

UNIT 2

HUMANS

Various situations take place at the park in the afternoon. What activities can you observe in this picture that are related to life processes?

Wow, such fresh air!

Ouch! That hurts!

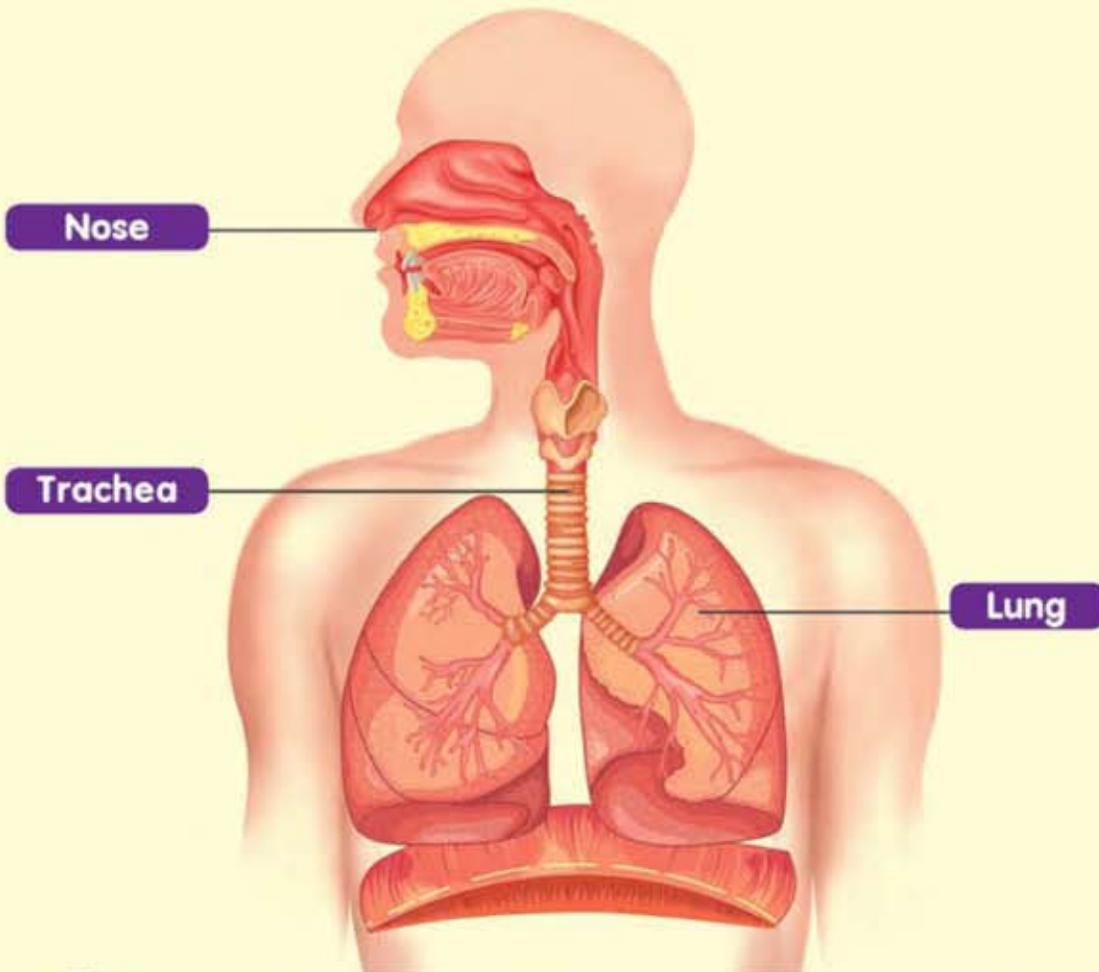
Oh, my stomach is acting up!

I am so tired! My whole body is sweating!

Hmm, so fragrant!

Organs Involved in Human Breathing

Humans breathe to survive. During inhalation, air is taken into the lungs. During exhalation, air is expelled from the lungs. The lungs are the organs involved in human breathing. Observe the figure below showing the organs that are involved during breathing.



Try to identify the organs that are involved in the breathing process.

SCIENCE INFO

The size of the left lung is smaller compared to the right because the heart is located on the left side.





FUN ACTIVITY

Labelling the Human Breathing Organs

Apparatus and Materials

Red modelling clay, purple modelling clay, brown modelling clay, rolling pin, ruler, pencil, white paper, manila card, marker pen, scissors



Steps



1. Draw the shape of the lungs on a piece of white paper. Then, cut it out.



2. Knead the red modelling clay and then flatten it using the rolling pin.



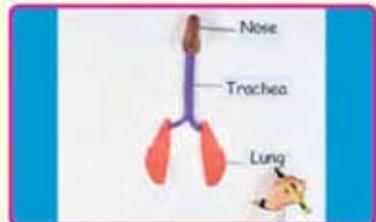
3. Trace the cut-out of the lungs on the flattened red modelling clay. Use the ruler to cut through the modelling clay according to the shape.



