

Chan and his friends are playing in their neighbourhood.

Haha, you can't get away from me.

Suddenly ...

Chan tripped over a large tree root.

KRAK!

Ouch! That hurts!

Don't worry, madam. The X-ray scan of your son's leg does not show any injury.

What can you observe from the X-ray scan? State its importance to humans.

THE HUMAN SKELETAL SYSTEM AND ITS FUNCTIONS

Do you know why worms are not able to stand up like humans? This is because worms do not have bones like humans.

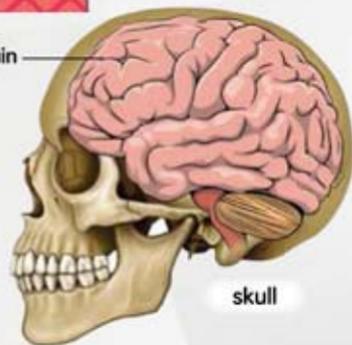
Bones in the human body make up a system called the human skeletal system.

Without a skeletal system, you may just have to writhle and wriggle to move like me.



The human skeletal system is made up of bones in the body. How does the main skeletal system function?

brain



skull

rib
backbone
hand bone



leg bone

The skull protects our brain from injury.



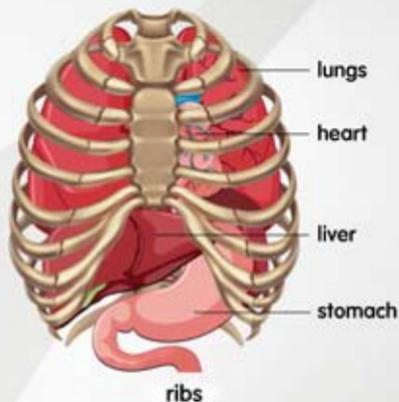
human skeletal system



backbone



The backbone provides **support** for the body.



The ribs **protect the internal organs** such as the lungs and heart.



hand bone and leg bone



supports the body



allows the body to move

The bones of the hands and legs provide **support** and **movement**.

Explain the functions of the main human skeleton.



POSITIONS OF JOINTS

Ravi observes a human skeleton model.



Miss Hawa, how do the skeletal bones connect to each other?



Our bones connect or meet at the joints. For example, the two bones of the knee meet at the knee joint.

A joint is **a place where two or more bones are joined together**. Let us observe the positions of the joints that are found in the figure of a human skeleton below.



Positions of joints in human body



Based on the figure of the human skeleton, name and show positions of joints in your body.

FUNCTIONS OF JOINTS

The joints that are found in the human body have specific functions. Why do we need joints to connect two bones together? Understand the following situation.



Erm, why can't I bend my arm?



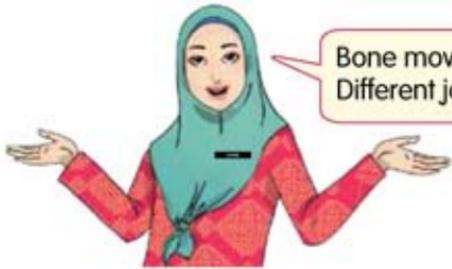
Take a look at Ravi's arm that is covered with bandage. Is Ravi able to bend his arm?

Ravi cannot bend his arm that is covered with bandage because his bones are prevented from moving. Ravi's arm that cannot be bent is an example of a situation if humans have no joints.

Observe the athlete, dancer, and skateboarder below. How do they move their parts of the body easily to make specific movements?



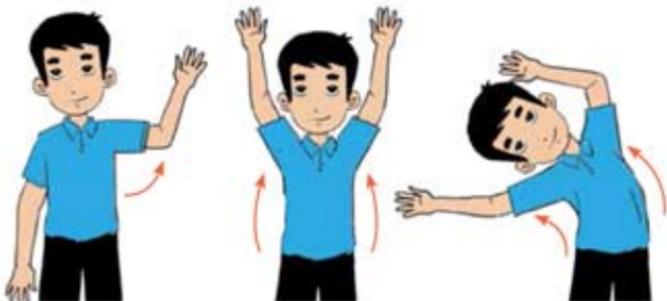
2. Joints allow movement and flexibility of the body.



