

STANDARD-BASED CURRICULUM FOR PRIMARY SCHOOL (REVISED 2017)
DUAL LANGUAGE PROGRAMME

SCIENCE

YEARS 5



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Dewan Bahasa dan Pustaka
Kuala Lumpur
2020





KEMENTERIAN PENDIDIKAN MALAYSIA

Serial No.: 0022

KK 507-221-0102021-49-2952-20101
ISBN 978-983-49-2952-7

First Printing 2020
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Published for the Ministry of Education Malaysia by:
Dewan Bahasa dan Pustaka,
Jalan Dewan Bahasa,
50460 Kuala Lumpur.
Telephone: 03-21479000 (8 hunting lines)
Facsimile: 03-21479643
Website: <http://www.dbp.gov.my>

Design and Typeset:
Attin Press Sdn. Bhd.

Text Typeface: Azim
Text Typeface size: 14 point

Printed by:
Aslita Sdn. Bhd.,
Lot 20, Jalan 4/10B,
Springcrest Industrial Park,
Batu Caves,
68100 Kuala Lumpur.

ACKNOWLEDGEMENTS

The publication of this textbook involved various parties. Sincerest appreciation and gratitude particularly to the following:

- The Panel of Evaluators, Educational Resources and Technology Division, Ministry of Education Malaysia.
- Officers of the Educational Resources and Technology Division and Curriculum Development Division, Ministry of Education Malaysia.
- The Panel of Evaluators, Dewan Bahasa dan Pustaka.
- The Panel of Readers, Dewan Bahasa dan Pustaka.
- Officers of the English Language Teaching Centre (ELTC), Ministry of Education Malaysia.
- Department of Wildlife and National Parks Peninsular Malaysia (DWNP).
- SK Tengku Mahmood Iskandar 2, Pontian, Johor.
- SK Sendayan, Seremban, Negeri Sembilan.
- SK Bandar Bukit Mahkota, Kajang, Selangor.
- All parties involved in the process of publishing this book.



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INTRODUCTION

The contents of this *Science Year 5 Textbook* are written and interpreted based on the Standard Curriculum and Assessment Document (DSKP) Science Year 5 of the Science Standard-based Curriculum for Primary School (Revised 2017). The publication of this book is aimed at fulfilling the new policy under the Malaysia Education Blueprint (PPPM) 2013–2025 that integrates knowledge, values, 21st Century Learning Skills, and Higher Order Thinking Skills (HOTS) through Science, Technology, Engineering and Mathematics (STEM) approach explicitly. This curriculum is also aimed at providing education that is comparable to international standards. Thus, this book is expected to contribute towards positive outcomes of pupils.

This textbook consists of 10 units that cover six themes: Inquiry in Science, Life Science, Physical Science, Material Science, Earth and Universe as well as Technology and Sustainability of Life. The contents of this book are designed to stimulate and capture pupils' interest in learning either in the classroom or independently. Each unit in this textbook begins with a stimulus page, concluding activities, evaluation and enrichment activities. To facilitate teaching and learning, answer pages are provided at the end of the book. Science Info contains additional information as added values to the contents of the topics discussed.

To ensure the goals and objectives of the Science Standard-based Curriculum for Primary School (Revised 2017) are achieved, the contents of this textbook emphasise aspects of HOTS that focus on inquiry and project-based learning approaches. In addition, existing elements of learning across the curriculum are added with elements of creativity, innovation, entrepreneurship, and Information and Communication Technology (ICT). Moral values, positive attributes, and good working cultures are also incorporated in this textbook.

Furthermore, the teaching and learning strategies in the DSKP for the science subject prioritise thoughtful learning, acquisition and mastery skills as well as emphasising pupils' knowledge to the optimum level. The STEM approach is integrated in a contextual and authentic manner in order to inculcate a harmonious learning environment among pupils through investigative activities. Fun and enjoyable learning experiences are stimulated through weaving edutainment with the subject content.

Therefore, the panel of writers hopes that this book will generate new ideas for teachers to enhance their teaching and learning effectiveness. It is also hoped that pupils will find this book interesting and will utilise it in their learning.

The panel of writers

ICON DESCRIPTIONS



LET'S TEST

Investigative science activities that help the pupils to master the learning standards.



FUN SCIENCE

Interesting and challenging enrichment activities that encourage fun learning and appreciation of the contents of each unit.



SCIENCE INFO

Additional information to increase the pupils' knowledge.



Questions to help the pupils to better understand the concepts in order to achieve the learning standards.



HIGHER ORDER THINKING SKILLS (HOTS)

Questions that can test the pupils' thinking skills on the content learned.



Information to guide and supplement teachers during teaching and learning activities.



AR CODE

Additional information which is presented using animation or interactive forms that can be scanned using a smartphone or tablet. The pupils are required to download the AR DBP Science Year 5 SK from Play Store (Android) or App Store (iOS 11 and above) before scanning the AR codes.



FUN ACTIVITY

Activities that help the pupils to master the learning standards through innovative and creative methods either individually, in pairs or in groups.



MIND REFLECTION

Brief notes on the contents at the end of each unit.



MIND TEST

Questions aimed at assessing the pupils' understanding at the end of each unit.

1.1.5

Numbers referring to the learning standards as stipulated in the Standard Curriculum and Assessment Document (DSKP).

Safety aspects that the pupils need to be aware of while conducting the activities.



QR CODE

Additional information of learning activities that can be scanned and accessed using a smartphone or a tablet.

SCIENTIFIC SKILLS

Ana, Melia, Chan, and Ravi are playing *tarik upih* in the front yard.

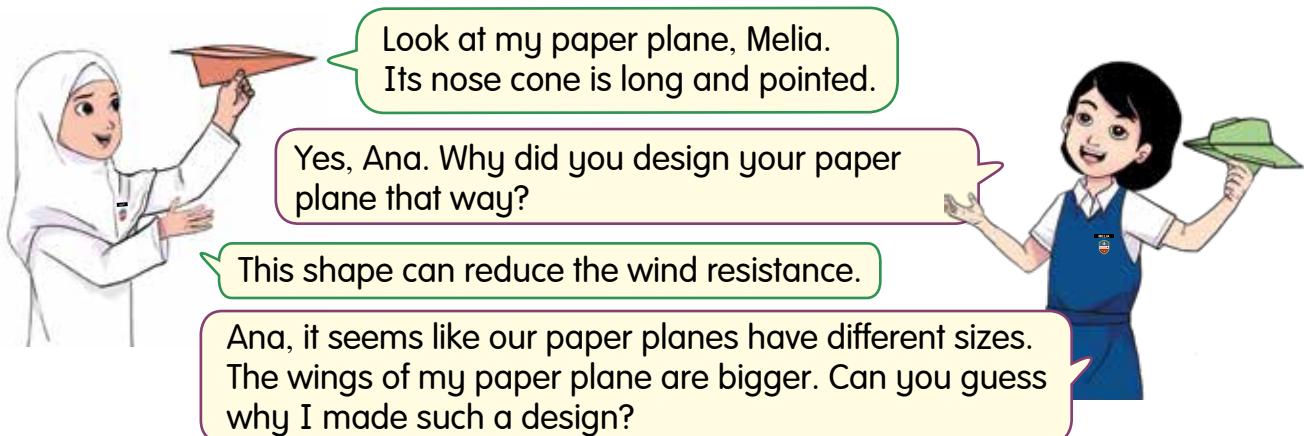
This is heavy! It's difficult to pull faster. The palm sheath is about to break!

Hurry up, Chan!
We are leading!

State two science process skills that you can observe in the situation above. Suggest easier ways for Ana to pull Melia.

