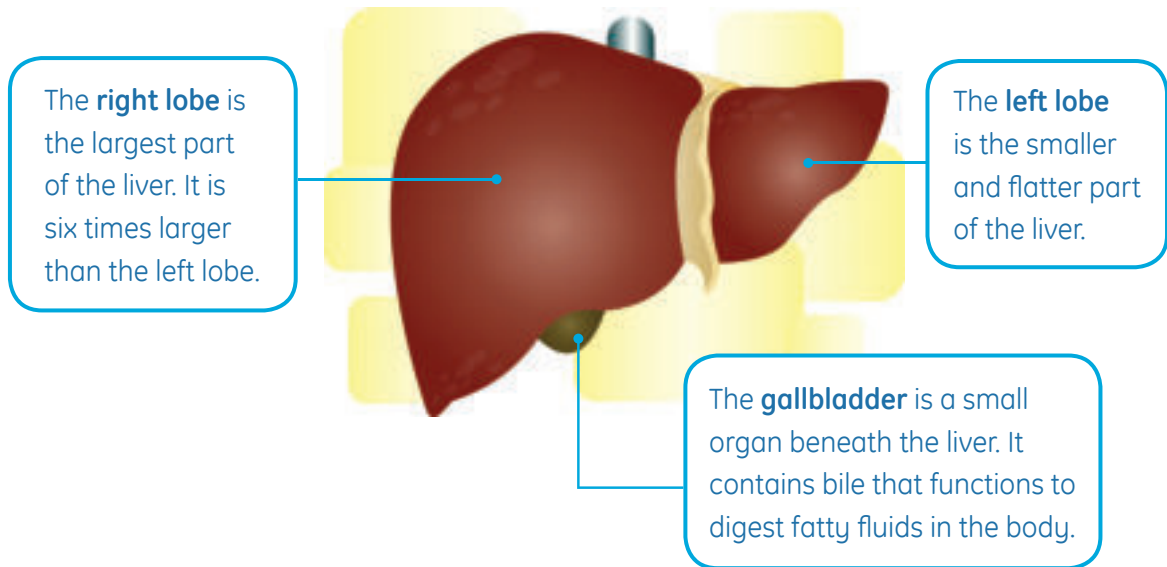
Gastric juice or **gastric acid** is the digestive liquid secreted by the lining of the stomach.

The food in liquid form goes to the **small intestine** where digestion is completed. In the small intestine, **nutrients** from food are absorbed by the blood.

However, not all of the food materials are digested. Some undigested materials go to the **large intestine**. Water is absorbed in the large intestine. The solid waste leaves the body through the anus.

Liver and Kidneys

Our body produces toxins when it breaks down food during digestion. Our liver and kidneys take care of these toxins and make sure that they are filtered and flushed out of the body.



Science Bank

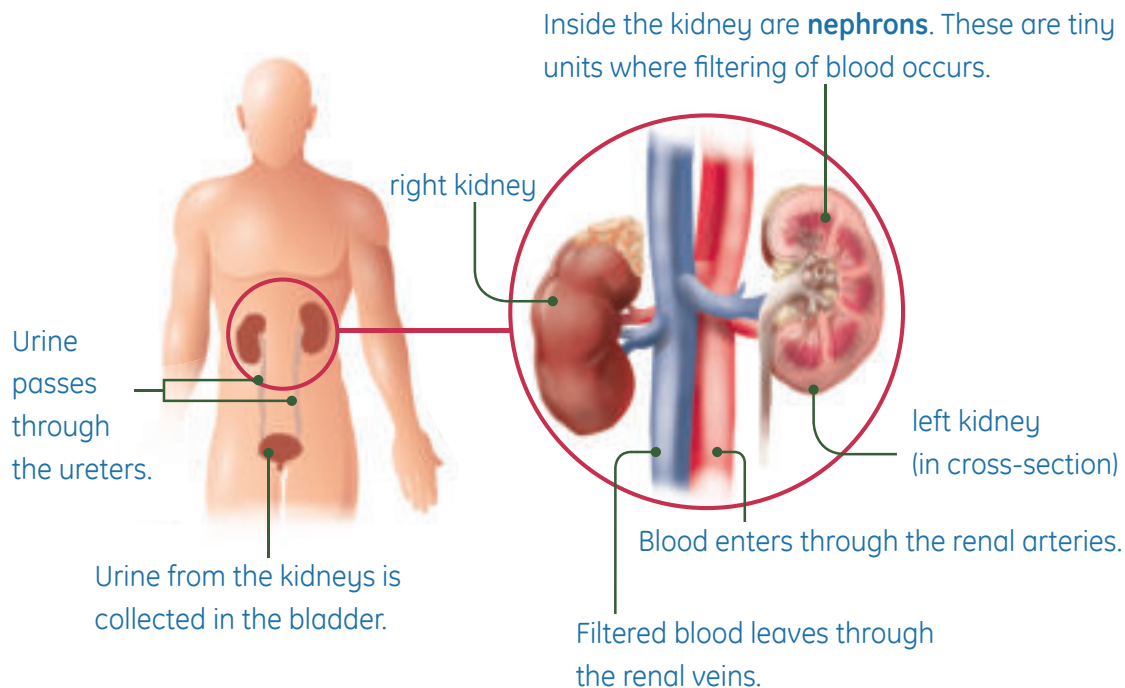
The liver is the largest internal organ in the human body. It weighs about 1.5 kg and is about 15 cm thick. The liver performs 500 different functions.

How does your body remove toxins?

When our body breaks down food into minerals, nutrients, and vitamins, it sometimes releases toxins as part of the process. To ensure that those toxins and other harmful substances are not absorbed by the body, nutrient-rich blood from the small intestine is carried to the liver. The **liver** cleans the blood before it goes to the other parts of the body. The toxins and other harmful substances from the blood become waste and are carried by the **bile** to the large intestine. They are mixed with other waste materials and leave the body through the anus.

Some of the toxins and harmful substances are carried by the blood to the kidneys through the **renal artery**.

The **kidneys** are two bean-shaped organs, each about the size of a fist. They are located below the rib cage, one on each side of the spine. Their main function is to clean the blood and remove toxins from the body in the form of **urine**. They also control the amount of fluids in the body and produce active vitamin D that the body needs.



You have two kidneys, but you can survive with only one.

