

UNIT 2

HUMANS



Oh, I'm
in pain!

Be patient, madam. We are
almost at the labour room.

Congratulations.
You have a son,
madam!

Observe the situation in the picture. The birth of a child is a happy and miraculous event for a married couple. Do you know how a baby is formed? What would happen if there were no babies in this world?

Human Reproduction

A newborn baby is formed through human reproduction. Humans reproduce to ensure the survival of their species.



How do humans reproduce?

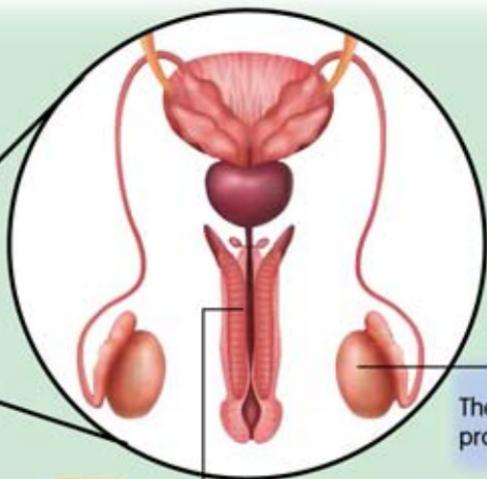
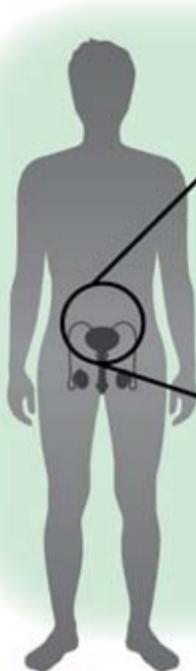
Humans reproduce through a process called reproduction. Reproduction involves a man and a woman. The male and female reproductive organs make up the reproductive system.



Male Reproductive Organs

The male reproductive organs consist of the testes and penis.

What are the **functions** of the male and female reproductive organs?



Penis

Transfers sperms into the female reproductive organ.

Testis

The organ that produces sperms.



Testis - singular
Testes - plural

Female Reproductive Organs

The female reproductive organs consist of the vagina, uterus, Fallopian tubes, and ovaries.

uterus

The organ in which the embryo develops and grows. It is also known as the womb.

ovary

The organ that produces "eggs" or ova (ovum) every month.

Fallopian tube

The fertilisation process between a sperm and an ovum takes place here.

vagina

A vagina is a channel that receives sperms from the penis.

Describe the **functions** of the male and female reproductive organs.



If the ovary releases more than one ovum at once and these ova are successfully fertilised, there is a probability that multiple births will take place.

Ovum - singular

Ova - plural



The Process of Human Fertilisation Until Birth

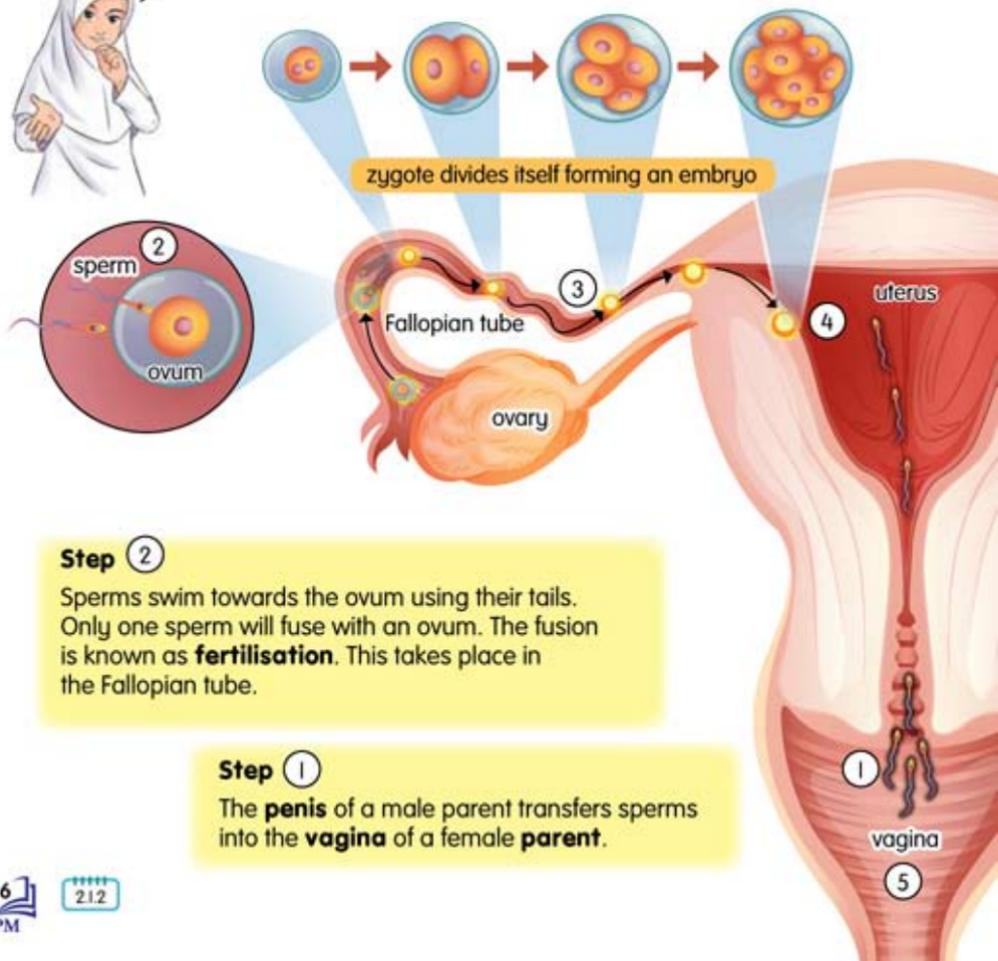
Do you know what fertilisation process is? A fertilisation process is the fusion of a sperm from a male parent and an ovum from a female parent.