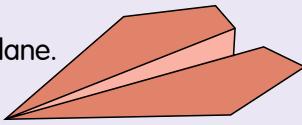
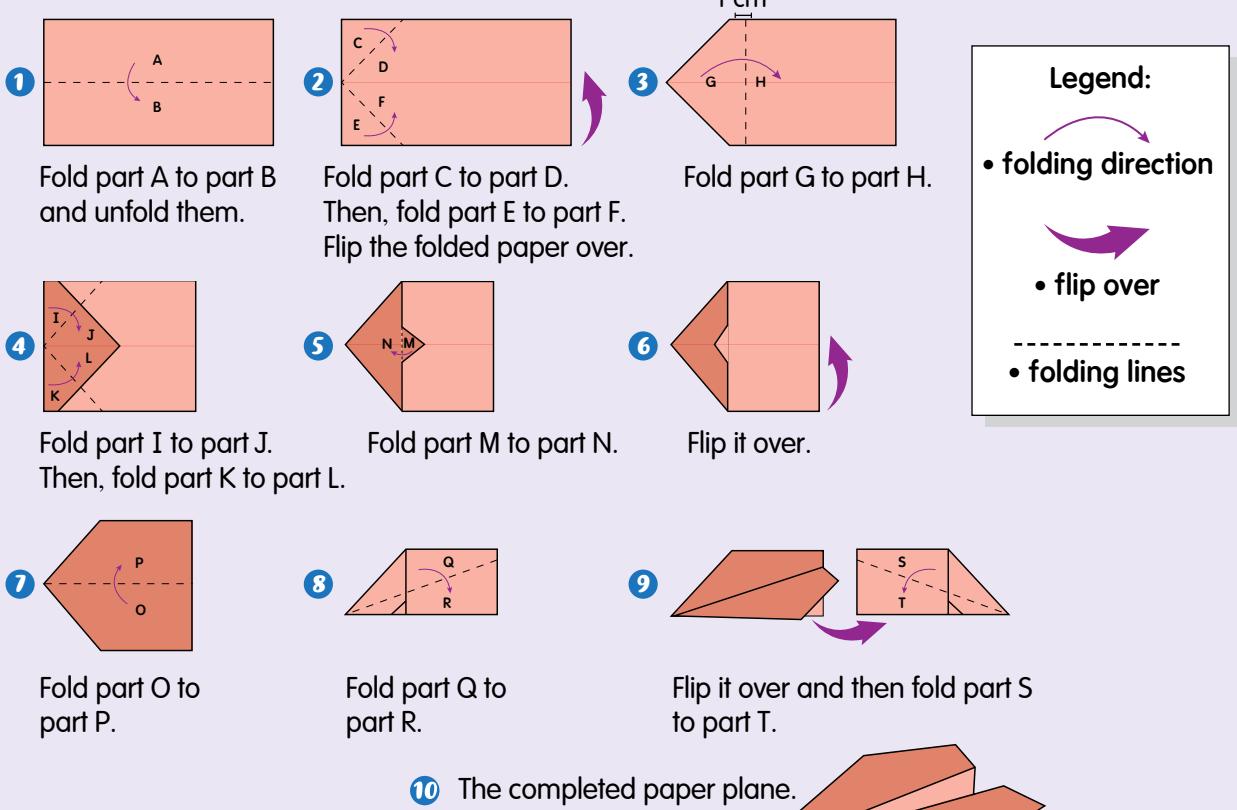
SCIENCE PROCESS SKILLS

The pupils of 5 Zamrud are having a competition on designing paper planes. Each pupil receives a coloured paper from the teacher. Let us look at what they did a day before the competition.



Then, they discussed how their paper planes were folded.

Steps on how Ana folded her paper plane:



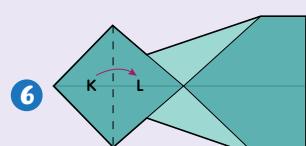
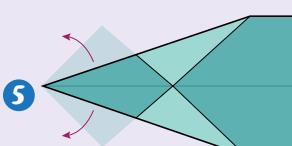
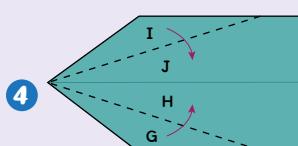
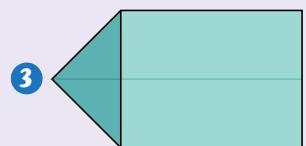
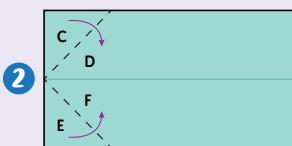
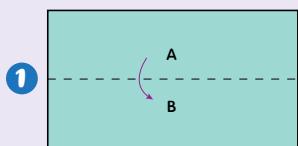


Wow! The nose cone of your paper plane is so attractive, Ravi. Why did you design it that way?



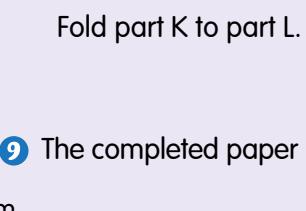
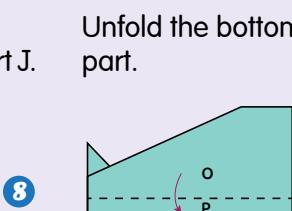
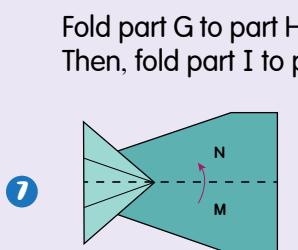
This shape increases the mass of the front part of the paper plane. It will be more stable and can fly farther. This is how I fold it.

Steps on how Ravi folded his paper plane:



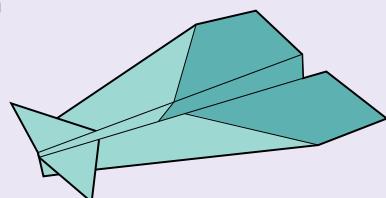
Legend:

- folding direction
- flip over
- folding lines



Fold part M to part N.

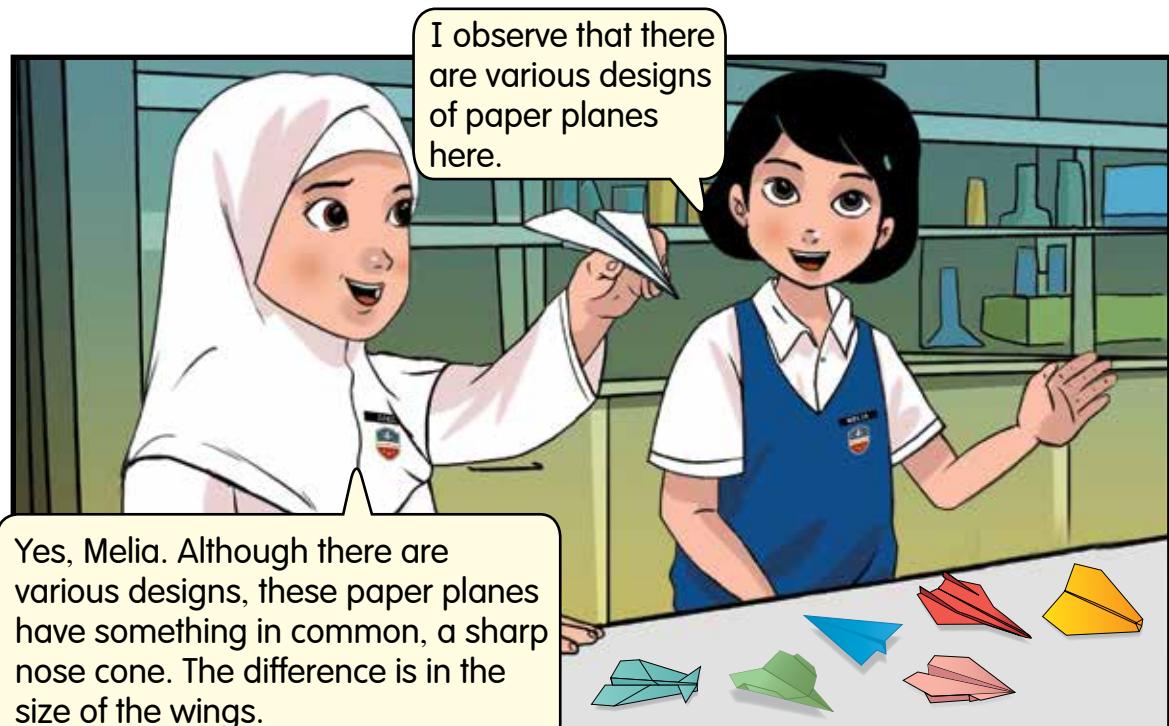
Fold part O to part P. Repeat this step on the other side.