Bones and Muscles

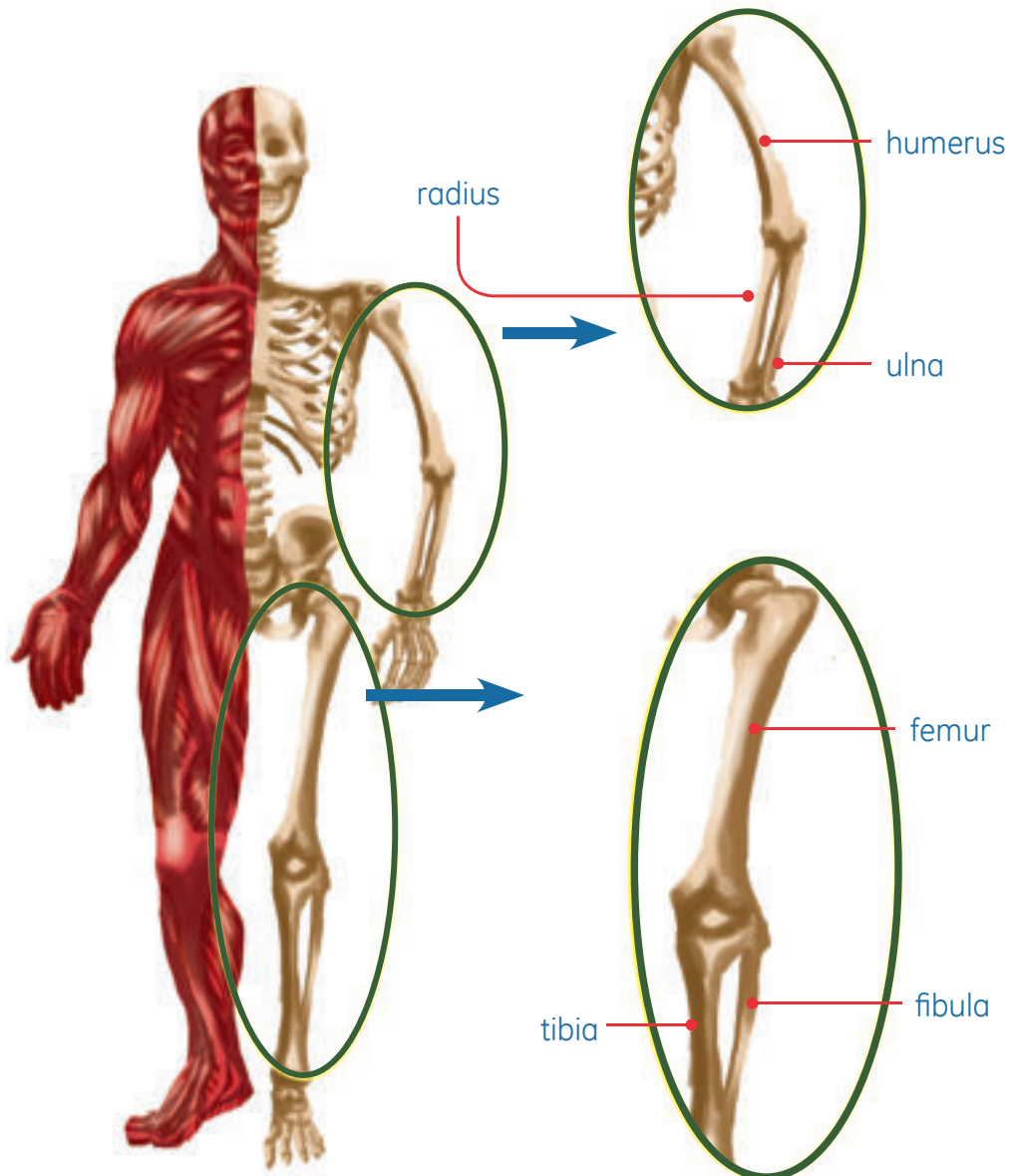
Do you dance, run, or play? These activities are possible because of the bones and muscles in your body.

The combination of the bones and muscles in your body is called the **musculoskeletal system**.

The main function of the musculoskeletal system is to give form, shape, and stability to your body, thus enabling you to move.

Bones

You are born with over **300 bones**. As you grow older, some of your bones join together. As a result, the number of your bones is reduced to **206**. Your bones give frame to and protect the different organs in your body. Your brain, for example, is protected by the **skull**. Your heart and lungs are protected by the **rib cage**. The spinal cord is protected by the **spinal column**. Other bones in your body work together to facilitate motion. These bones include the **humerus, radius, and ulna** (arm bones); and the **femur, tibia, and fibula** (leg bones).



Joints

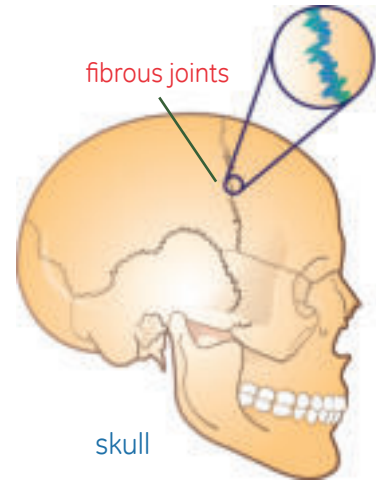
Bones are connected to each other by joints.

Joints are structures in the body at which two parts of the skeleton are joined together.

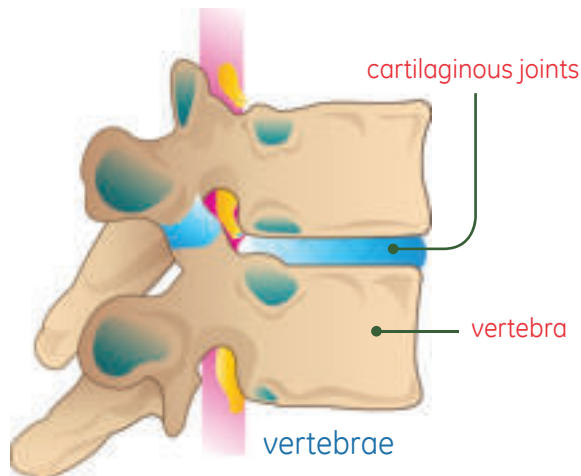
Joints allow the bones to move and/or rotate.

The three types of joints in the body are the fibrous joints, cartilaginous joints, and synovial joints.