4. Repeat step 2 using the brown modelling clay to form the nose.



5. Shape the purple modelling clay into the letter 'Y' to form the trachea.



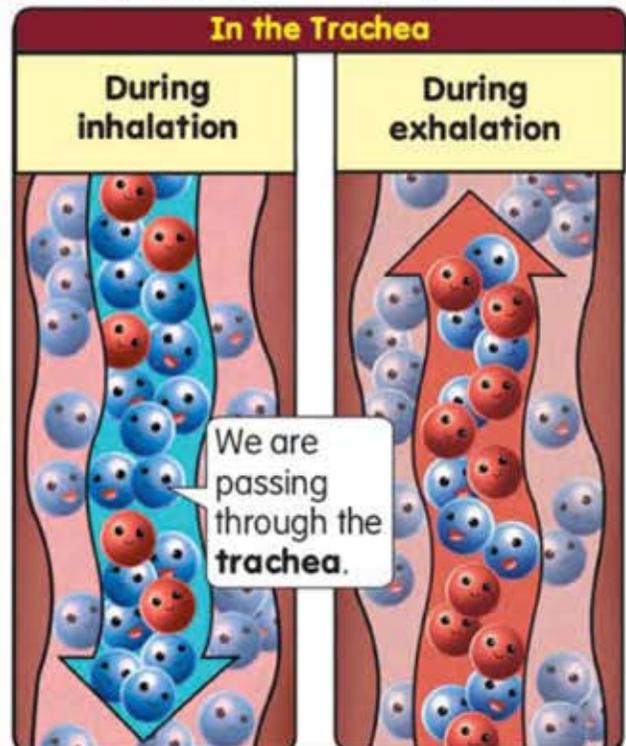
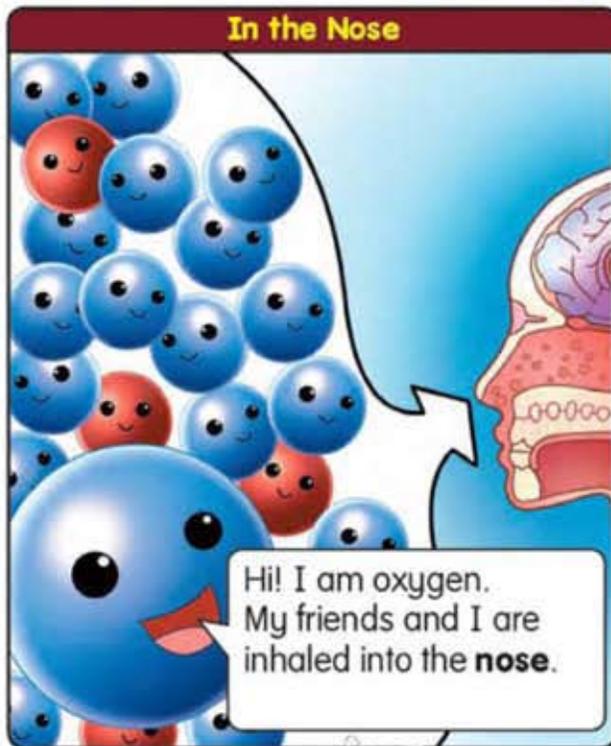
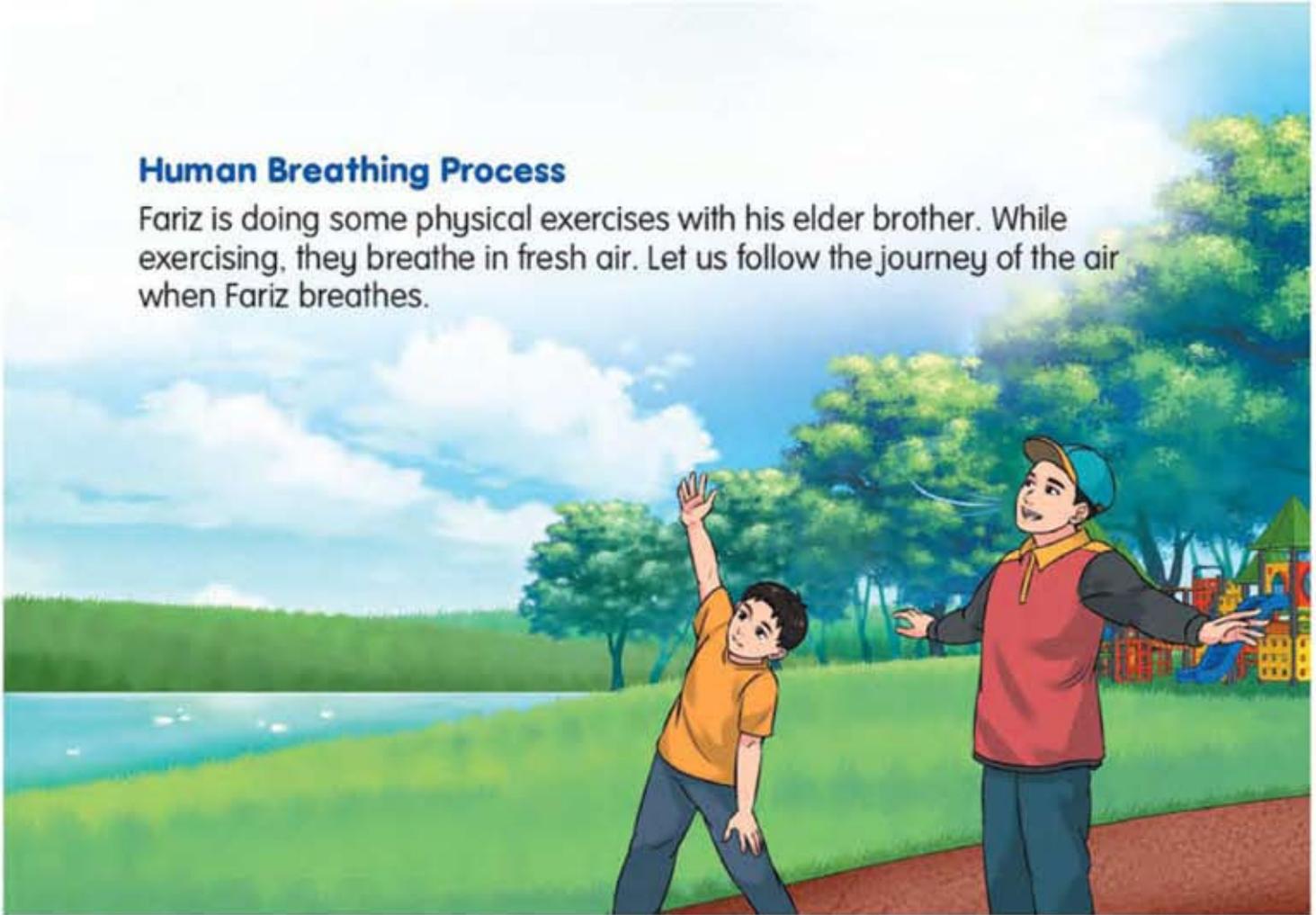
6. Place the clay models of the lungs, nose, and trachea onto a manila card. Label accordingly using a marker pen.