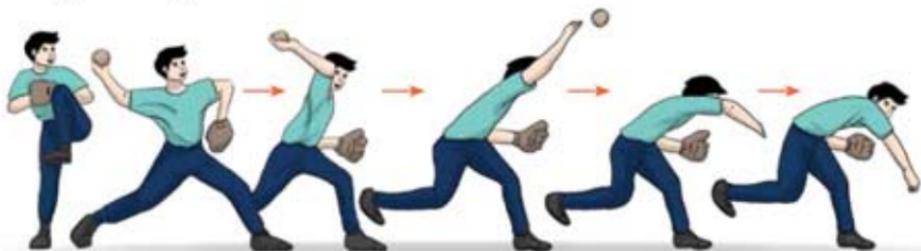
Bone movement at the joints allows the body to move. Different joints enable different bone movements.



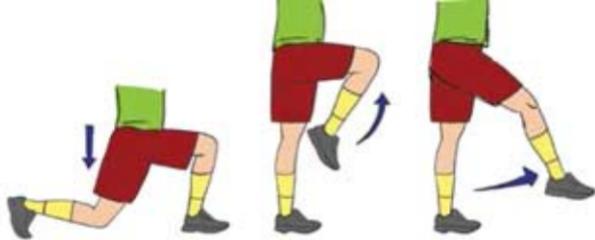
The joint at the neck makes turning and rotation of the head possible.



The joints at the shoulders, hands, and backbone make movements of the upper body possible.



The joints at the shoulders allow the arms to move back and forth, to the sides or to make rotations.



The joints at the knees and hips allow the legs to bend and straighten.



Based on the movement of the bones at the joints shown, state the functions of joints.



Press and identify the bones in your hand. In your opinion, why are there many bones in your fingers and hand?



THE IMPORTANCE OF HUMAN SKELETAL SYSTEM

The skeletal system is very important to our body. Observe the following situations.



What would happen to our bodies if there were no skeletal system?

Situation 2



What would happen if humans did not have skeletal system?

Situation 3



What would happen if the brain were not protected by skeletal system?

Situation 4



What would happen to the internal organs if humans did not have skeletal system?

Based on these situations, why is skeletal system important to the human body?





FUN ACTIVITY

HUMAN SKELETON MODEL

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GROUP
ACTIVITY

APPARATUS AND MATERIALS

Computer, internet access, printer, scissors, modelling clay, manila card, adhesive tape, and adhesive notepads.



The main human skeletal system

STEPS



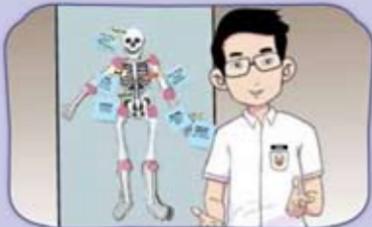
1. Find pictures of the main human skeletal system on the internet. Print and cut them out.



2. Take turns to connect each bone using modelling clay to represent the joints.



3. Paste the pictures of the main human skeleton on the manila card. Then, label the function of each main skeleton with the adhesive notepads.



4. The group leader will present the work. The group members will move to see the work of other groups.



- (a) Explain the functions of all the main human skeleton.
- (b) State the functions of joints in the human skeletal system.

TEACHER'S
NOTES

As an alternative, teachers can scan the QR code to download the picture of the main human skeletal system to be used for this activity.

HUMAN BLOOD CIRCULATORY SYSTEM



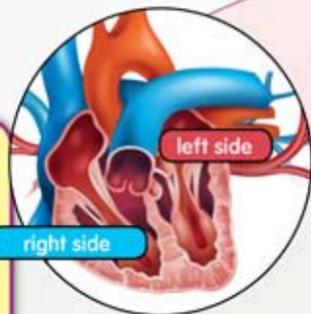
The blood circulatory system plays an important role in our body. This system transports oxygen, nutrients, water, and waste products such as carbon dioxide.

The main parts involved in the human blood circulatory system are the heart, blood vessels, blood, and the lungs.



Let's look at the function of each main part involved in the blood circulatory system.

The heart is an **organ that pumps blood to the lungs and the whole body**. Every time the heart beats, blood is pumped in and out of the heart. The heart has two sides. The left side of the heart pumps blood that is rich in oxygen to the whole body. Meanwhile, the right side of the heart pumps blood that is rich in carbon dioxide to the lungs.



cross section of the heart

TEACHER'S NOTES

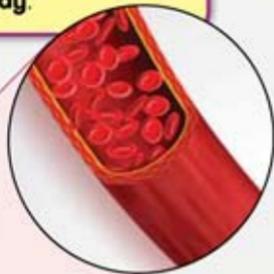
Blood rich in oxygen is shown in red. Blood rich in carbon dioxide is shown in blue.

The lungs are the **organs** where the exchange of **oxygen** and **carbon dioxide** occurs.

A blood vessel is a **tube** that allows **blood** to flow. Blood vessels **transport** blood to the **whole body**.