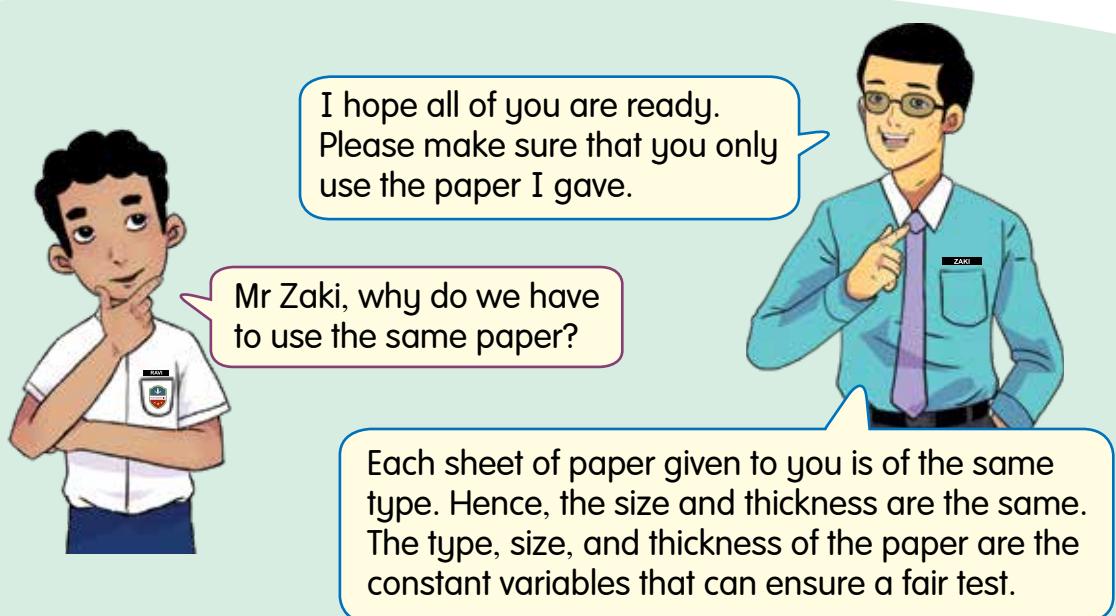
Look! My paper plane is ready.

Great! I predict that your paper plane will fly far because of the large size of its wings.

The pupils have successfully made their paper planes.



The following day, Mr Zaki asks the pupils of 5 Zamrud to bring along their paper planes and gather in the school indoor hall. They are going to launch the paper planes they have made.



Mr Zaki, how do we launch these paper planes to fly farther?



That is a good question, Ana. After this competition, we will investigate other ways of launching paper planes.



How do the size and thickness of the paper affect the distance travelled by the paper plane? Test and discuss.

How do science process skills help the pupils of 5 Zamrud in solving the problem? Let us follow how they investigate the factors affecting the distance travelled by their paper planes.

Pupils, only use the paper given to you. Use Ana's method of folding the paper plane so that all of the paper planes have the same design. For this activity, we will make some modifications to the paper planes.

All right, Mr Zaki.





LET'S TEST

DISTANCE TRAVELED BY A PAPER PLANE

AIM

To investigate the relationship between the length of the stretched rubber band and the distance travelled by a paper plane.



MATERIALS

Measuring tape, stapler, paper plane, paper clip, wooden pencil, and rubber band.

STEPS



1. Prepare a paper clip as shown above.



2. Place the paper clip at the front part of the paper plane.



3. Staple the paper clip so that it does not fall off.



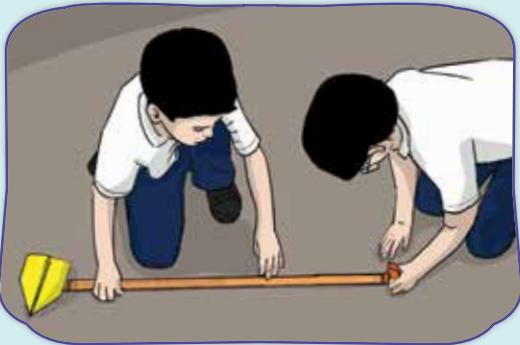
4. Fasten the rubber band to the paper clip and pencil.



5. Stand at the starting point and stretch the rubber band for 10 cm.



6. Release the paper plane and observe its movement.



7. Measure the distance travelled by the paper plane.
8. Repeat steps 4 to 7 by stretching the rubber band for 20 cm and 30 cm.
9. Record your observations in the table as shown below.

Length of stretched rubber band (cm)	Distance travelled by the paper plane (cm)
10	10
20	20
30	30

- ?
- (a) State your observation when the rubber band was stretched for 30 cm.
 - (b) Give your inference.
 - (c) Based on this investigation, identify the following variables:
 - (i) manipulated.
 - (ii) responding.
 - (iii) constant.
 - (d) What is the relationship between the manipulated variable and the responding variable in this investigation?
 - (e) Give the operational definition for the distance travelled by the paper plane.
 - (f) State your conclusion for the experiment conducted.

How were the science process skills used in this situation? Explain.



SCIENCE PROCESS SKILLS IN SOLVING PROBLEMS

Science process skills is one of the scientific skills that are used to solve problems. Let us observe the situation below. Ana, Ravi, Chan, and Melia are playing giant soap bubbles at a park.





1. Aim

To investigate the relationship between the quantity of glycerine and the time taken for the soap bubbles to burst.

2. Problem statement

Does different quantity of glycerine affect the time taken for the soap bubbles to burst?

3. Hypothesis

The more quantity of glycerine is used, the longer the time taken for the soap bubbles to burst.

4. Determining the variables

- manipulated: quantity of glycerine.
- responding: time taken for the soap bubbles to burst.
- constant: type of dishwashing liquid, volume of water, size of the bubbles produced, and the speed of surrounding wind.

5. Apparatus and materials

Safety goggles, measuring cylinder, stopwatch, plastic container with a lid, drinking straw, tablespoon, water, dishwashing liquid, and glycerine.

6. Steps

- Conduct this experiment at a less windy area.
- Wear safety goggles to protect your eyes.



- (c) Prepare a soap solution using 200 mL of water and 50 mL of dishwashing liquid. Then, stir the solution well without producing any bubbles.



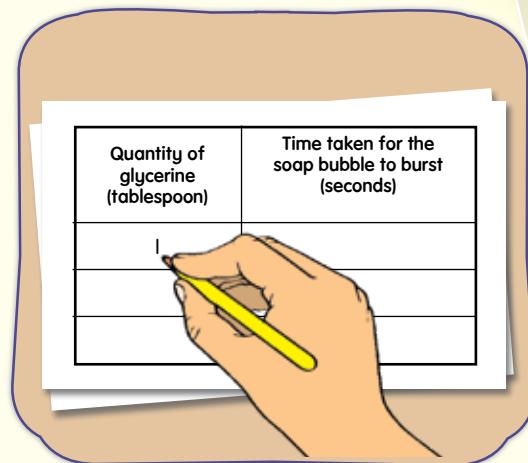
- (d) Add one tablespoon of glycerine into the soap solution. Stir well without producing any bubbles.



- (e) Then, leave the solution for four hours at room temperature.



- (f) Dip a drinking straw into the solution and place the end of the straw on the plastic lid.



- (g) Keep blowing until a bubble appears and covers the surface of the plastic lid. Then, start the stopwatch immediately.
- (h) Record the time taken for the soap bubble to burst in the table as shown above.
- (i) Repeat steps (c) to (h) by using three and five tablespoons of glycerine into every soap solution.

7. Data

Quantity of glycerine (tablespoon)	Time taken for the soap bubble to burst (seconds)
1	
3	
5	

8. Analysing the data

- (a) Based on the quantity of glycerine used in this experiment, _____ tablespoons of glycerine are needed to produce a soap bubble that can burst the latest.
- (b) The time taken for the soap bubble to burst is _____ seconds.

q. Conclusion

- (a) The hypothesis is (accepted/not accepted).
- (b) The _____ the quantity of the glycerine, the _____ the time taken for the soap bubble to burst.

Space-time relationship



How do we relate the relationship of time and space in this activity?



In this situation, the bigger the size of the soap bubble, the longer the time taken for the soap bubble to burst.

Operational definition



How do we make an operational definition for the durability of the soap bubbles?



The durability of the soap bubbles can be defined operationally as the time taken for the soap bubbles to burst.

Experiment Report

1. Aim

To investigate the relationship between time taken for the soap bubbles to burst.

2. Problem statement

Does different quantity of glycerine bubbles to burst?

3. Hypothesis

The more quantity of glycerine is used, the longer the soap bubbles to burst.

4. Determining the variables

- manipulated: quantity of glycerine
- responding: time taken for the soap bubble to burst
- constant: type of dishwashing liquid, water, size of lid

5. Apparatus and materials

Safety goggles, measuring cylinder, lid, drinking straw, table spoon and glycerine.