Question

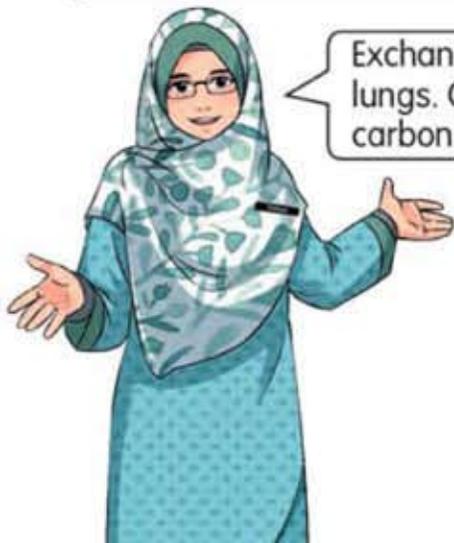
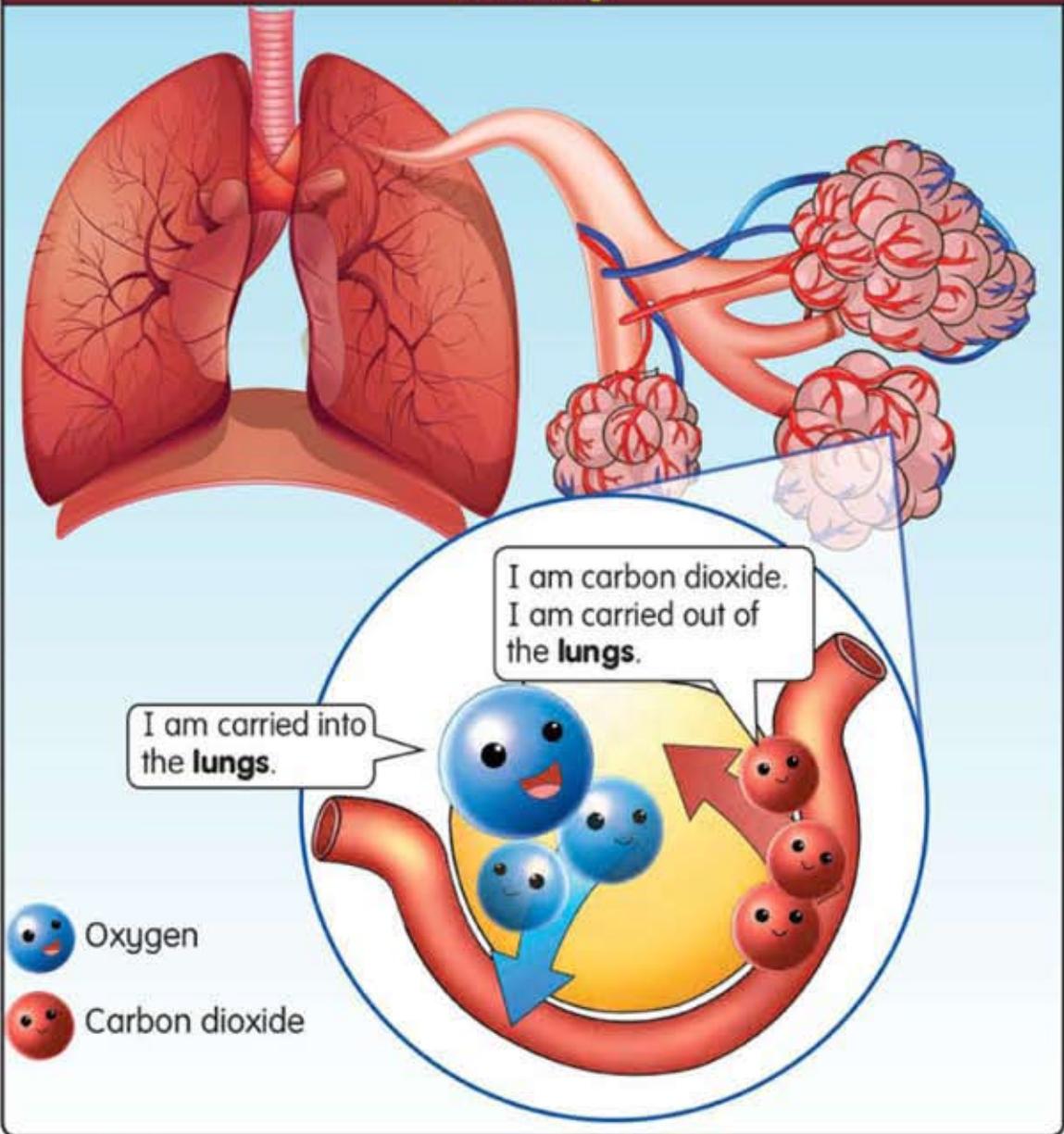
Based on the activity above, what organs are involved when humans breathe?

Human Breathing Process

Fariz is doing some physical exercises with his elder brother. While exercising, they breathe in fresh air. Let us follow the journey of the air when Fariz breathes.



In the Lungs

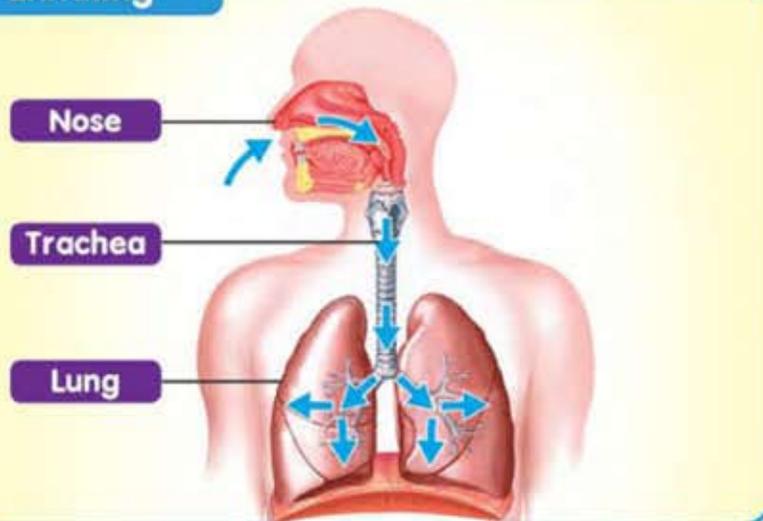


Exchange of gases take place in the lungs. Oxygen enters the lungs while carbon dioxide leaves the lungs.



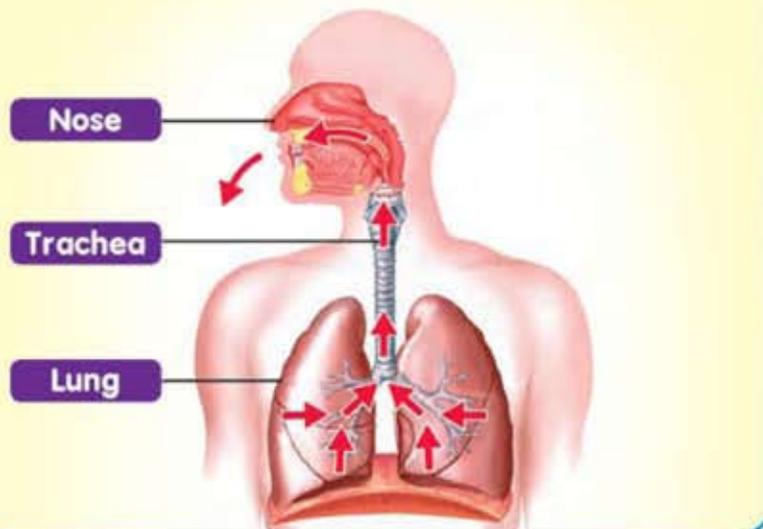
Breathing is a process of inhaling and exhaling. Observe the passage of air below.