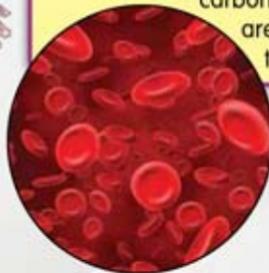


lungs



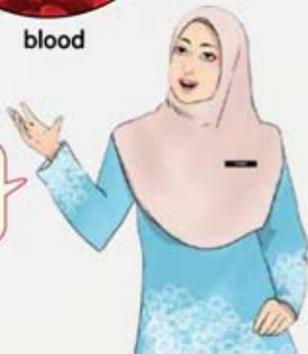
blood vessel

Blood **flows** through a **network** of **blood vessels** to every part of the **body**. Blood **carries** **oxygen**, **nutrients**, **water**, and **waste products**. Waste products such as **carbon dioxide** are removed from the **lungs**.



blood

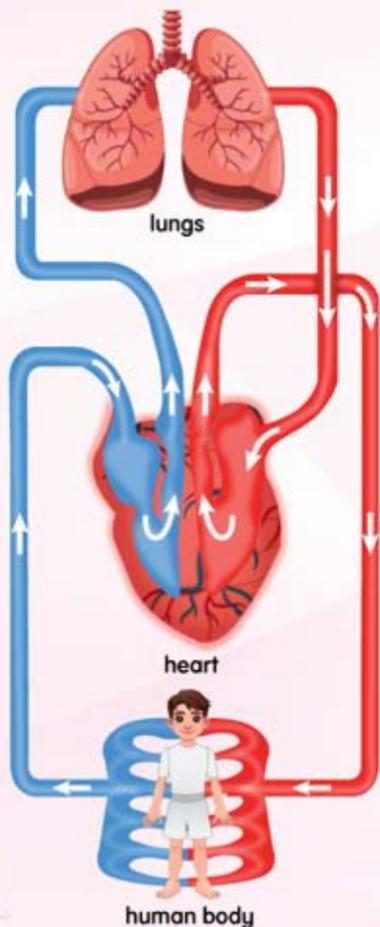
Describe the functions of the heart, blood vessels, blood, and the lungs involved in the human blood circulatory system.



HUMAN BLOOD CIRCULATORY PATHWAY

There are blood vessels that carry blood from the heart to the whole body. There are blood vessels that carry blood from the body to the heart. How does blood circulate in our body?

Look at this diagram. This is the blood circulatory pathway.



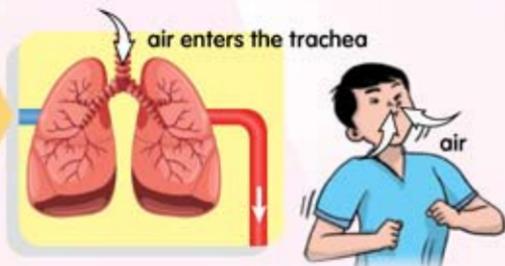
Legend:

● blood rich in oxygen

● blood rich in carbon dioxide

Our blood circulatory system is closely related to the respiratory system.

- 1 When we inhale, the air that enters the lungs is rich in oxygen and is absorbed into the blood vessels.



- 2 Here, the blood is known as blood rich in oxygen. The heart pumps the blood that is rich in oxygen to the whole body.

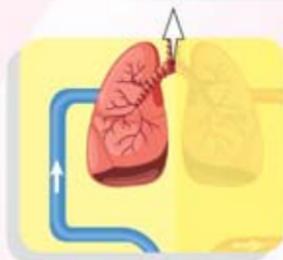


- 3 When the body uses up the oxygen, carbon dioxide is produced and absorbed into the blood.

- 4 Here, the blood is known as blood rich in carbon dioxide. Blood rich in carbon dioxide is transported to the heart.



- 5 From the heart, the blood rich in carbon dioxide will be pumped to the lungs. When we exhale, carbon dioxide is removed from the lungs.



The blood circulation process is repeated each time we breathe.





FUN ACTIVITY

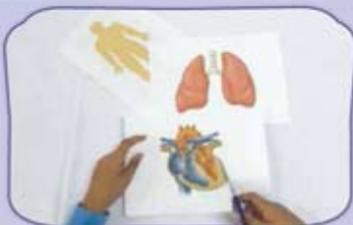
SKETCHING THE BLOOD CIRCULATORY PATHWAY

APPARATUS AND MATERIALS

Computer, internet access, printer, scissors, glue, red and blue drinking straws, manila card, and coloured paper.