6. Steps

- This experiment is conducted at a less windy area.
- Safety goggles are worn to protect the eyes.
- Soap solution is prepared using 200 mL of water and 50 mL of dishwashing liquid. Then, the solution is stirred without producing any bubble.
- One tablespoon of glycerine is added into the soap solution.
- The solution is stirred without producing any bubble.
- The soap solution and glycerine is left for four hours at room temperature.
- A drinking straw is dipped into the solution and the end of the straw is placed on the plastic lid.
- The soap solution is blown until a bubble appears and has covered the surface of the plastic lid. Then, the stopwatch is started immediately.
- The time taken for the soap bubble to burst is recorded in a table.
- Steps (c) to (h) are repeated by adding three and five tablespoons of glycerine into every soap solution.

7. Data

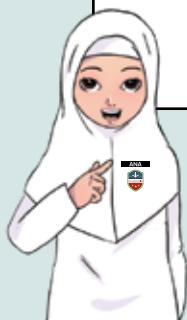
Quantity of glycerine (tablespoon)	Time taken for the soap bubble to burst (seconds)
1	45
3	120
5	145

8. Analysing the data

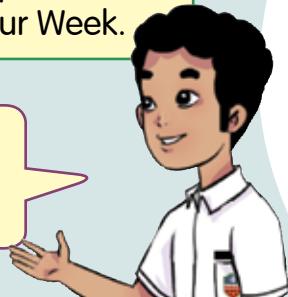
Based on the quantity of glycerine used in this experiment, five tablespoons of glycerine are needed to produce soap bubbles that can burst the latest.

9. Conclusion

- The hypothesis is accepted.
- The higher the quantity of the glycerine used, the longer the time taken for the soap bubble to burst.



Friends, our experiment was a success. We should produce more of the soap solution to be sold during the Entrepreneur Week.



That's a good idea, Ana. The profit obtained can be used to decorate the Science Garden in our school.



- What is the aim of the experiment?
- What is your observation when a soap bubble made using one tablespoon of glycerine is blown and being left for a moment?
- Give an inference to your observation.
- State the manipulated and responding variables in this experiment.
- What is the relationship between the quantity of glycerine with the time taken for the soap bubbles to burst?

Plan and conduct a new experiment using different types of dishwashing liquid such as body wash and hand wash. Use different items such as cornflour or potato starch to make the soap bubbles last longer.



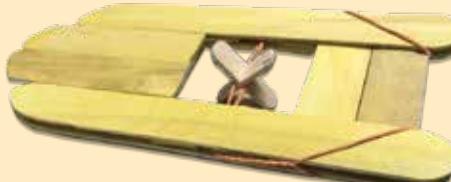


FUN SCIENCE

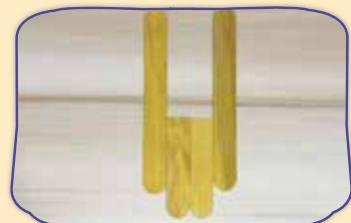
ICE CREAM STICK BOAT

Build an ice cream stick boat using a ruler, pencil, knife, hot glue gun, sandpaper, small saw, rubber band, and ice cream sticks.

STEPS



Ice cream stick boat



1. Prepare all the materials.

2. Measure and cut the ice cream sticks.

3. Arrange the ice cream sticks that have been cut.



4. Attach the ice cream sticks as shown in the picture.

5. Smooth the edges using sandpaper.

6. Build the paddle of the ice cream stick boat using a knife or small saw.



7. Attach the rubber band.

8. Insert the paddle to the ice cream stick boat.

9. Rotate the paddle and launch it on water.



Be careful when using hot glue gun and sharp tools such as a knife or small saw.



MIND REFLECTION

We can understand and solve a problem scientifically using the science process skills as follows:

- observing.
- classifying.
- measuring and using numbers.
- making inferences.
- predicting.
- communicating.
- using space-time relationship.
- interpreting data.
- defining operationally.
- controlling variables.
- making hypothesis.
- experimenting.



MIND TEST

Answer all questions in the Science exercise book.

1. Provide a suitable inference for each of the following situation:

(a)



Large logs float on water.

(b)



Rate of breathing is higher after exercising.

2. The following figures show how two pupils of Year 5 Zamrud travel to school. The distances between their houses and the school are the same, which is 1 km.



Pupil A

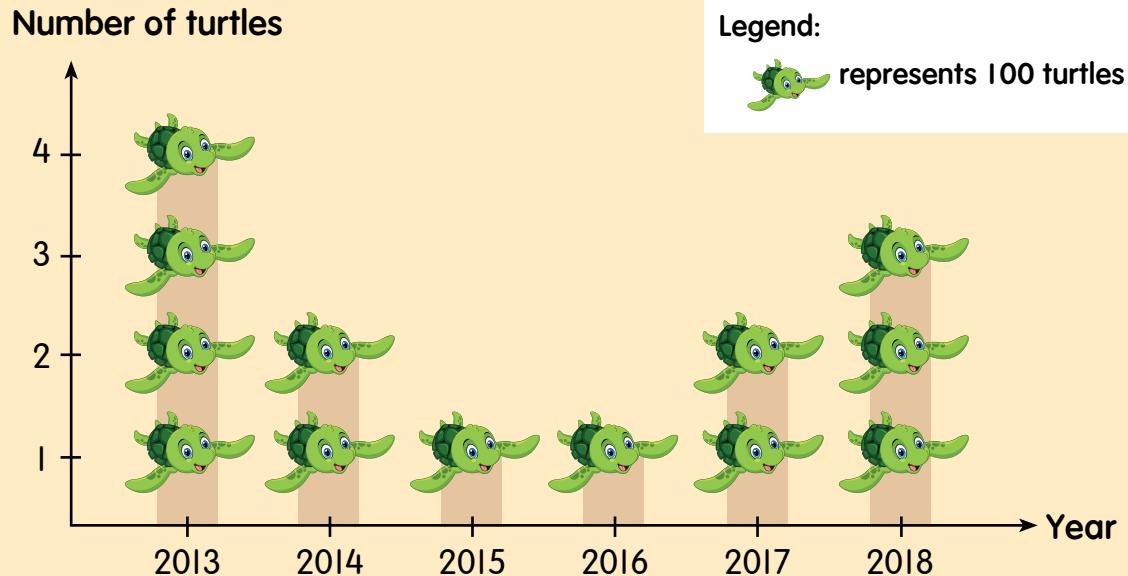


Pupil B

(a) Predict the time taken for both pupils to travel to school.

(b) If Pupil B takes 15 minutes to reach the school, how long will Pupil A take?

3. The figure below shows the number of turtles that landed on the beach of State M for a duration of six years.



- (a) Based on the figure above, what is your observation?
(b) Give an inference on the number of turtles that landed in 2015 and 2016.
(c) What is the total number of turtles that landed from 2016 until 2018?
4. Classify the following objects based on an identified characteristic.



5. An investigation was carried out to identify the chemical properties of substances J, K, L and M by using red and blue litmus papers. The results of the investigation are as follows:

Substance	Colour change on litmus paper	
	Blue	Red
J		
K		
L		
M		

- (a) Predict the chemical properties of substances K and M.
- (b) Classify substances J, K, L and M according to the correct chemical properties.
- (c) What is the operational definition of an alkali?
- (d) Which following pair of substance is alkaline?

Tick [✓] the correct box.