Inhaling



Nose → **Trachea** → **Lungs**

Exhaling



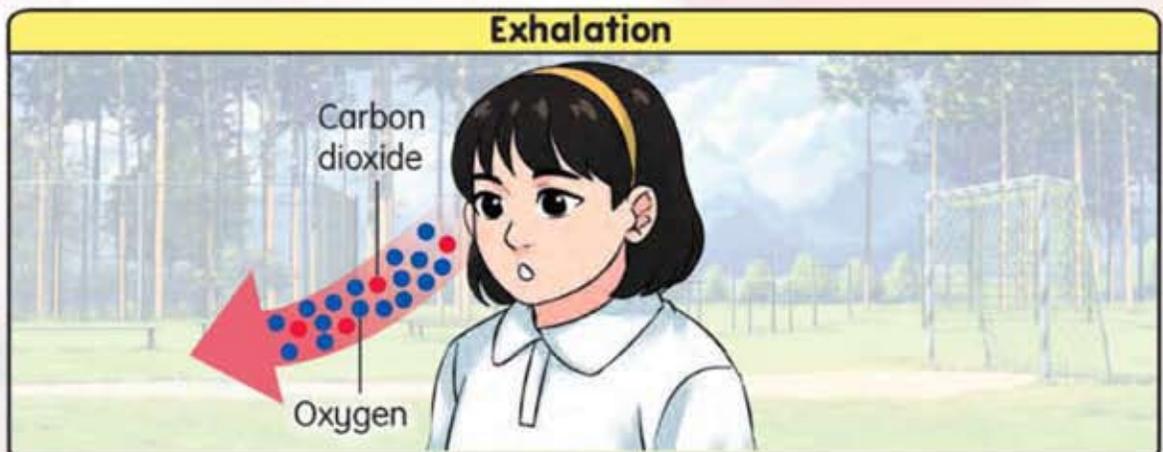
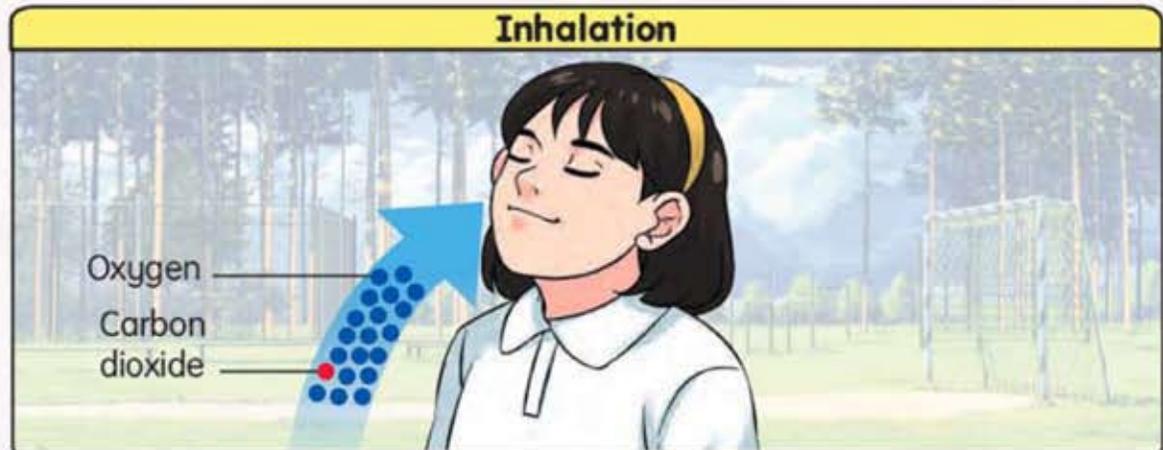
Lungs → **Trachea** → **Nose**



Based on the journey of the air, try to creatively retell the breathing process in terms of the air passage and the exchange of gases in the lungs.

Content of Oxygen and Carbon Dioxide During Breathing

Do you know that when we breathe, there is a difference in the content of oxygen and carbon dioxide during inhalation and exhalation? Observe the pictures below.



Inhaled air contains **more oxygen** compared to exhaled air.
Exhaled air contains **more carbon dioxide** compared to inhaled air.



State the difference in the content of oxygen and carbon dioxide during inhalation and exhalation.



SCIENCE INFO

The surrounding air contains **oxygen, carbon dioxide, nitrogen, other gases, and water vapour.**



FUN ACTIVITY

Human Breathing Process

GROUP
ACTIVITY

Apparatus and Materials

Flip chart paper, marker pens, pictures of the human breathing organs

Steps

1.



Discuss the human breathing process in terms of **air passage** and **exchange of gases** during inhalation and exhalation.

2.



Prepare the discussion in the form of a flow chart.

3.