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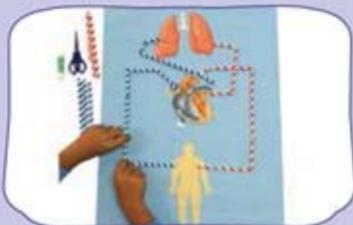
STEPS



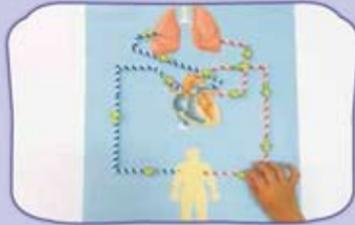
1. Find printable pictures of the lungs, the heart, and the human body on the internet. Print and cut the pictures.



2. Paste the pictures on the manila card. Take turns to paste the red drinking straws to represent the pathway of the blood rich in oxygen from the lungs to the heart and from the heart to the whole body.



3. Then, paste the blue drinking straws to represent the pathway of the blood rich in carbon dioxide that is produced by the body to the heart and the pathway of the blood rich in carbon dioxide pumped by the heart to the lungs.



4. Draw arrows on the coloured paper and cut them up. Paste the arrows on the drinking straws to represent the blood flow.

5. Present your work in front of the class.



Based on the activity above, explain:

- (a) the pathway of the blood rich in oxygen.
- (b) the pathway of the blood rich in carbon dioxide.

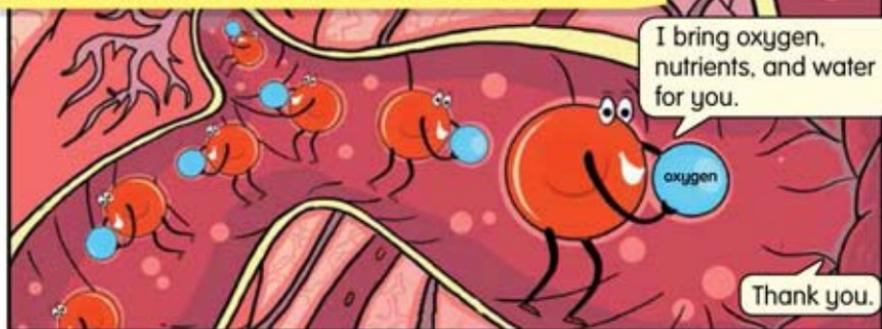
THE IMPORTANCE OF BLOOD CIRCULATORY SYSTEM

The blood circulatory system plays an important role in our body. Without it, we will not be able to perform life processes.



What is the importance of the blood circulatory system in the human body?

Transports oxygen, nutrients, and water to the whole body.



Blood transports oxygen from the lungs throughout the body. The blood containing nutrients absorbed from the intestines is brought to the heart before being pumped to the whole body.

Transports carbon dioxide and other waste products to be removed from the body.



Blood transports carbon dioxide from the whole body to the lungs. Blood also transports waste products from the body to the excretory organs such as kidneys where they are removed.

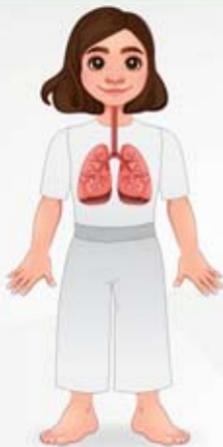
RELATIONSHIP BETWEEN THE SYSTEMS IN THE HUMAN BODY

The human body is made up of several systems. Each system has its own function. Each system is related to one another to ensure that our bodies function efficiently.

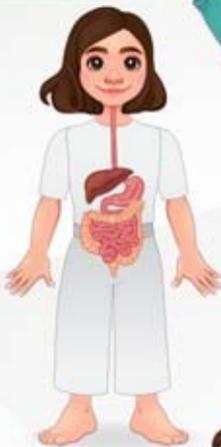
Do you remember the systems in the human body that you have learned before?



skeletal system

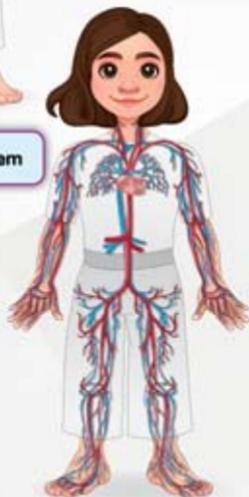


respiratory system



digestive system

Let's review the human blood circulatory system. This system has a close relationship with other systems in the body.

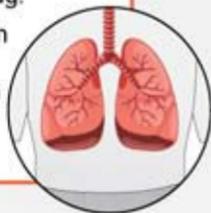


blood circulatory system

Respiratory System

The respiratory system transports oxygen. It depends on the blood circulatory system to transport oxygen to the whole body.