Lime juice and vinegar	<input type="checkbox"/>
------------------------	--------------------------

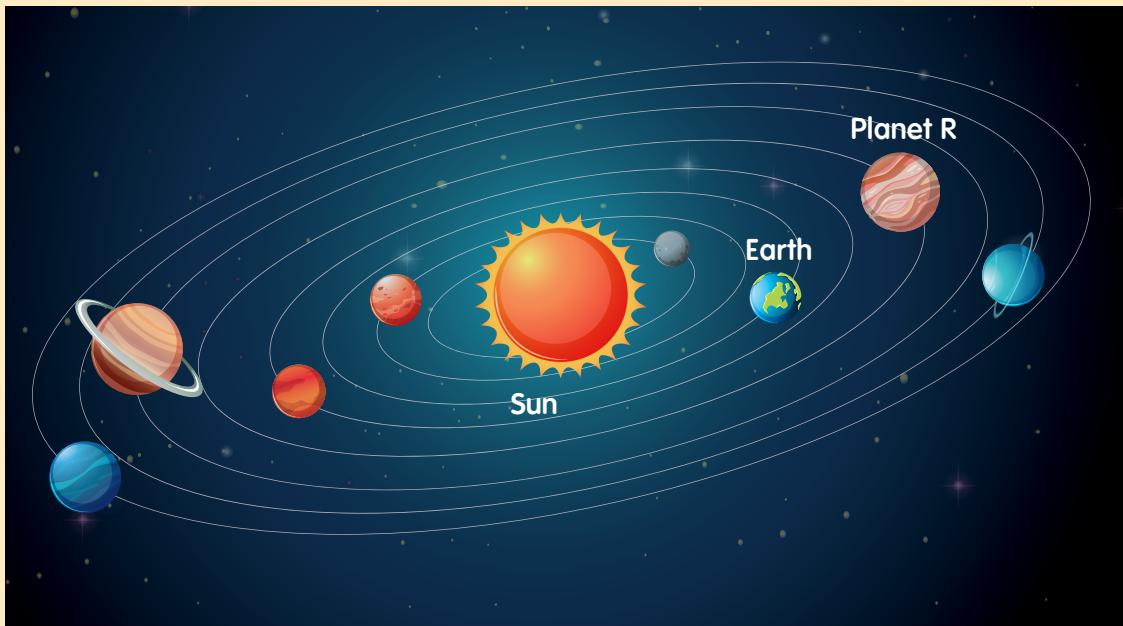
Lime water and soap	<input type="checkbox"/>
---------------------	--------------------------

6.



What is the space-time relationship for the situation above?

7. The figure below shows the positions of planets from the Sun in the Solar System. The position of a planet determines the time it takes to make one complete revolution around the Sun.
- (a) What is Planet R?
 - (b) Based on the investigation above, state the variable that is:
 - (i) manipulated.
 - (ii) responding.
 - (c) Make a hypothesis from the information identified based on the observation in this investigation.
 - (d) Predict the time taken by planet R to make one complete revolution around the Sun as compared to the Earth. Give your inference.



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

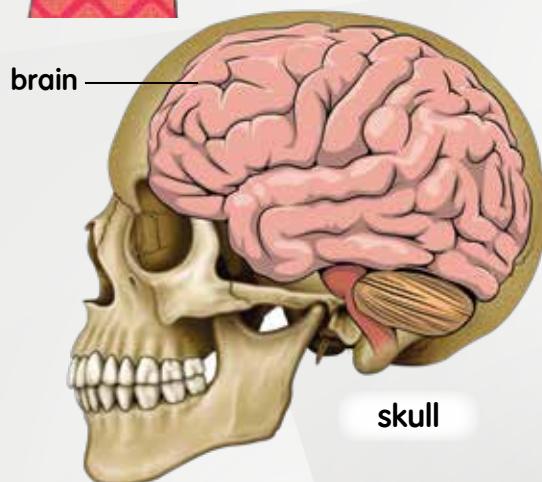
Do you know why worms are not able to stand up like humans? This is because worms do not have bones like humans.

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

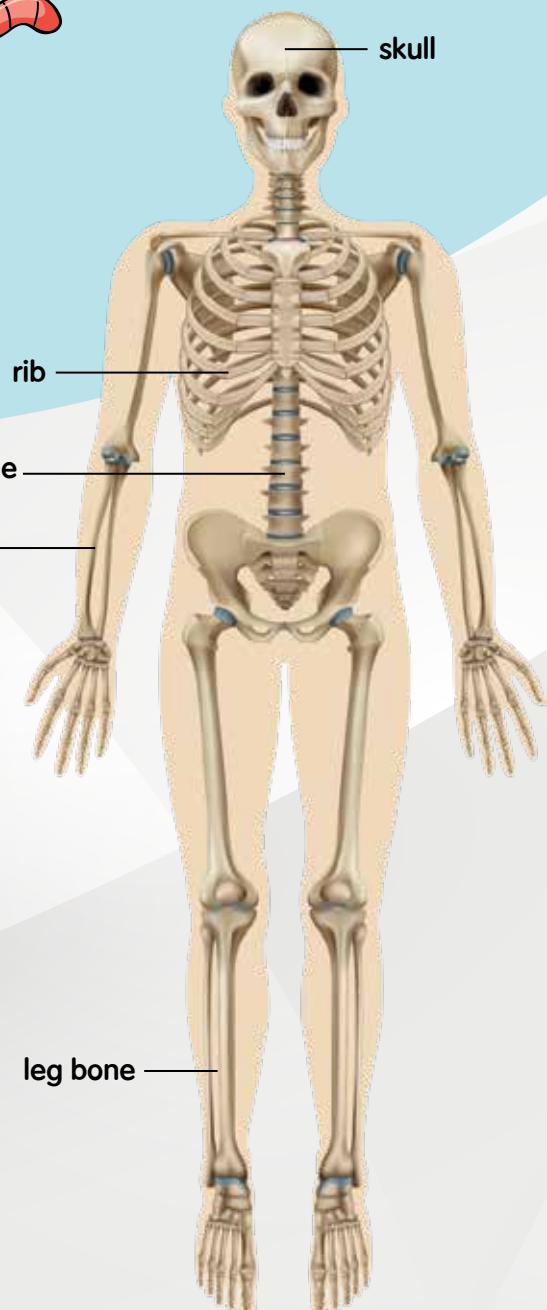
Without a skeletal system, you may just have to writhe and wriggle to move like me.

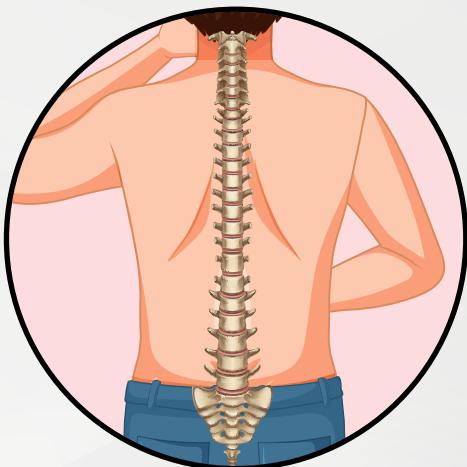


The human skeletal system is made up of bones in the body. How does the main skeletal system function?



The skull **protects our brain** from injury.

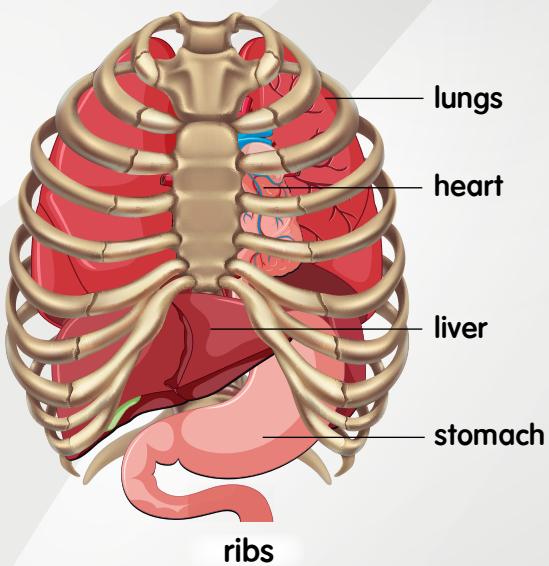




backbone



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

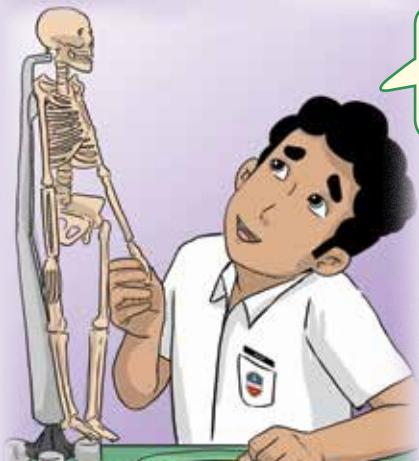


The bones of the hands and legs provide **support** and **movement**.

Explain the functions of the main human skeleton.

POSITIONS OF JOINTS

Ravi observes a human skeleton model.