Let's look and understand the process of human fertilisation until the baby is born.



Step ③

The **ovum** that has been fertilised by a sperm is known as a **zygote**. The zygote divides itself and forms multiple cells known as the **embryo**.



Step ②

Sperms swim towards the ovum using their tails. Only one sperm will fuse with an ovum. The fusion is known as **fertilisation**. This takes place in the Fallopian tube.

Step ①

The **penis** of a male parent transfers sperms into the **vagina** of a female **parent**.

SCIENCE INFO

Sperm



When a boy reaches puberty, his testes start producing sperms.

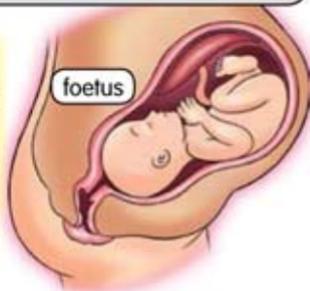
Ovum



When a girl reaches puberty, her ovaries produce ova.

Step 4

An **embryo** develops in the uterus of the mother to form a **foetus**. The **foetus** remains in the uterus of the mother for about nine months until its organs are completely developed.

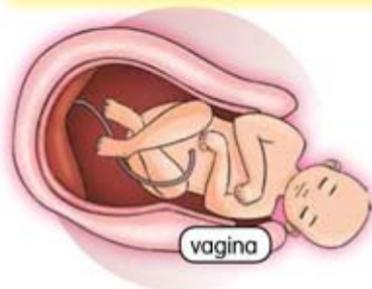


SCIENCE INFO

A developing foetus is connected to the mother through the umbilical cord. It provides nutrients and oxygen from the mother to the foetus. The umbilical cord also removes waste products from the foetus.

Step 5

After about nine months, the mother gives birth to the **foetus** through the vagina. The foetus is now known as a **baby**.



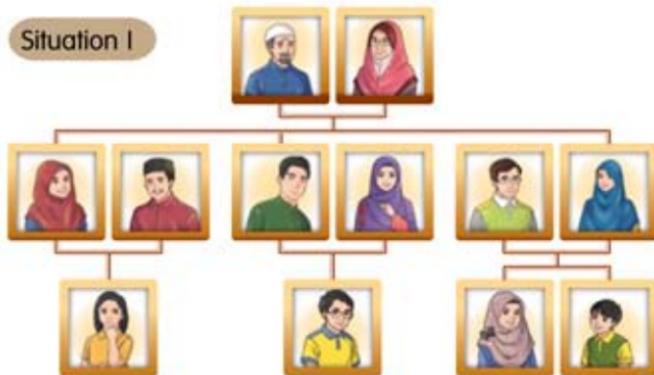
Based on the situation above, explain the process of human fertilisation until birth.



The Importance of Reproduction to Humans

Reproduction is very important to humans just like any other life processes. Observe the situation below.