The respiratory system also depends on the blood circulatory system to remove carbon dioxide from the body.



Skeletal System

The blood circulatory system transports oxygen and nutrients to the skeletal system to help the growth of bones.

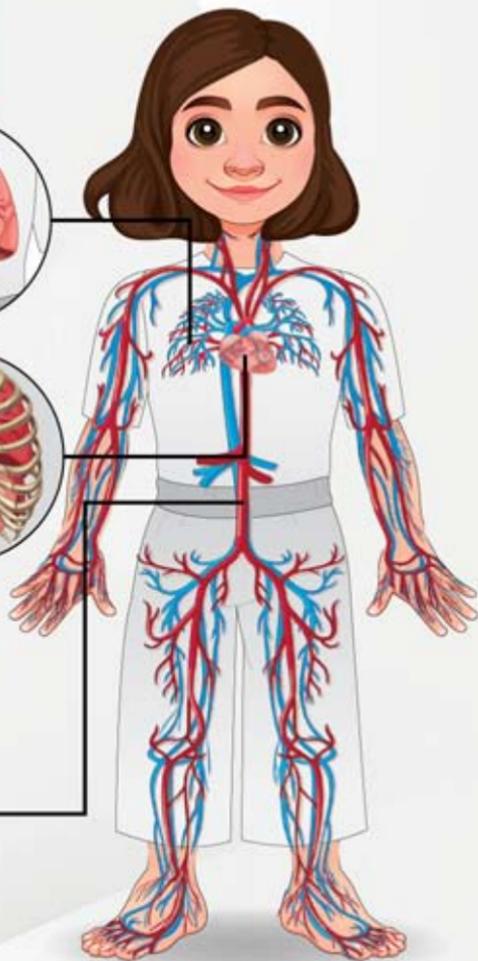
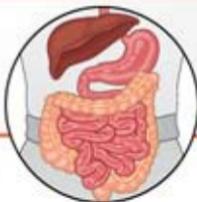
The skeletal system, in turn, protects the body and the organs involved in respiration and blood circulation such as the lungs and heart.



Digestive System

The blood circulatory system transports oxygen to the digestive system.

The digestive system supplies nutrients to organs such as the heart so that it can continue to function well.



blood circulatory system



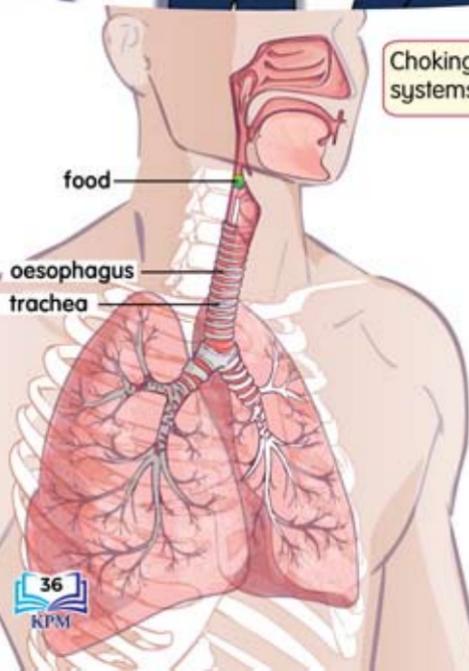
Can the blood circulatory system function on its own?

The systems in the body cannot function independently. If one of the systems fails to function, other systems will also be affected. Let us look at the following situations.

Situation 1
When choking on food



Choking can disrupt several systems in the human body.

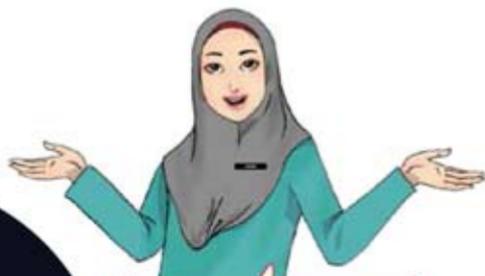


Digestive system and respiratory system

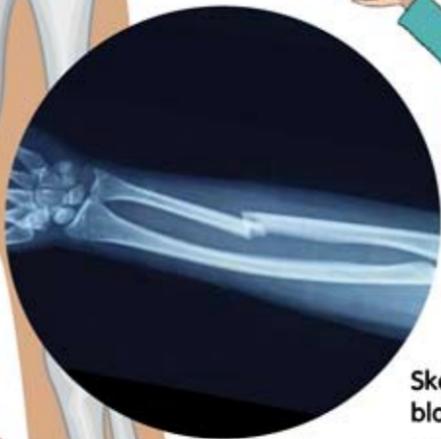
When food gets stuck in a person's throat, his/her digestive system is disrupted at the oesophagus.