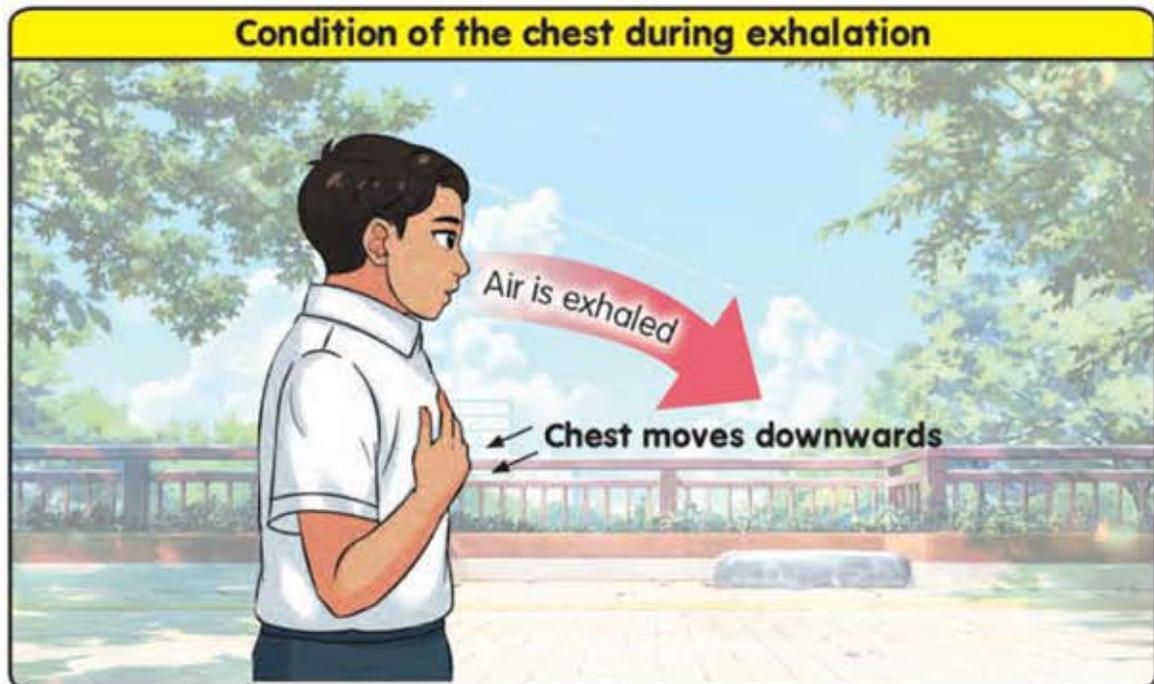
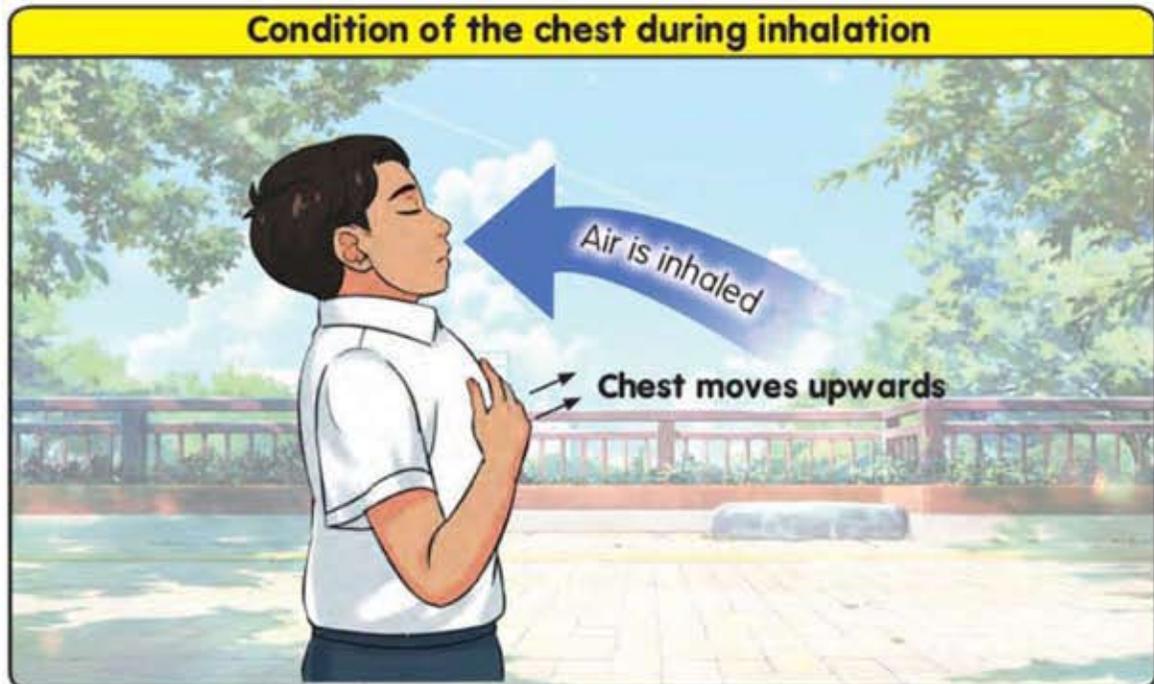
Present the group work in front of the class.

Questions

1. State the air passage during inhalation and exhalation.
2. What is the difference in the air content during inhalation and exhalation?

Chest Movement During Breathing

Try placing your hand on your chest while you inhale and exhale. What changes do you observe to your chest? Look at the pictures below.





LET'S TEST

Chest Movement While Breathing

Aim

To investigate the chest movement during inhalation and exhalation.

PAIR WORK
ACTIVITY

Apparatus and Materials

Book, mat

Steps



1. Choose a partner of the same gender as you. On the mat, one partner lies flat on his/her back.
2. Place a book on his/her chest. Then, ask him/her to inhale and exhale.
3. Observe the movement of the book and chest. Record your observations in the following table.

Activity	Movement of book (up/down)	Movement of chest (upwards/downwards)
Inhale		
Exhale		

Questions

1. What causes the book to change its movement during inhalation and exhalation in this activity?
2. State your conclusion regarding chest movement during inhalation and exhalation.

Rate of Breathing

The rate of breathing is the number of upward and downward chest movements in one minute. The rate of breathing depends on the type of activity that is carried out. Observe the situation below.

Moderate Rate of Breathing

High Rate of Breathing

Low Rate of Breathing

Why is the rate of breathing different in each activity shown above?

Give other examples of activities for each type of rate of breathing.



LET'S TEST

Rate of Human Breathing



Aim To investigate the relationship between types of activities and the rate of breathing.

Apparatus and Materials Stopwatch, radio

Steps

1. Play some music and start walking slowly for one minute.
2. After one minute, stop the music and stop walking.
3. Place one hand on your chest and start the stopwatch. Count the number of chest movements in one minute.
4. Record your observations in the following table.

Type of activity	Number of upward and downward movements of the chest	Rate of breathing (low/moderate/high)
Slow walk		
Running on the spot		
Jumping jacks		

5. Repeat steps 1 to 4 with running on the spot and jumping jacks.

Questions

1. Is there a difference in the rate of breathing for each type of activity that was carried out?
2. What can you summarise regarding the relationship between the type of activity and rate of breathing?



Besides the type of activity, explain other factors than can affect the rate of breathing.

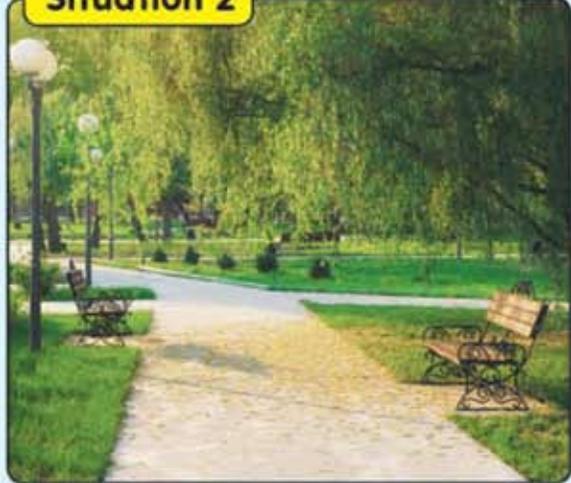
Situations That Affect Breathing

Air in a clean environment ensures that humans breathe better. Observe the situations below.

Situation 1



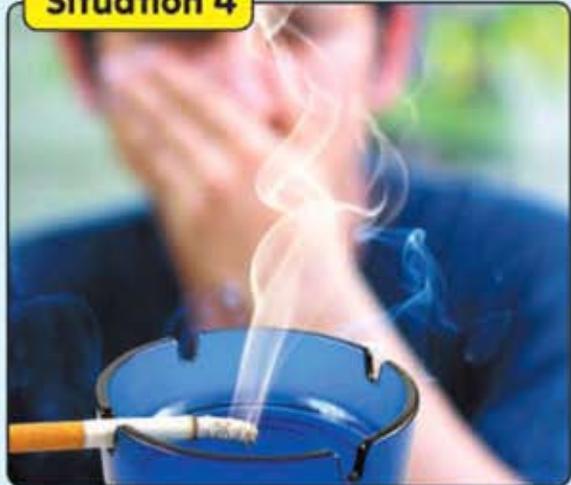
Situation 2



Situation 3



Situation 4



What is the effect of each situation on human breathing?