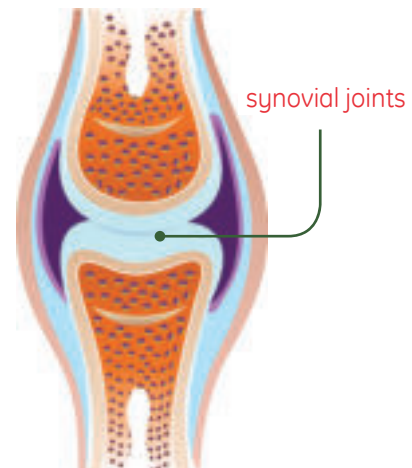
The **fibrous joints**, also called **fixed joints**, do not allow any movement. The joints in the skull and hip bone are examples of fibrous joints.



The **cartilaginous joints**, also called **slightly movable joints**, allow little movement. The bones in the spinal column and the cartilage of the trachea are connected by cartilaginous joints.



The **synovial joints**, also called **freely movable joints**, allow more movement. The bones in your arms and legs are connected by synovial joints.

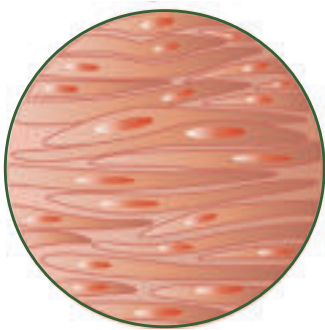


Muscles

Do you know that you have more than **600 muscles** in your body? Muscles are made of elastic tissues that can stretch and contract. They are responsible for the movement of your body.

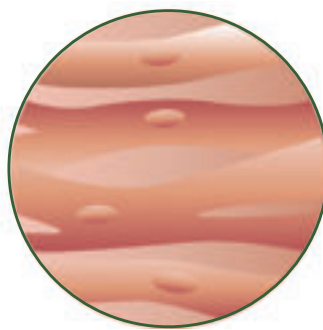
There are three types of muscles, namely, smooth muscles, cardiac muscles, and skeletal muscles. The **smooth muscles** move involuntarily. They can be found on the walls of the stomach and intestines. The **cardiac muscles** also move involuntarily. They are found in the heart. On the other hand, **skeletal muscles** are the muscles around your bones. Skeletal muscles make movement possible, improve posture, and generate heat in the body.

smooth muscle tissue



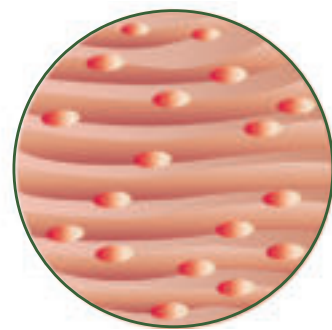
involuntary control

cardiac muscle tissue



involuntary control

skeletal muscle tissue



voluntary control

Skin

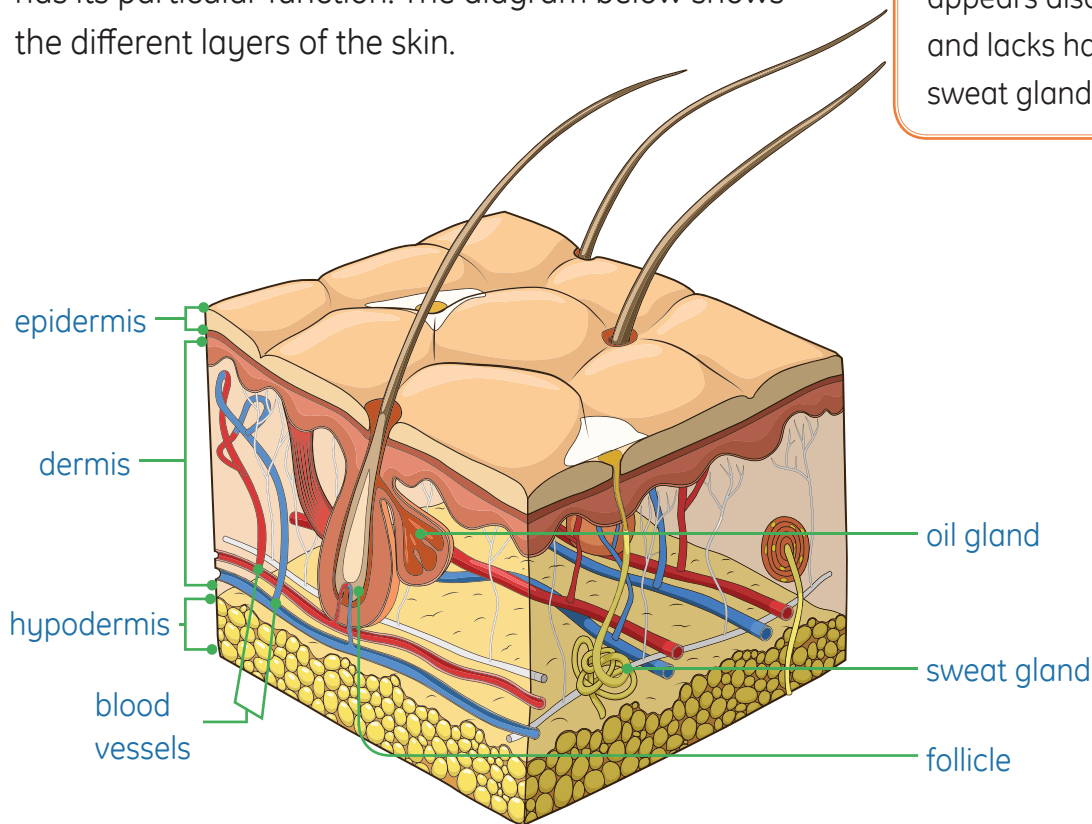
Your skin covers, holds, and protects every part of your body. Without your skin, your muscles, bones, and organs would be exposed to many harmful elements in your surroundings. In addition, your skin helps keep your body in the **right temperature**. Also, your skin allows you to have the **sense of touch**.

The skin consists of various layers, and each layer has its particular function. The diagram below shows the different layers of the skin.



Science Bank

If the skin is damaged, it heals by forming a scar tissue. A scar tissue is not the same as the normal skin tissue. It often appears discolored and lacks hair and sweat glands.



The **epidermis** is the outer layer of the skin. The main function of this layer is for protection. The cells on the outermost layer of the epidermis are constantly replaced by new cells.