Food trapped in the oesophagus will block air from entering the trachea. This will cause a disruption in the respiratory system because breathing becomes difficult.

Situation 2
When a bone is fractured



Fractured bones can also disrupt several systems in the human body.



Skeletal system and blood circulatory system

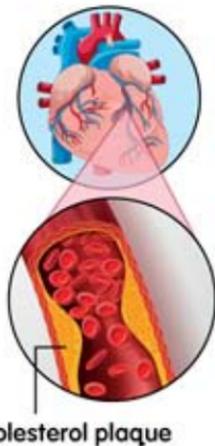
A fractured hand bone affects the skeletal system.

At the same time, the arm becomes swollen because the blood flow in the blood circulatory system is disrupted.

THE IMPORTANCE OF TAKING CARE OF ALL SYSTEMS IN THE HUMAN BODY

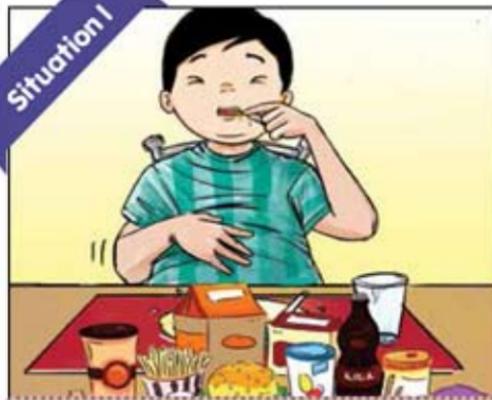
We need to take care of all the systems in the human body to make sure they function effectively.

What will happen if the systems in the body are not properly taken care of?



The heart is an essential organ in the blood circulatory system. The blood vessels in the heart can become narrow due to the formation of plaque. This is caused by the presence of excess cholesterol in the body.

Situation 1



How does healthy eating habits protect our blood circulatory system?



SCIENCE INFO

Cholesterol is a fat-like substance that can be found in the blood. The liver produces cholesterol for the body. Cholesterol is also found in food. We need cholesterol so that the brain, skin, and other organs can function properly. Eating foods containing too much cholesterol is harmful to the body.

Situation 2

According to this X-ray scan, there is a problem with your lungs. That's why you have persistent cough and shortness of breath.



We need to avoid bad habits such as smoking to protect our respiratory system. Why?

Situation 3



Why does wearing protective gear such as the helmet important in this situation?

Situation 4

I'm having constipation again!



How does drinking enough water protect our digestive system?

Why is it important to protect all the systems in the human body?



PROTECTING THE SYSTEMS IN THE HUMAN BODY

All the systems in the human body need to be taken care of so that they can function efficiently. How do we protect the systems in our body to maintain a healthy life?



Skeletal system

Consume foods that are rich in calcium

We need to take calcium to build strong bones. Milk and dairy products contain calcium that can strengthen bones.



Do physical activities

Physical activities such as running, jumping, and dancing can strengthen bones.

Wear protective gear and seat belts

Use helmets when riding motorcycles or when cycling. Use knee guards, elbow guards, and wrist supports when necessary. Wear seat belts in vehicles.



Respiratory system

Avoid cigarettes

Smoking causes respiratory diseases such as asthma, bronchitis, and lung cancer.

Live in a clean environment

A clean environment without air pollution reduces the risk of respiratory diseases.



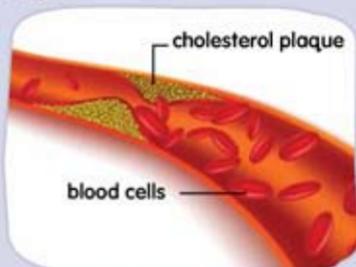


Wash hands frequently

Make it a habit to clean your hands often with soap and water or hand sanitising liquid. Avoid touching your mouth or nose before washing your hands because bacteria or virus on your hands may enter your respiratory system and cause diseases such as COVID-19.



Blood circulatory system



Reduce the consumption of foods that are high in fat and sugar

Consuming foods containing excessive fats can cause cholesterol to build up in the blood vessels and form plaques. Plaques narrow the blood vessels and the heart has to work harder to pump blood to the whole body.



Exercise

We should have proper and regular exercise to ensure a strong heart.



Digestive system

Eat foods that are rich in fibre

Eat foods that are rich in fibre such as vegetables, fruits, and whole grains to ease defecation.