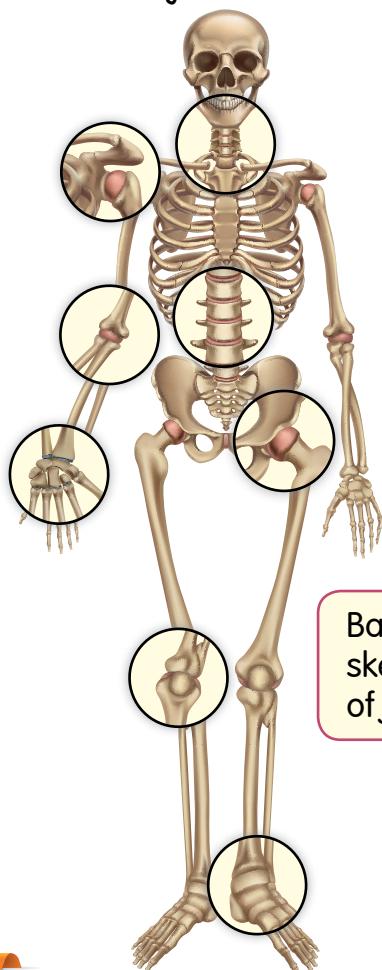


Miss Hawa, how do the skeletal bones connect to each other?



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.

positions of joints in human 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.



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

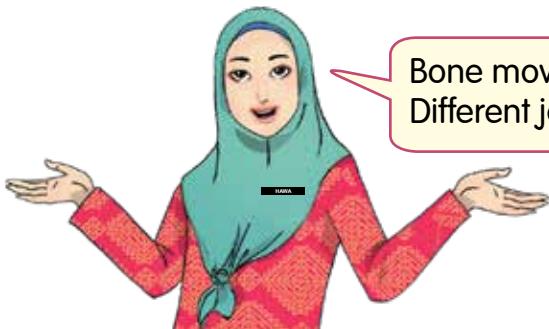
Erm, why can't I bend my arm?

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.

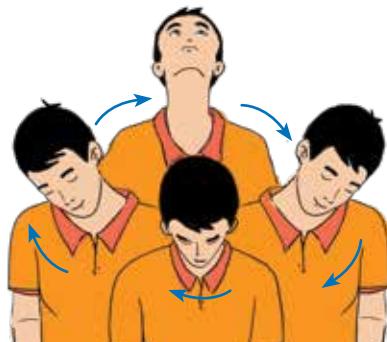
Observe the athlete, dancer, and skateboarder below. How do they move their parts of the body easily to make specific movements?



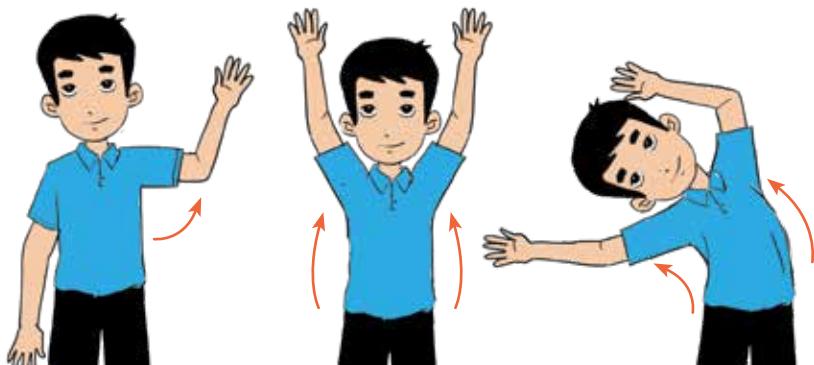
Joints allow movement and flexibility of the body.



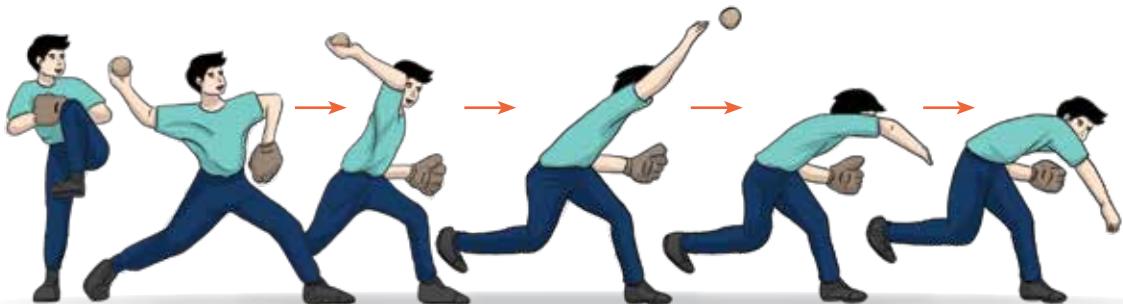
Bone movement at the joints allows the body to move. Different joints enable different bone movements.



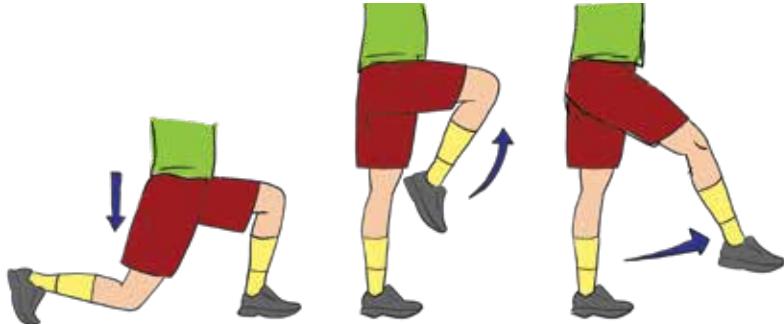
The joint at the neck makes turning and rotation of the head possible.



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?



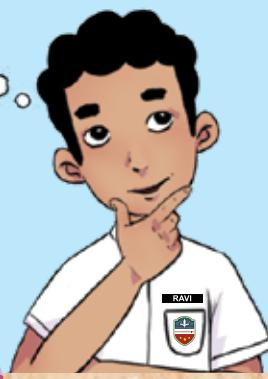
THE IMPORTANCE OF HUMAN SKELETAL SYSTEM

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



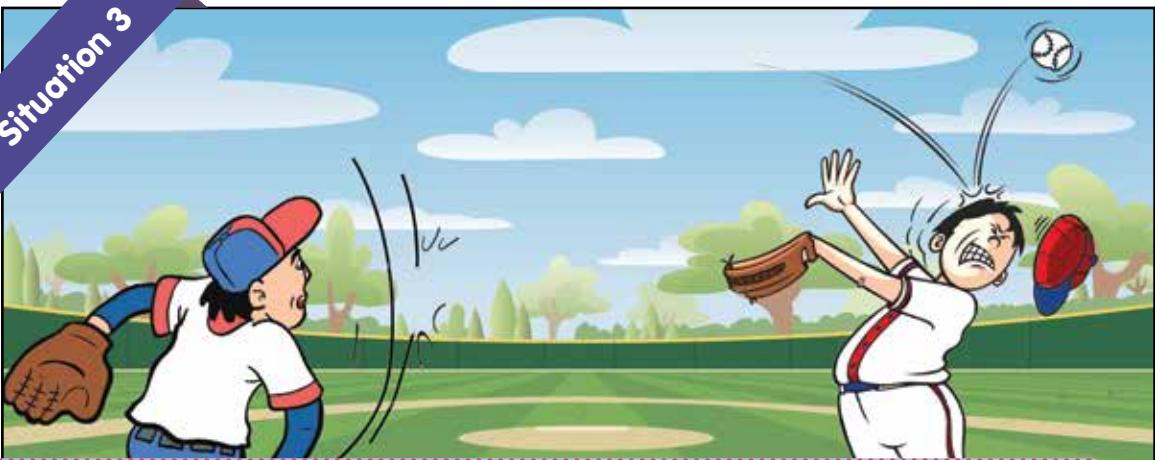
What would happen to our bodies if there were no skeletal system?

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.

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.