The **dermis** is thicker than the epidermis. The dermis holds blood vessels, hair follicles, and sweat glands.

The **hypodermis** lies under the dermis and connects the skin to muscles and bones. This layer helps keep your body from getting too warm or too cold.



Science Bank

The color of one's skin depends on the amount of pigment (melanin) that the skin produces. Small amounts of melanin result in light skin, while large amounts result in dark skin.

Let us find out the function of each part of the different layers of the skin.

Melanocytes produce the pigment melanin, a substance that gives your skin its color. However, melanin's primary function is to filter out the Sun's ultraviolet radiation, which damages skin cells, resulting in a number of harmful effects, including skin cancer.

Oil glands secrete sebum into hair follicles. **Sebum** is a kind of oil that keeps the skin moist, smooth, and soft. It also acts as a barrier against harmful substances from the surroundings.

Hair follicles produce the hair throughout the body. Hair helps regulate body temperature, provides protection from injury, and enhances sensation.

Sweat glands produce sweat in response to heat. Sweat is made up of water, salt, and other chemicals. As sweat evaporates out of the skin, it helps cool the body.

Nerve endings help you sense or feel pain, pressure, temperature, and touch. Some areas of the skin have more nerve endings than others. For example, the fingertips and toes contain many nerves and are very sensitive to touch.

Blood vessels provide the skin with nutrients and help regulate body temperature. Heat enlarges blood vessels, allowing large amounts of blood to circulate near the skin surface, where the heat can be released. Cold temperature narrows blood vessels, retaining the body's heat.



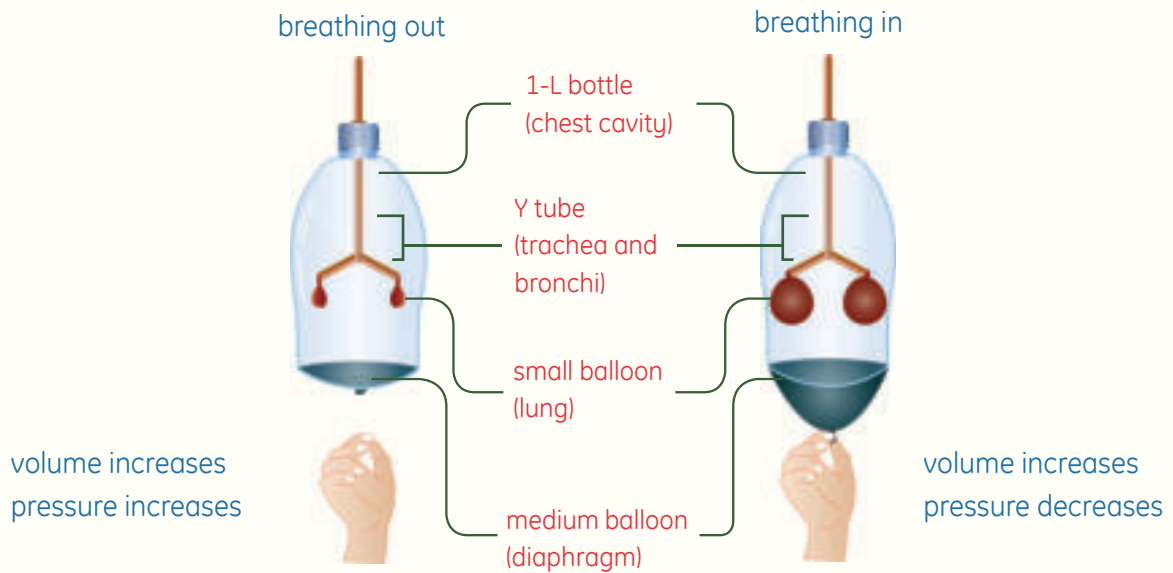
What Happens to Your Lungs When You Breathe?

What You Need

- one 1-L plastic bottle
- two small balloons
- one medium-sized balloon
- one small plastic Y-shaped hose connector
- clay
- scissors
- rubber band
- masking tape

What You Need to Do

1. Start creating a lung model by cutting the plastic bottle in half. You may ask an adult for help.
2. Fit the plastic straw into the opening of the hose connector. Use the tape to seal the area where the straw and the hose connector meet.
3. Attach the small balloons around each of the two openings of the hose connector. Use the rubber band to seal the area where the balloons and hose connector meet.
4. Place the balloon and hose connector setup inside the bottle. Use the clay to seal the opening where the straw goes through the opening of the bottle. The seal must be airtight.
5. Tie a knot at the end of the medium-sized balloon and cut the balloon horizontally in half.
6. Stretch the open end of the larger part of the balloon over the bottom of the bottle. Make sure that it fits tightly.
7. Gently pull down the balloon from the knot. This will cause the air to flow into the balloons in your lung model.
8. Release the balloon with the knot and observe as the air is expelled from your model.