Drink enough water

Drink enough water to keep our digestive system running smoothly.



Explain ways that can be practised to protect the systems in the body if a person has obesity.



FUN ACTIVITY

CHECKLIST OF SYSTEMS IN THE HUMAN BODY

APPARATUS AND MATERIALS

Manila card and marker pen.



STEPS

CHECKLIST					
Systems in the Human Body					
Situation					



- Based on the checklist provided, choose one system in the human body.
- Discuss with your group members a situation when the chosen system is disrupted and its effect on another system in the body.

CHECKLIST					
Systems in the Human Body					
Situation					
Lungs failure		X	X		



- Label "X" on the systems that are affected in the situation discussed earlier. For example, for a situation where the lungs fail to function, the affected systems in the body will be labelled with "X".
- Paste your completed work on the wall. A group representative will present the outcome to the other groups.



Based on the title discussed, how can we protect the systems in the human body to ensure a healthy life?

TEACHER'S NOTES

Teachers provide a checklist on the systems in the human body for each group.

Systems in the Human Body					
Situation					



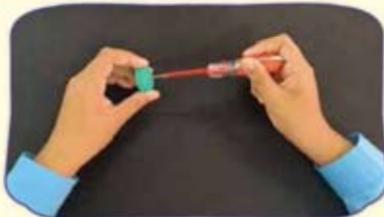
BLOOD CIRCULATORY SYSTEM MODEL

Produce a blood circulatory system model using a screwdriver, scissors, hot glue gun, plastic cups, binder clips, plastic bottles, plastic tubes, blue-coloured and red-coloured water.

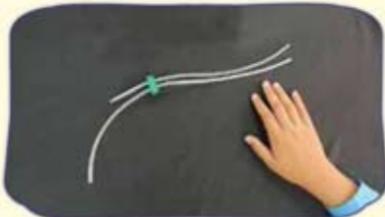


Blood circulatory system model

STEPS



1. Make two holes on the bottle cap. Enlarge the holes using a screwdriver.



2. Prepare two plastic tubes of different lengths. Insert the tubes into the holes of the bottle cap.



3. Screw the bottle cap back to the bottle. Make sure the end of the longer tube reaches the bottom of the bottle. The shorter tube is inserted just below the bottle cap.



4. Repeat steps 1 to 3 to produce the second bottle. Label the bottles as shown above.



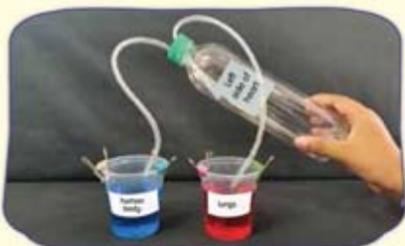
5. Seal gaps on the bottle cap to prevent air from entering the bottle using the hot glue gun.



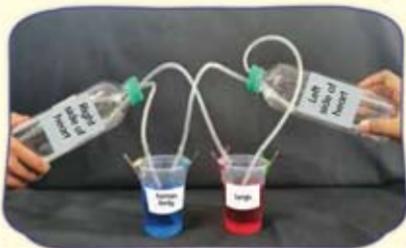
Be careful when making holes on the bottle caps and using the hot glue gun.



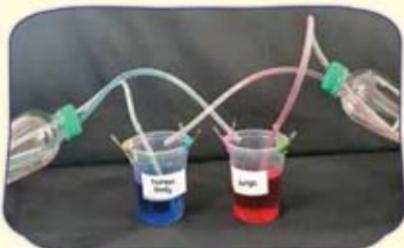
6. Pour blue-coloured water into the first plastic cup and label it "human body". Then, pour red-coloured water into the second plastic cup and label it "lungs". Fasten two binder clips to each cup.



7. For the left side of the heart, attach the end of the shorter tube to the mouth of the cup labelled "human body". Then, attach the longer tube to the base of the cup labelled "lungs".



8. For the right side of the heart, attach the end of the shorter tube to the mouth of the cup labelled "lungs". Then, attach the longer tube to the base of the cup labelled "human body".



9. Alternately, squeeze and release the bottles. Observe the movement of the red-coloured water (blood rich in oxygen) and the blue-coloured water (blood rich in carbon dioxide).