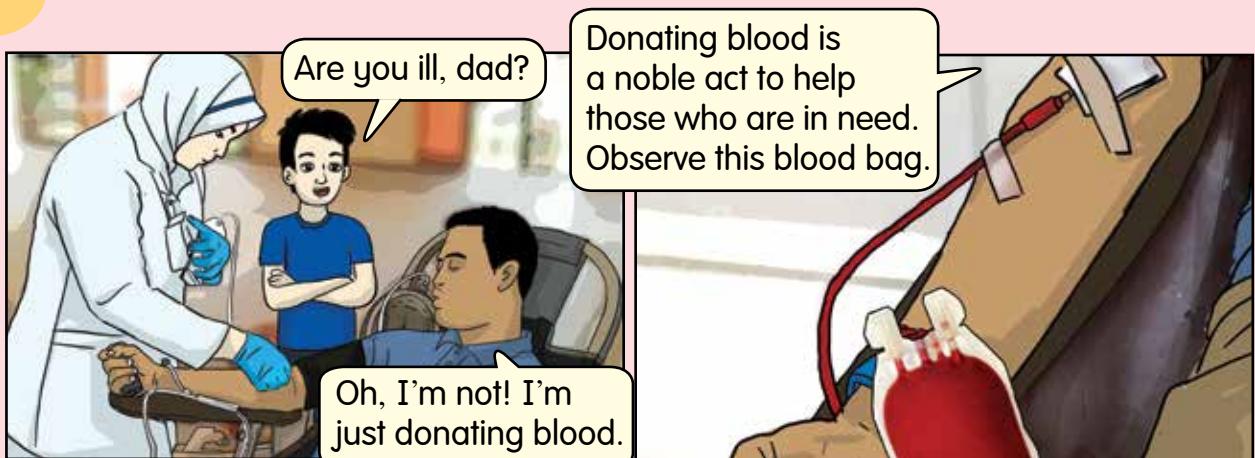
TEACHER'S NOTES

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.



The main human skeletal system

HUMAN BLOOD CIRCULATORY SYSTEM



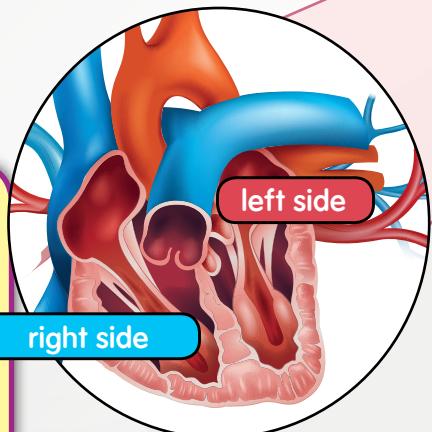
The blood circulatory system plays an important role in our body. This system transports oxygen, nutrients, water, and waste products such as carbon dioxide.

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

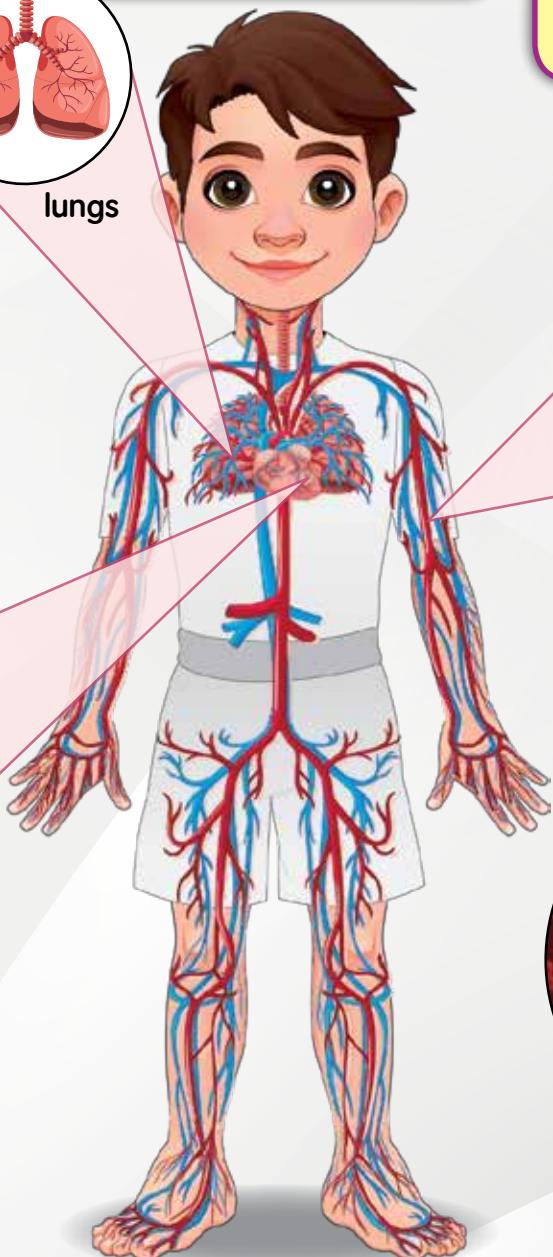


Blood rich in oxygen is shown in red. Blood rich in carbon dioxide is shown in blue.

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



lungs



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



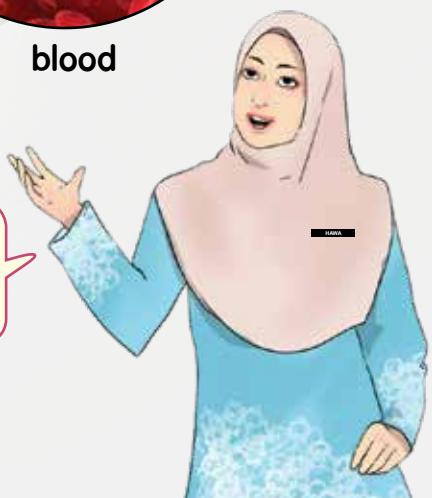
blood vessel

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

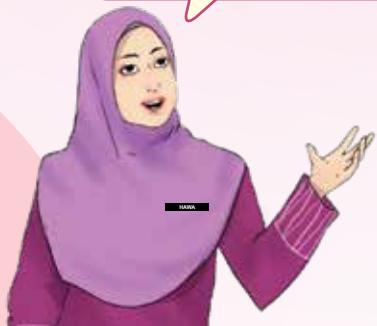
Describe the functions of the heart, blood vessels, blood, and the lungs involved in the human blood circulatory system.



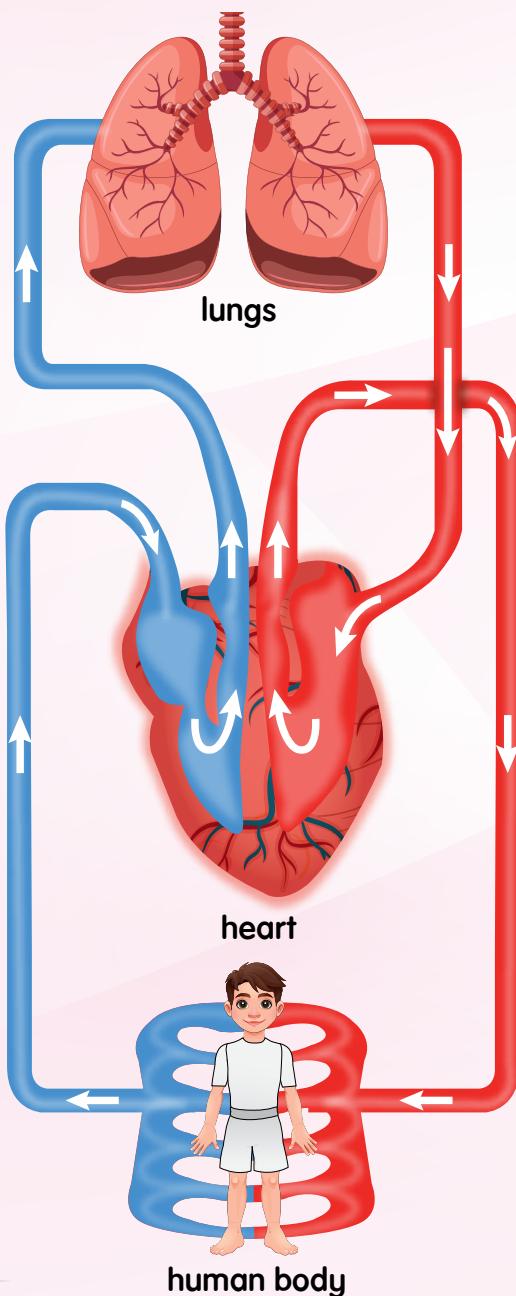
HUMAN BLOOD CIRCULATORY PATHWAY

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?