Suggest ways on how humans can keep their lungs healthy.

SCIENCE-INFO

Haze is dry air containing various gases, dust, and floating particles in the atmosphere which causes low visibility and it is unhealthy for humans.



FUN ACTIVITY

Maintaining Healthy Lungs

GROUP
ACTIVITY

Apparatus and Materials

Paper, stationery, situation cards, envelopes

Steps



1. Form a group of four members. Each member receives a numbered envelope; 1, 2, 3 or 4. Each envelope contains a different situation card.



2. Pupils with the same numbered envelopes form a new group of experts.



3. Each expert group is given 10 minutes to discuss the situation cards in terms of the good and bad effects as well as suggestions on how to keep the lungs healthy.



4. After the discussion, the experts return to their original groups and share the information with their group members.

Question

Why is it important for humans to take care of their breathing organs?

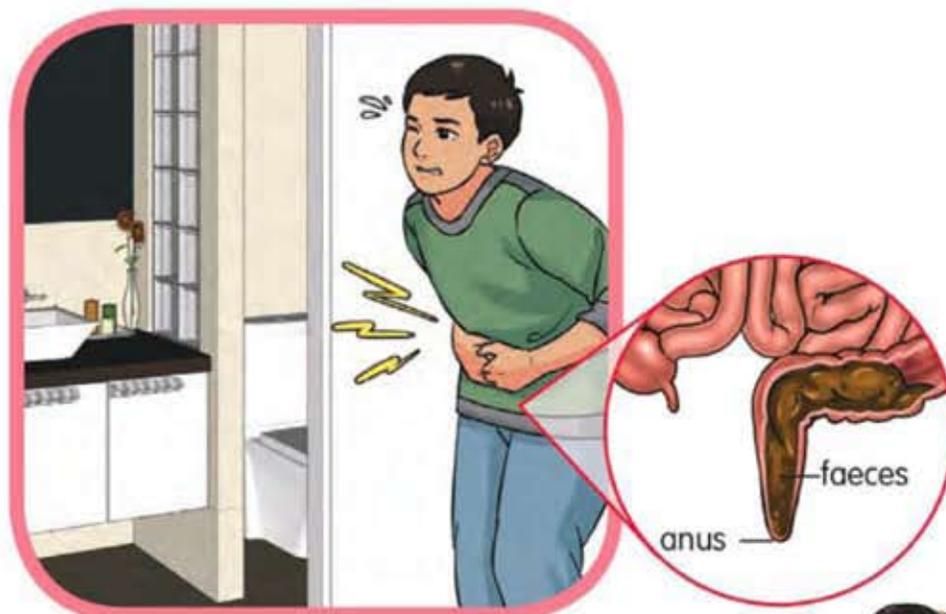
Excretion and Defecation

The human body produces different waste products such as urine, sweat, faeces, carbon dioxide, and water vapour. These waste products must be removed from the body to avoid diseases.

The removal of waste products from the body is called **excretion**. Some examples are shown below.



Meanwhile, **defecation** is the removal of faeces through the anus.

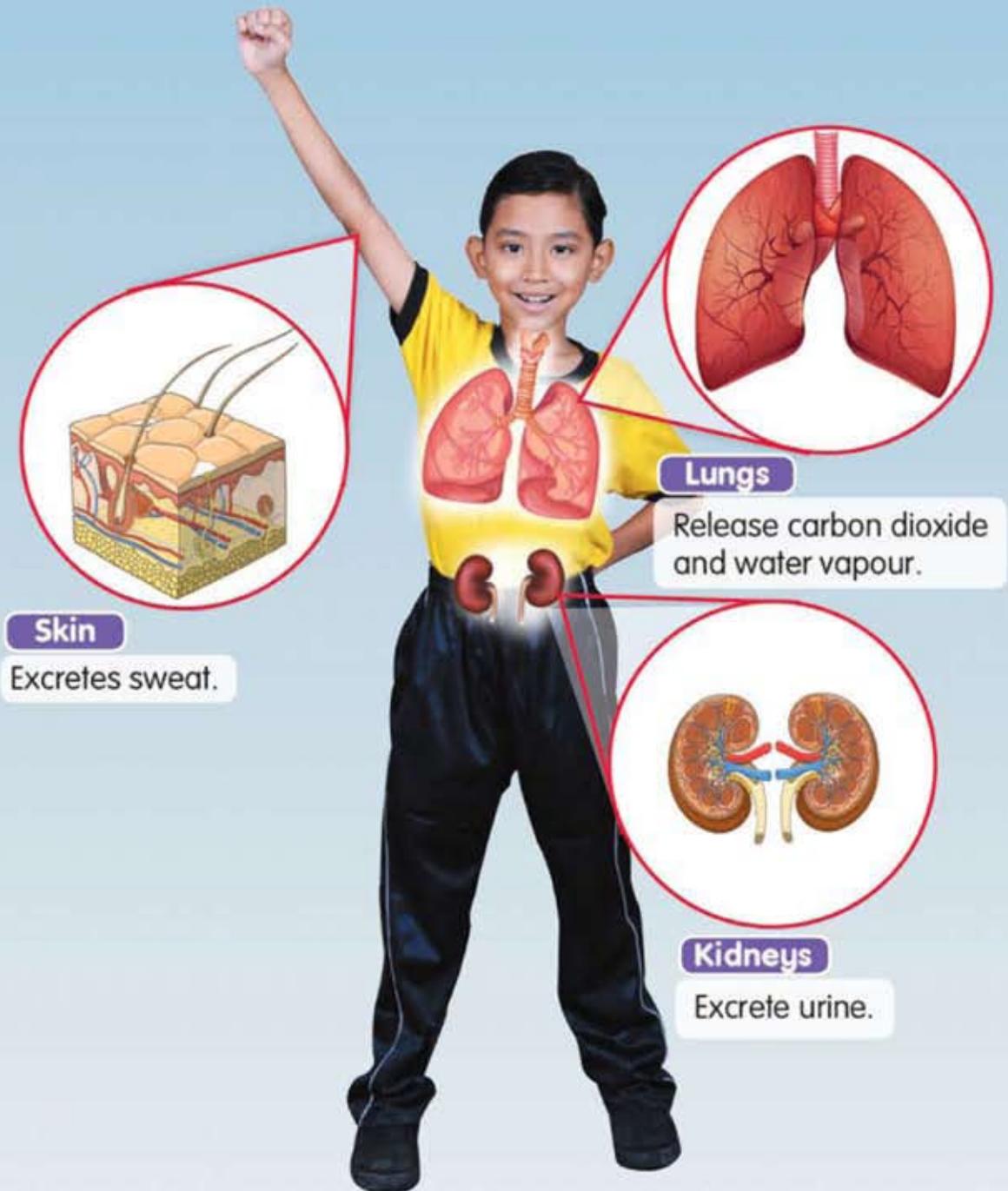


What do excretion and defecation mean?