Questions

1. What happens to the small balloons when you pull down the medium-sized balloon?

2. What happens to the small balloons when you release the medium-sized balloon?



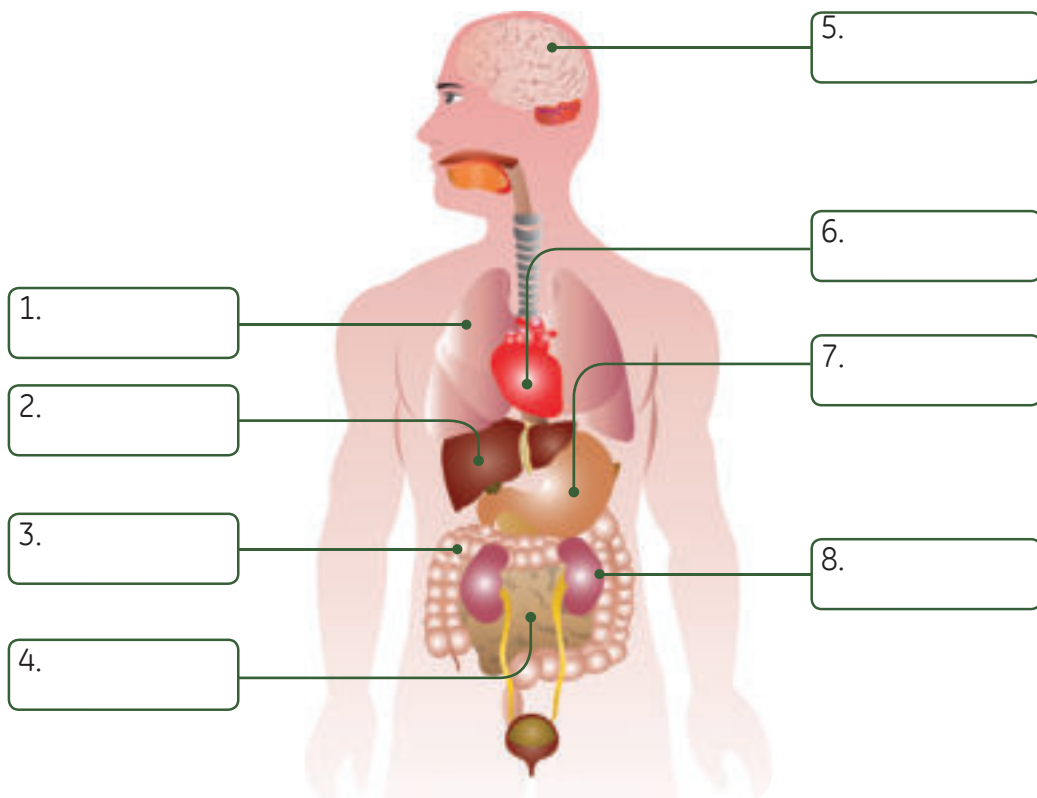
Looking Over

- There are ten major organs in the body. They are the brain, heart, lungs, stomach, intestines, liver, kidneys, bones, muscles, and skin.
- The **brain** controls the functions of the different parts of the body.
- The **heart** pumps oxygen-rich blood to the body.
- The **lungs** supply oxygen to the blood stream.

- The **stomach** and **intestines** help digest food; absorb minerals, nutrients, and vitamins from food; and dispose of waste.
- The **liver** and **kidneys** help clean blood, and remove toxins and other harmful substances from the body.
- The **bones** and **muscles** give form, shape, and stability to the body, and enable the body to move.
- The **skin** covers, holds, and protects the parts of the body.

Enhance Your Skills

A. Name the following main organs of the human body. Write their primary functions on the space provided.



Functions

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

B. Describe the functions of the following organs of the body.

Organs	Functions
Bones	
Muscles	
Skin	



● **Everyday Science**

- Why is having clean air in our surroundings important to our body?

Learning Goals

- Describe some common diseases that are related to the main organs of the body
- Find out the causes of and treatments for the common diseases of the main organs of the body

Diseases Related to the Main Organs of the Human Body

Diseases can affect your body in many ways. They can harm or damage the main organs of your body and may cause death. Some diseases are acquired from the environment, while others are passed on from parents to children.

Many diseases are due to poor habits or lifestyle. Some common diseases and their causes and treatments are discussed in this lesson.



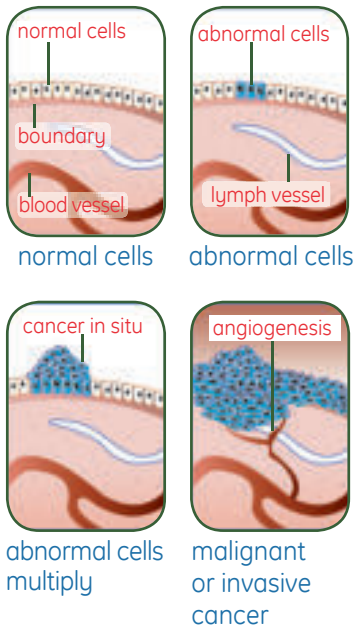
Explore!

What are the common diseases of the major organs of the body? What are their causes? What treatments may be given to patients suffering from such diseases?





Science Bank



A cell becomes cancerous if it grows abnormally or out of control from a tumor to the lymph nodes, and to the blood vessels. The cancer cells then infect nearby organs.

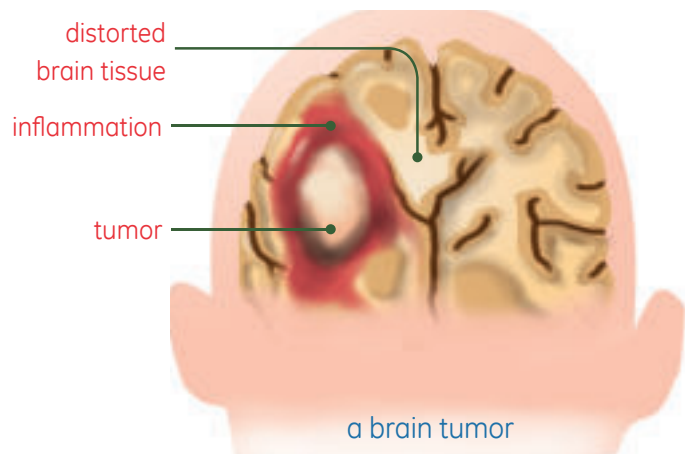
Diseases of the Brain

Brain tumor

A brain tumor is a mass of abnormal cells that grow at a rapid rate.

A **tumor** is an abnormal growth of tissue that can be either benign or malignant. A **benign** tumor is non-cancerous, while a **malignant** tumor is cancerous.

When cancer cells divide very rapidly, they form a tumor. Sometimes, a tumor can be destroyed by the immune system of the body. However, some tumors produce substances that prevent the immune system from detecting their growth. A brain tumor can severely affect bodily processes.



A brain tumor can be treated or removed by chemotherapy, radiation therapy, or surgery, depending on its location and size.

Chemotherapy uses drugs to destroy cancer cells. **Radiation therapy** or **radiotherapy** uses radiation to destroy cancer cells or stop them from growing. **Surgery** can be done when the tumor has developed in the outer part of the brain; if not, radiation therapy or chemotherapy can be used.

Alzheimer's disease

This is a disease in which the brain cells involved in **language, learning, memory,** and **reasoning** start failing over a period of time. As the disease progresses, communication between nerve cells breaks down. Alzheimer's disease is one of the common causes of **dementia**, or loss of memory or other thinking skills. This loss has a huge impact on a person's everyday life.



Currently, Alzheimer's disease has no known cure. However, scientists are hopeful that someday it might be possible to delay, slow down, or prevent this disease. Scientists are studying the effect of a healthy lifestyle on the prevention of Alzheimer's disease.