MIND REFLECTION

1. The functions of the main human skeleton are as follows:

Main skeleton	Function
backbone	supports the body
skull	protects the brain
ribs	protect the internal organs
hand and leg bones	for support and movement

2. A joint is a place where two or more bones are joined together.
3. The positions of the joints in the human body are as follows:



4. Joints allow movement and flexibility of the body.
5. The main parts in the blood circulatory system and their functions are as follows:

Main part	Function
heart	pumps blood to the lungs and to the whole body
blood vessels	transport blood throughout the body
blood	transports oxygen, nutrients, water, and waste products
lungs	place where oxygen and carbon dioxide are exchanged

6. Blood circulatory pathway:

- blood rich in oxygen: lungs → heart → human body
- blood rich in carbon dioxide: human body → heart → lungs

7. The importance of the human blood circulatory system are:

- to transport oxygen, nutrients, and water throughout the body.
- to transport carbon dioxide and other waste products out of the body.

8. Ways to protect the systems in the human body are as follows:

Skeletal system

- consume foods that are rich in calcium.
- do physical activities.
- wear protective gear and seat belts.

Blood circulatory system

- reduce the consumption of foods that are high in fat and sugar.
- exercise.

Respiratory system

- avoid cigarettes.
- live in a clean environment.
- clean hands frequently.

Digestive system

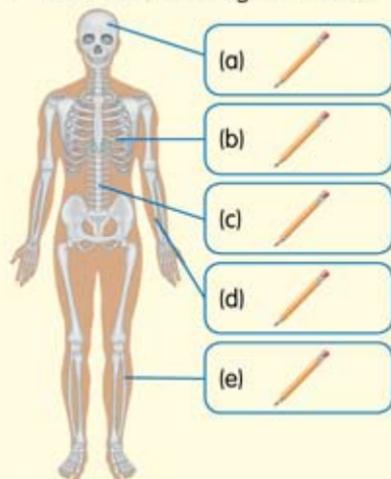
- eat food that are rich in fibre.
- drink enough water.



MIND TEST

Answer all questions in the Science exercise book.

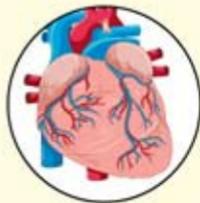
1. Label the skeletal system below.



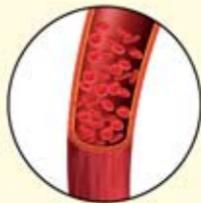
2. Sketch the diagram of the human skeleton. Identify and circle the positions of joints in the diagram.



- State the functions of joints in the human skeletal system.
- The figures below show the three main parts of the human blood circulatory system.



X



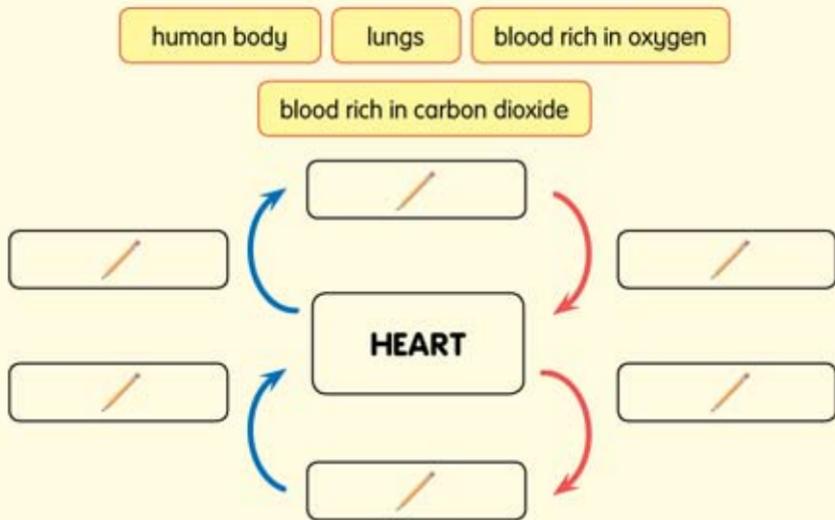
Y



Z

State the functions of X, Y and Z in the system.

- Complete the concept map of the blood circulatory pathway in humans with the answers provided below. You may use the answers more than once.



6. Write the correct answers to show the importance of the blood circulatory system using the list given below.

nutrients

food

other waste products

water

(a) Transports oxygen, _____, and water throughout the body.

(b) Transports carbon dioxide and _____ to be removed from the body.

7. The following pictures show several situations that disrupt the systems in the human body.

Situation			
	A. choking on food (digestive system)	B. fractured bone (skeletal system)	C. heart failure (blood circulatory system)

Based on the situations above, explain how the disruptions of the systems can affect other systems in the human body.

8. The picture below shows a habit that can disrupt the digestive system. Based on this situation, state another system in the human body that is also disrupted.



9. State two ways of protecting the systems in the human body to ensure a healthy life.