Organs and Their Products of Excretion

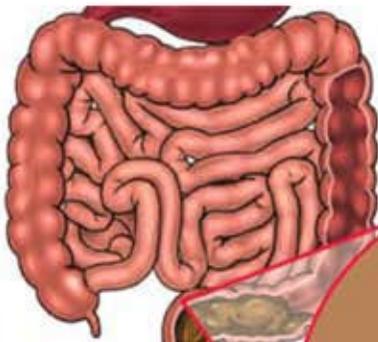
Excretion takes place in excretory organs. Let us find out about the excretory organs and their products.



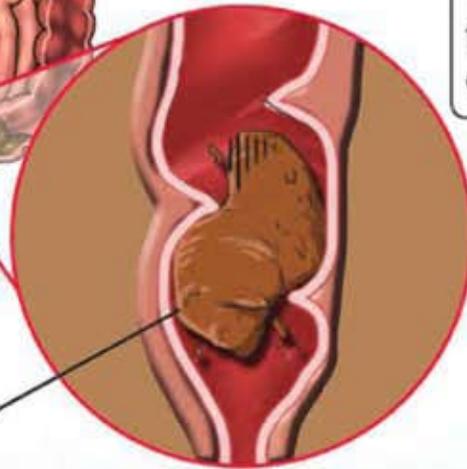
Based on the information above, try to identify the excretory organs and their products.



Teacher, what about defecation?



anus



faeces

Undigested food during the digestion process becomes **faeces**. The removal of faeces through the **anus** is called **defecation**.



Compare and contrast the excretion and defecation processes.



FUN ACTIVITY

Getting to Know Excretion and Defecation

Apparatus and Materials

A4 paper, marker pen, pictures of organs, answer cards

GROUP
ACTIVITY

Steps



1. A representative from each group chooses three pictures of organs from Table 1.



2. Members in each group discuss and identify the product(s) of each selected organ.



3. Another group representative goes to Table 2 and chooses the corresponding answer card as discussed earlier.



4. The group members match the organs with the products of excretion using suitable graphic organisers according to their creativity. Present it in front of the class.

Question

What can you tell about excretion and defecation?

Importance of Excretion and Defecation

What will happen if the excretion and defecation processes are disrupted? Have a look at the situations below.

Situation 1



Why must urine be excreted?

Situation 2



Why must faeces be excreted?

Why is it important to get rid of the products of excretion and faeces?

**Apparatus and Materials**

A4 paper, coloured pencils, marker pens

Steps

1.



Gather information from various sources on good habits which ensure that excretion and defecation processes are not disrupted.

2.



Discuss the information gathered within the group and then present it creatively in the form of MS PowerPoint slides.

3.



Present the outcome of the group in front of the class.

Questions

1. What are the habits that can be practised to ensure that our kidneys, skin, and lungs function well?
2. How do we ensure the defecation process goes smoothly?
3. Discuss the health problems associated with the disruption of defecation.

Response to Stimuli

Humans respond to changes in their surrounding environment. The surrounding environment can change. The changes are known as **stimuli**. Meanwhile, the action taken towards the stimulus is called **response**. The sensory organs of humans receive stimuli such as light, smell, sound, taste, and touch.

Have a look at the situation below.



Based on the situation above, the **smell of food** is an example of a **stimulus**, while the action of **smelling** with the nose is an example of a **response**.



Observe the different situations below.



Moving the hand away spontaneously as it touches a thorn.

Stimulus	a thorn
Response	moving the hand away spontaneously



Startled by the sound of thunder.

Stimulus	the sound of thunder
Response	startled

Sensory Organs

Let us take look at a day in Jimi's life. Observe every action taken by Jimi.



State the sensory organ that is involved in each action as shown above.

What can you say about Jimi's responses in all the situations above?





LET'S TEST

Response to Stimuli

GROUP
ACTIVITY

Aim To investigate human responses to stimuli.

Apparatus and Materials Torch, whistle, coffee with no sugar, shrimp paste, small towel, ice cubes

Steps

1. Each group will be conducting investigations at five stations. The activity at each station is as follows.

Station	Activity
A	Wrap some ice cubes using a small towel and place it on the neck.
B	Taste the coffee with no sugar.
C	Shine light towards the eyes. 
D	Smell shrimp paste.
E	Blow a whistle loudly into someone's ear. 

2. Identify the stimuli and responses in this activity. Then, record them in the table as shown below.

Stimulus	Response
	
	
	
	
	

3. Explain the results of your group's investigation in front of the class.

Question

State other examples of stimuli and responses in your daily life.

2.3.2
2.3.5

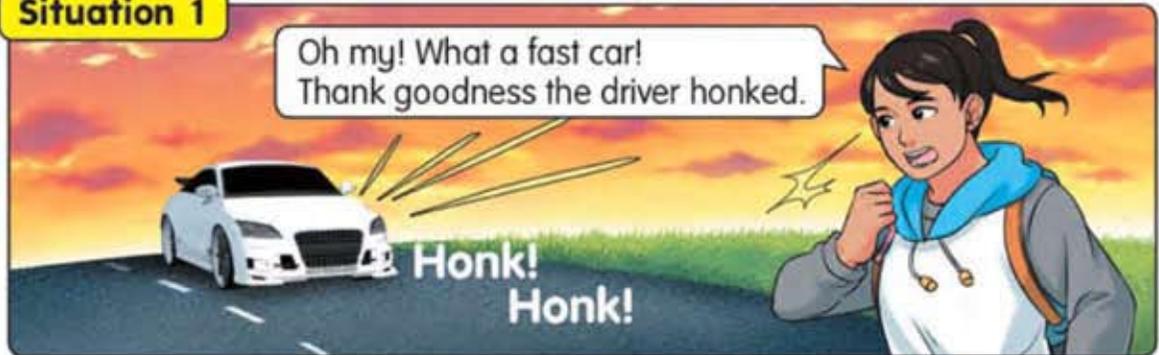
TEACHER'S
NOTES

Activities at stations C and E should be carried out 1 metre away as a safety precaution.