Diseases of the Heart

Rheumatic heart disease

This is a condition that causes permanent damage to the valves of the heart. This disease is caused by **rheumatic fever**, a complication of an untreated infection of the throat or tonsils. Scarring or damage to the heart muscles, the sac enclosing the heart, and the heart valves can happen during the infection.

Once a person gets rheumatic heart disease from rheumatic fever, he or she may have to take medicines to prevent rheumatic fever from recurring for it can cause more damage to the heart.

Coronary heart disease

Coronary heart disease is a condition when the blood vessels of the heart become blocked by fat deposits and reduce blood flow to the heart. If this condition is not treated right away, the blood vessels will become completely blocked and trigger a heart attack. Coronary heart disease can be prevented by proper diet and regular exercise.

Diseases of the Lungs

Lung cancer

This is usually characterized by uncontrolled growth of cells in the tissues of the lungs. The most common cause is smoking or exposure to cigarette smoke. Its most common symptoms are weight loss, shortness of breath, chest pain, and coughing of blood. To avoid lung cancer, one should avoid smoking and unhealthy food.



The lungs of a smoker (right) are darker than the lungs of a nonsmoker (left).

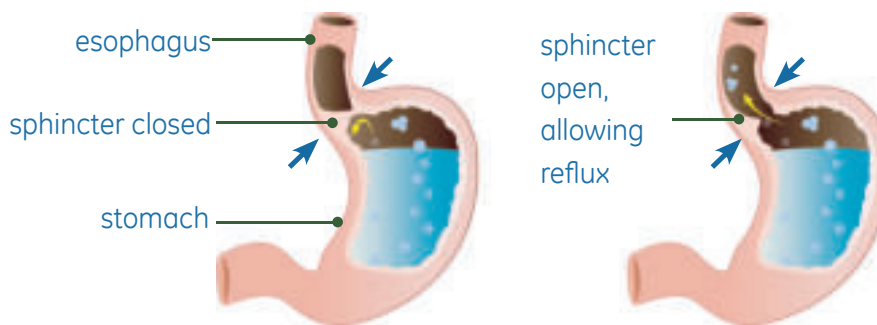
Tuberculosis

This infection, which is caused by a bacteria called **Mycobacterium tuberculosis**, can spread throughout the lungs and through the bloodstream to any organ in the body. The bacteria that cause the disease live in an inactive form in the body. They become active when the immune system weakens. Tuberculosis can be fatal if left untreated. Tuberculosis is treated with prescribed medicines.

Diseases of the Stomach and Intestines

Gastroesophageal reflux disease (GERD)

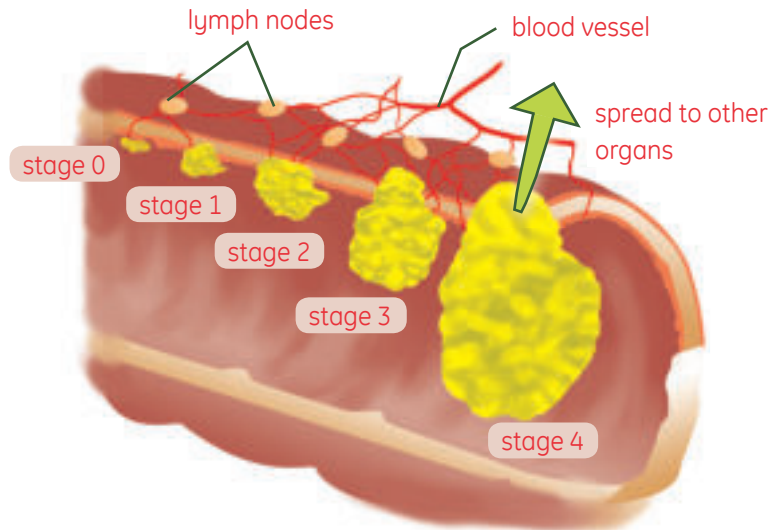
This is a digestive disorder that happens when **stomach acid**, or occasionally, stomach content, flows back into the esophagus. The backwash irritates the lining of your esophagus and causes heartburn.



Many people with GERD can manage the discomfort it causes by using medications bought from the drugstore and/or changing their lifestyle. However, some people with extreme cases of GERD may need stronger medications, or even surgery, to reduce the symptoms.

Colorectal cancer

Also known as **colon cancer**, colorectal cancer is cancer of the large intestine. The risk factors of colorectal cancer include heredity, ulcer, and colon tissue growth. This type of cancer often does not have symptoms. Regular screening and check-ups are therefore important. Treatment of colon cancer depends on the stage or extent of the disease.



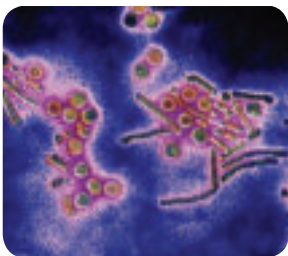
A cancerous tumor develops in the colon and affects the lymph nodes, and can spread to other organs if not treated.



Science Bank

Hepatitis B virus

(HBV) lives in blood and other body fluids. This virus is transmitted from one body to another through bodily fluids. HBV might be cured by liver transplant. However, the virus remains in the body and might attack the new liver.



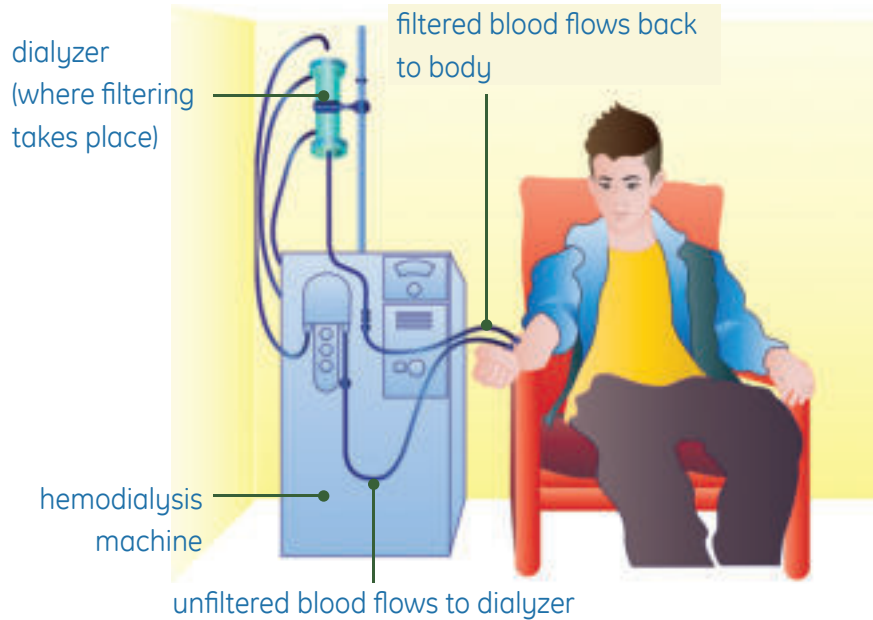
Diseases of the Liver and Kidneys

Hepatitis A

This is the most common and the most infectious of the hepatitis types. It is waterborne, hence it can be acquired through food and water contamination. The symptoms usually include nausea, vomiting, diarrhea, fever, and abdominal pain.