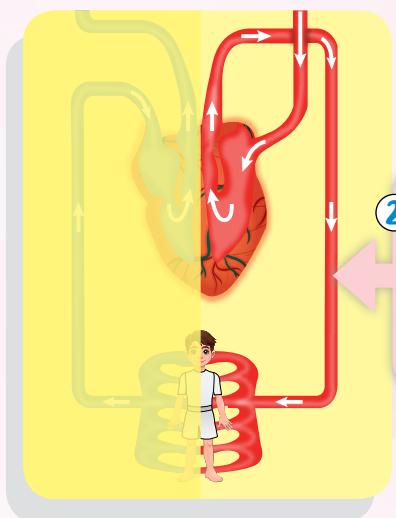
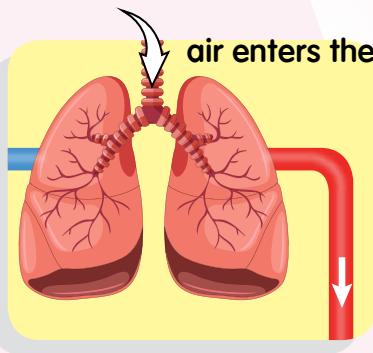
Look at this diagram. This is the blood circulatory pathway.



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



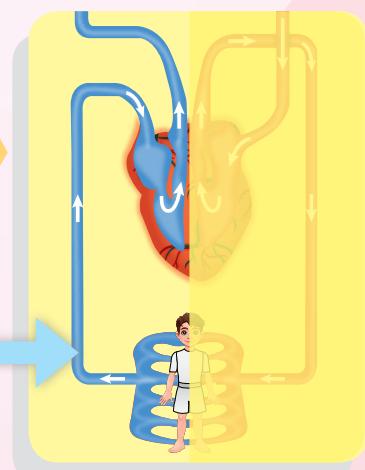
- 1 When we inhale, the air that enters the lungs is rich in oxygen and is absorbed into the blood vessels.



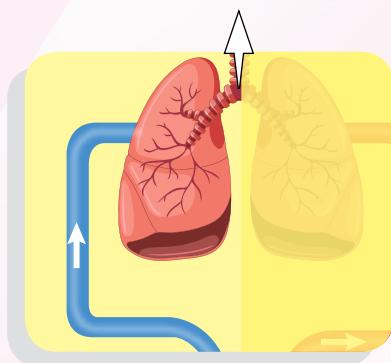
- 2 Here, the blood is known as blood rich in oxygen. The heart pumps the blood that is rich in oxygen to the whole body.

- 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

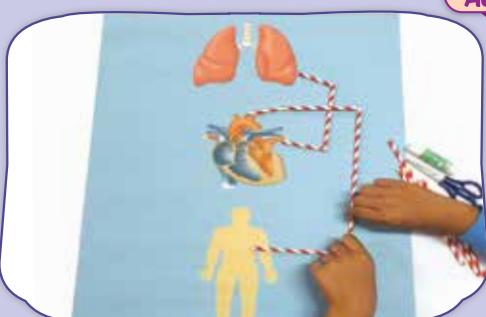
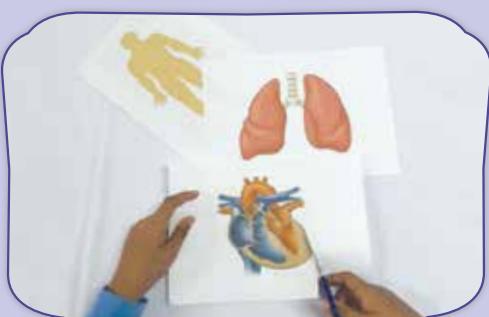
SKETCHING THE BLOOD CIRCULATORY PATHWAY

APPARATUS AND MATERIALS

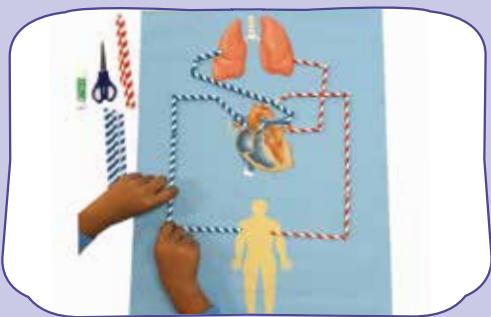
Computer, internet access, printer, scissors, glue, red and blue drinking straws, manila card, and coloured paper.

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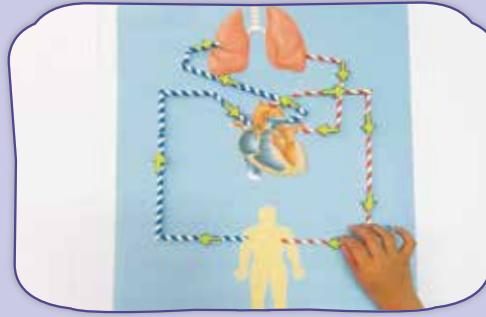
STEPS



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



- 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.



- 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.

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

- Present your work in front of the class.



Based on the activity above, explain:

- the pathway of the blood rich in oxygen.
- the pathway of the blood rich in carbon dioxide.

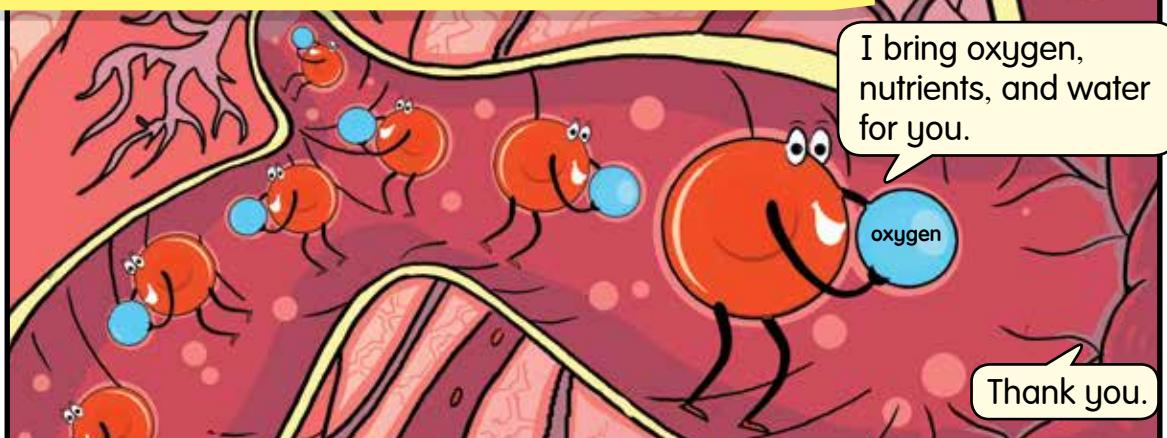
THE IMPORTANCE OF BLOOD CIRCULATORY SYSTEM

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?

Tранспортирует кислород, питательные вещества и воду в整個 тело.

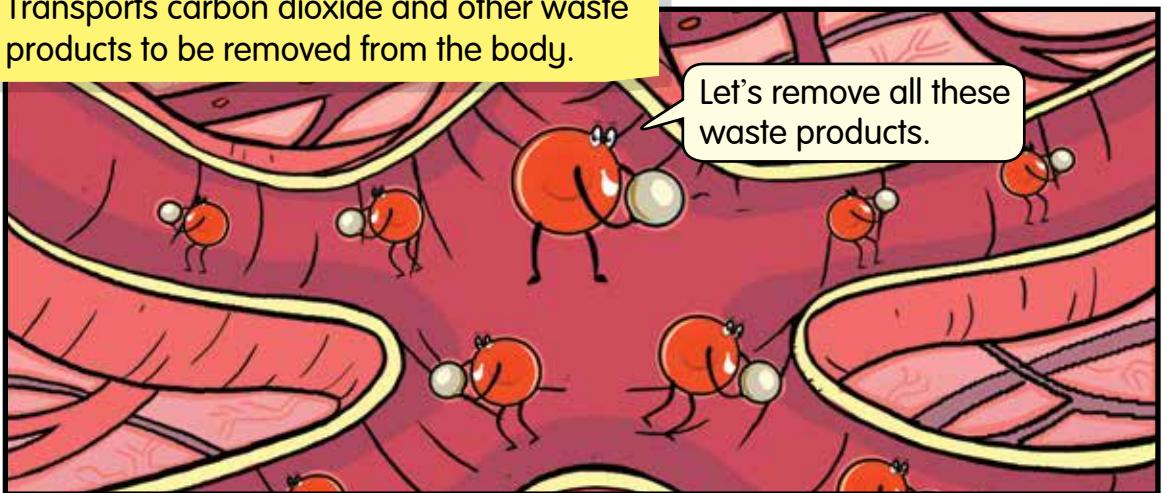


I bring oxygen, nutrients, and water for you.

Thank you.

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.



Let's remove all these waste products.

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.