Importance of Response

Humans respond when the sensory organs receive stimuli. Take a closer look at the situations below.

Situation 1



What will happen if she does not respond to the sound of the horn?

Situation 2



What will happen if he is unable to smell the smoke?

Situation 3



What will happen if all the drivers are unable to respond to the siren from the ambulance?

Why do humans need to respond to stimuli?



Habits that Disrupt Human Response

Alcohol consumption, glue sniffing, and drug abuse have serious consequences on human lives. These habits can disrupt human response to stimuli.



Alcoholic drinks can cause intoxication. When this happens, the person is not able to respond quickly to stimuli because the sensory organs are disrupted.

Glue is a chemical substance that can cause hallucination and addiction to those who sniff it. The chemical compounds in glue can disrupt the function of sensory organs as well as the brain. This causes slow response to stimuli.



Drugs can be used as medicine. However, abuse of drugs such as cough syrups or ecstasy pills can cause hallucinations, blackouts, and addiction. As a result, drug addict's responses to stimuli will be disrupted because the sensory organs are not functioning well.



How do the habits above disrupt human response to stimuli?

**Apparatus and Materials**

A4 paper, stationery

Steps

1.



In groups, obtain information from different sources on habits that can disrupt human response to stimuli.

2.



Discuss with your group members on how to relate the habits to the damages they can cause to the sensory organs.

3.



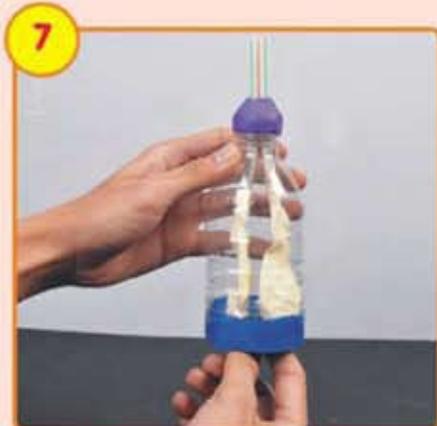
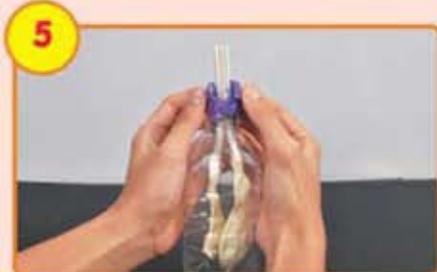
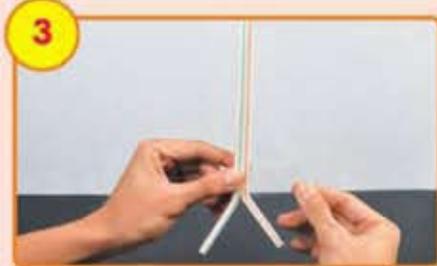
Present the result of the discussion in the form of a creative poster.

Question

Name several habits that must be avoided to prevent damages to the sensory organs. Explain.

**Steps**

Using your own creativity, construct a model of human lungs using materials such as plastic bottles, straws, balloons, adhesive tape, scissors, knife, and modelling clay.





MIND REFLECTION

1. The organs that are involved in the breathing process are the nose, trachea, and lungs.
2. The air passage during inhalation: Nose → Trachea → Lungs
3. The air passage during exhalation: Lungs → Trachea → Nose
4. Gas exchange takes place in the lungs.
5. The inhaled air contains more oxygen compared to the exhaled air.
6. The exhaled air contains more carbon dioxide compared to the inhaled air.
7. The chest moves upwards during inhalation.
8. The chest moves downwards during exhalation.
9. The more intense the activity, the higher the rate of breathing.
10. Excretion is the process of removing waste products from the body.
11. Defecation is the process of removing faeces through the anus.
12. The excretory organs and their products are as follows:

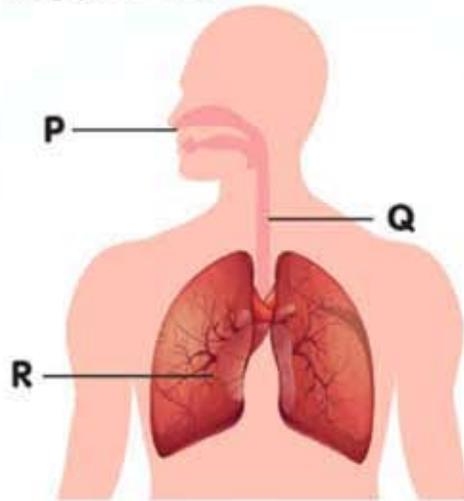
Organ	Product
Kidneys	urine
Skin	sweat
Lungs	carbon dioxide and water vapour

13. Stimuli are changes in the condition of the surrounding environment.
14. Response is the action taken towards a stimulus.
15. Human sensory organs receive stimuli such as light, smell, sound, taste, and touch.
16. The importance of human response to stimuli are:
 - (a) to avoid injury.
 - (b) to save oneself.
 - (c) to obtain information and to communicate.
17. Alcohol consumption, glue sniffing, and drug abuse can cause intoxication, hallucination, and addiction which disrupt the process of human response to stimuli.

 **MIND TEST**

Answer all questions in the Science exercise book.

1. The figure below shows the organs in a human body that are involved during the breathing process.



(a) Name organ **P** : , **Q** : , **R** : .

- (b) Arrange the organs above according to the correct passage of air during exhalation.



- (c) What will happen to a person who is always exposed to polluted air?

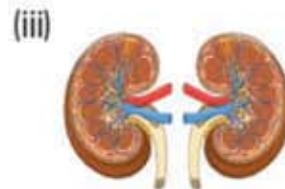
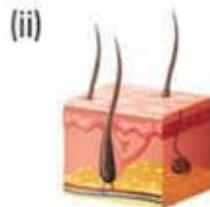
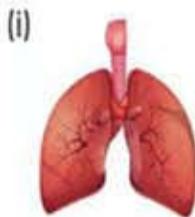
(d) Tick (✓) the correct statement.

-  Inhaled air contains more carbon dioxide compared to exhaled air.
-  Exhaled air contains less oxygen compared to inhaled air.

2. The bar chart below shows the result of an investigation on the effect of the types of activity on human breathing rate.



- (a) Based on the bar chart above, state one observation.
 (b) State one inference based on your observation above.
 (c) What conclusion can be drawn from this investigation?
3. (a) What are the meanings of excretion and defecation?
 (b) State the product(s) of each excretory organ below:



- (c) Why are excretion and defecation important?
4. The figure below shows a human's response to a stimulus.



- (a) State the sensory organ involved in the response above.
 (b) State the stimulus and response involved.
 (c) What is the importance of response to the stimulus above?
5. State one habit that can disrupt the process of human response to stimuli. Explain.