Kidney failure

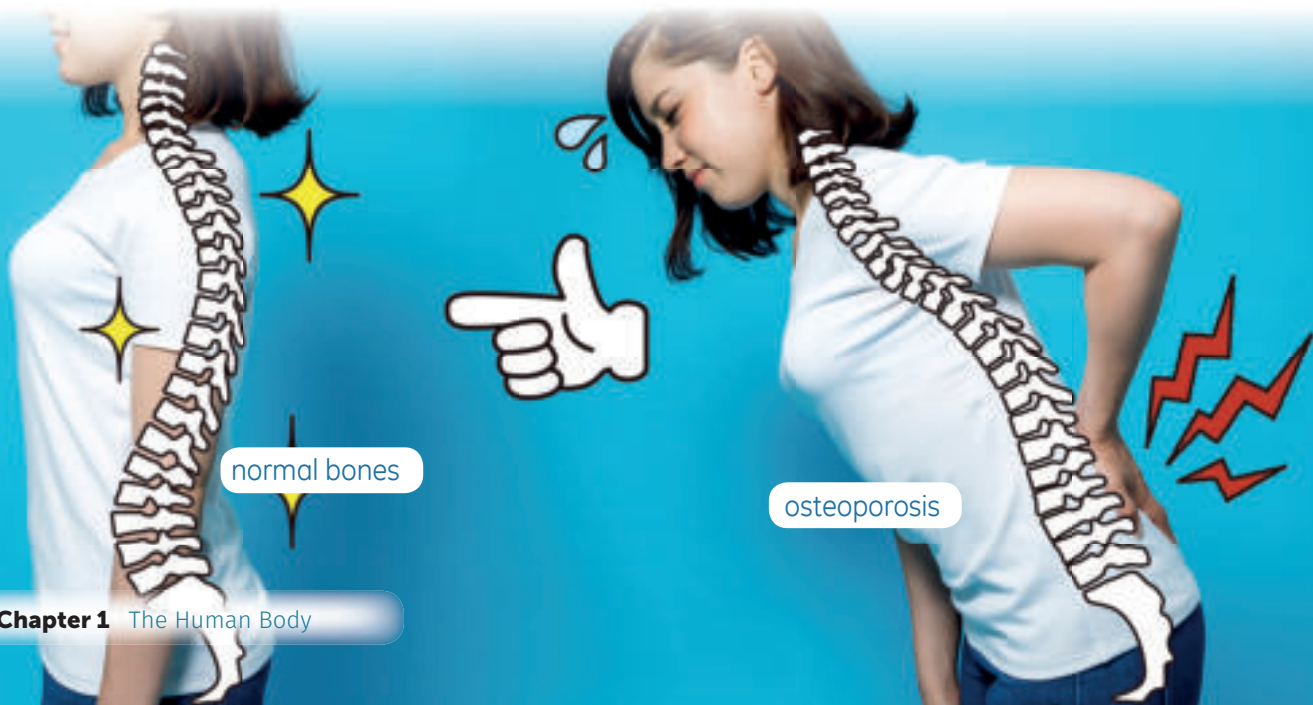
This happens when the kidneys become inefficient in filtering waste products from the blood like **creatinine** and **urea**. Usually, it occurs when the blood supply to the kidneys is suddenly interrupted, or when the kidneys become overloaded with toxins. A process called **dialysis** helps to cleanse the blood if one's kidneys cannot function anymore. In dialysis, blood is temporarily removed from the body and undergoes cleansing through an artificial dialyzer. This process removes unwanted elements from the blood. Cleansed blood is then returned to the body through a vein.



Diseases of the Bones and Muscles

Osteoporosis

This is a condition in which the bones, particularly the hip, wrist, and spine, become **brittle** and **weak**. The bones can weaken to the point that they may crumble, which can result in severe pain. The condition occurs when the formation of new bones in the body cannot keep up with the breaking down of old bones. Spinal fractures can occur even if you have not tripped. Osteoporosis can be prevented by adequate calcium intake and regular exercise.



Muscular dystrophy

This is a hereditary condition or disorder that gradually weakens the body's muscles. A person with muscular dystrophy gradually loses the ability to do things like walk, sit upright, breathe easily, and move the arms and hands. This increasing weakness can lead to other health problems.

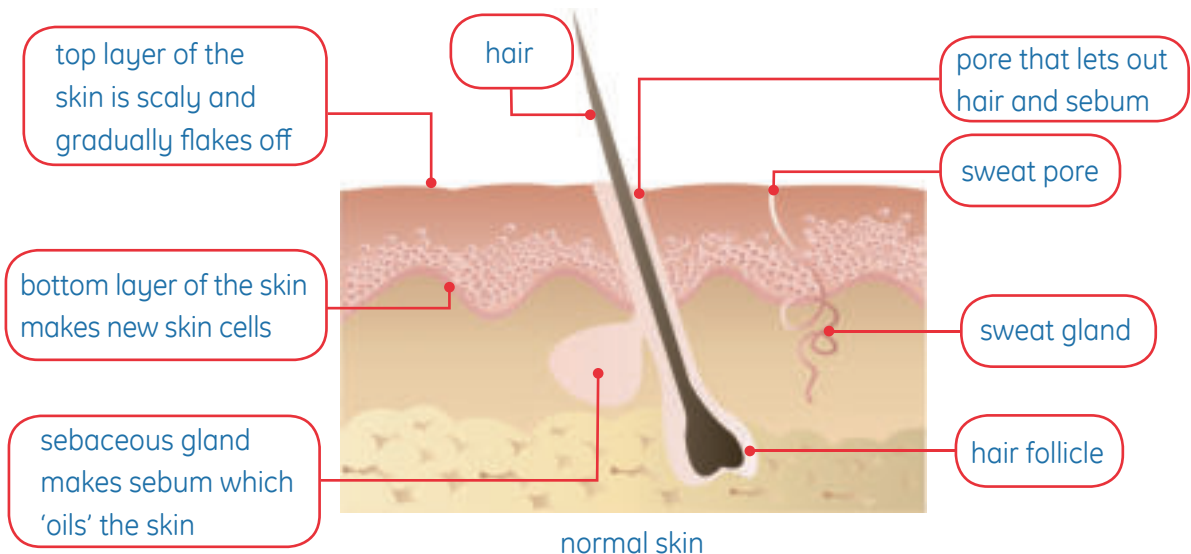
There is no cure for any form of muscular dystrophy. However, treatment can help prevent or reduce problems in the joints and spine, to allow people with muscular dystrophy to remain mobile as long as possible. Treatment includes medications, physical therapy, and surgical and other medical procedures.

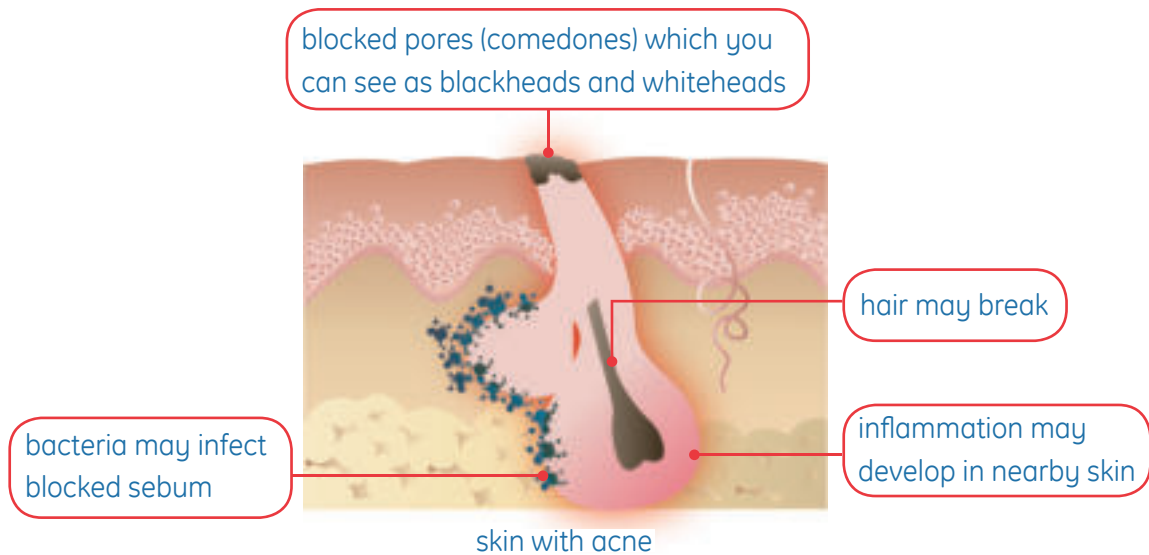
Diseases of the Skin

Acne

This is a disease that affects the skin's oil glands. The small holes in the skin, called **pores**, are connected to the oil glands under the skin. These glands make a substance called **sebum**. The pores connect to the glands by canals called **follicles**. When a follicle of a skin gland clogs, a pimple grows. Early treatment is the best way to prevent acne scars. A dermatologist, a skin doctor, may suggest prescription drugs.

The diagram that follows shows how acne develops in the skin.





Eczema

This is a long-term skin disease. The most common symptoms are dry and itchy skin, rashes on the face, inside the elbows, behind the knees, and on the hands and feet.



skin with eczema

Currently, there is no single procedure to diagnose eczema, hence doctors rely on information about the patient. A person with eczema needs to take good care of his/her skin. He/she should take warm baths on a regular basis and immediately apply moisturizers afterward. Over-the-counter remedies can also help relieve the discomfort.

There are many other diseases that can affect the major organs of the body. It is well known that prevention is always better than cure. A proper diet, regular exercise, and a healthy lifestyle are the best ways to prevent disease.



What Common Diseases Affect My Family?

What You Need

- pen and paper
- computer with internet connection

What You Need to Do

1. Interview each member of your family and find out the three most common diseases in your family.
2. Research on the diseases and record your findings in the table below.

Disease	Affected Organ	Cause(s)/ Symptoms	Prevention/ Treatment

3. Present your findings to your family.

Questions

1. What are the most common diseases in your family?

2. What can you do to help your family prevent or treat these diseases?

Looking Over



- Diseases can harm or damage the main organs of the body, and may lead to sickness or death.
- **Brain tumor** and **Alzheimer's** disease are diseases related to the brain.
- Heart diseases include **rheumatic** heart disease and **coronary** heart disease.
- **Lung cancer** and **tuberculosis** are diseases of the lungs.
- **Gastroesophageal reflux (GERD)** is a disease related to the stomach.
- **Colorectal cancer** is a disease related to the large intestine or colon.
- **Hepatitis A** is a disease of the liver.
- **Kidney failure** refers to the inability of the kidneys to function properly.
- **Osteoporosis** is a disease of the bones.
- **Muscular dystrophy** is a muscular disease.
- **Acne** and **eczema** are skin diseases.



Enhance Your Skills

Match the term in column A with its description in column B. Write in the spaces provided.

Organ	Function
___ 1. acne	A. caused by rheumatic fever
___ 2. chemotherapy	B. cancer of the large intestine
___ 3. colorectal cancer	C. uses drugs to eradicate cancer cells
___ 4. dialysis	D. a disease that affects the skin's oil glands
___ 5. gastroesophageal reflux disease	E. a disease caused by blockage of the heart arteries
___ 6. coronary heart disease	F. commonly caused by overexposure to cigarette smoke
___ 7. lung cancer	G. an abnormal growth of tissue that can be either benign or malignant
___ 8. muscular dystrophy	H. cleanses the blood if one's kidneys do not function anymore
___ 9. rheumatic heart disease	I. a hereditary condition that gradually weakens the body's muscles
___ 10. tumor	J. happens when stomach acid or content flows back into the esophagus



Everyday Science

- People, especially children, are very susceptible to illness. What can you do to protect yourself from illness?