Situation 1



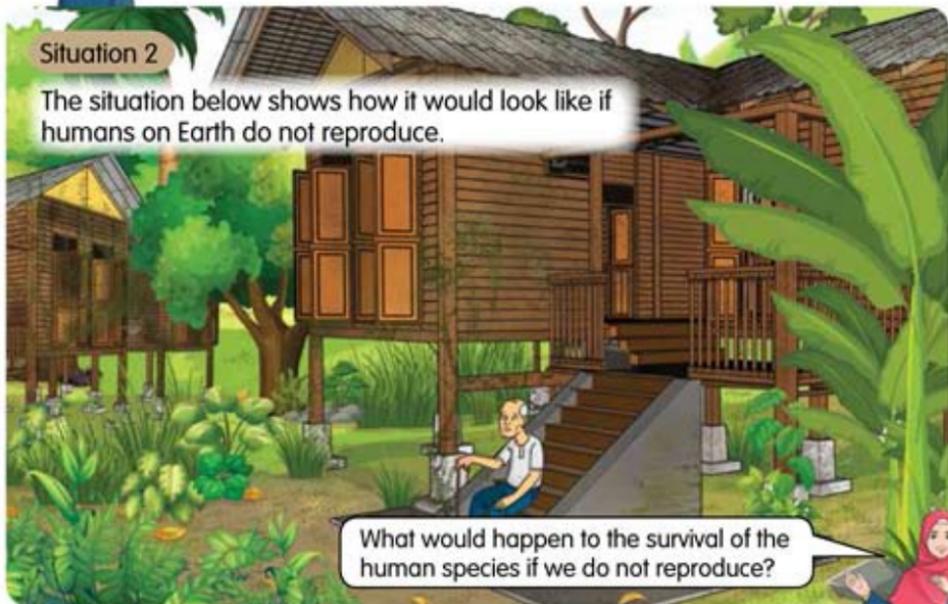
Encik Ahmad has three children from his marriage to his wife. Now, his family consists of 12 persons.



Reproduction is important to increase the number of new individuals. What would happen to the number of Encik Ahmad's family members if he and his wife did not reproduce?

Situation 2

The situation below shows how it would look like if humans on Earth do not reproduce.



What would happen to the survival of the human species if we do not reproduce?





reproductive organs
and the process of
human fertilisation

Group Activity

**Apparatus and materials:**

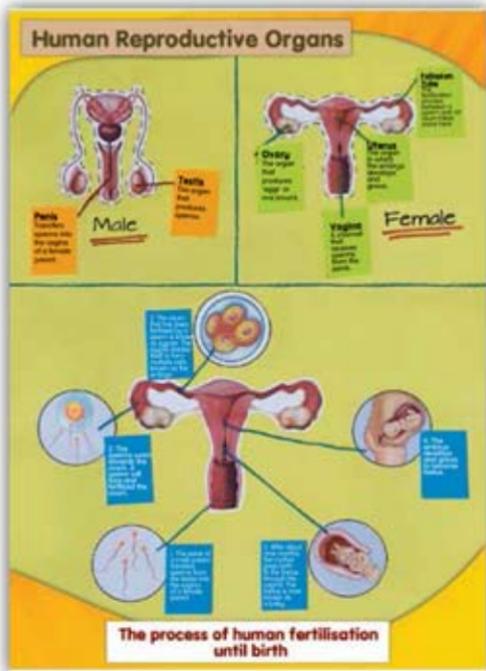
computer, Internet access,
printer, scissors, manila card,
adhesive tape, coloured
markers



Be careful when
using scissors.

Steps:

1. Scan the QR code to download the diagrams of human reproductive organs and the process of human fertilisation.
2. Print and paste the diagrams on a manila card.
3. In groups, discuss and label the male and female reproductive organs as well as their functions.
4. Discuss the process of human fertilisation until the baby is born in the correct sequence. Write about the process on the manila card.
5. Display the work of your group. The leader of the group will explain the process of human fertilisation.

**Questions:**

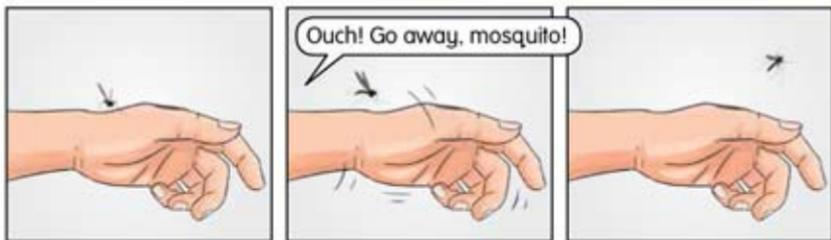
1. Explain the functions of the male and female reproductive organs.
2. Explain the process of human fertilisation.
3. What is the importance of reproduction to humans?

211, 212,
213, 214,
226



The pupils may also present the above activity
in the form of an electronic poster (e-poster).

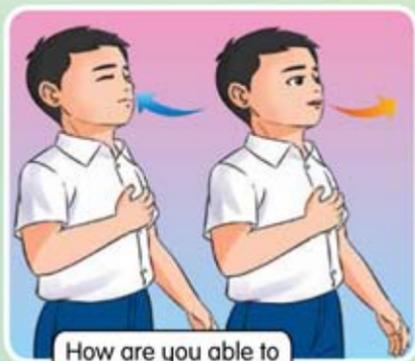
Human Nervous System



What happens when your hand is bitten by a mosquito?
You will shake it off quickly.



What happens when you bite a sour orange? You will taste the sourness of the orange immediately.



How are you able to breathe naturally?

All actions produced by the body are caused by the coordination of a system. This system controls the functions of the human body. This system tells the body how to respond when in contact with a stimulus. Do you know what the system is called?

This system is called the nervous system.



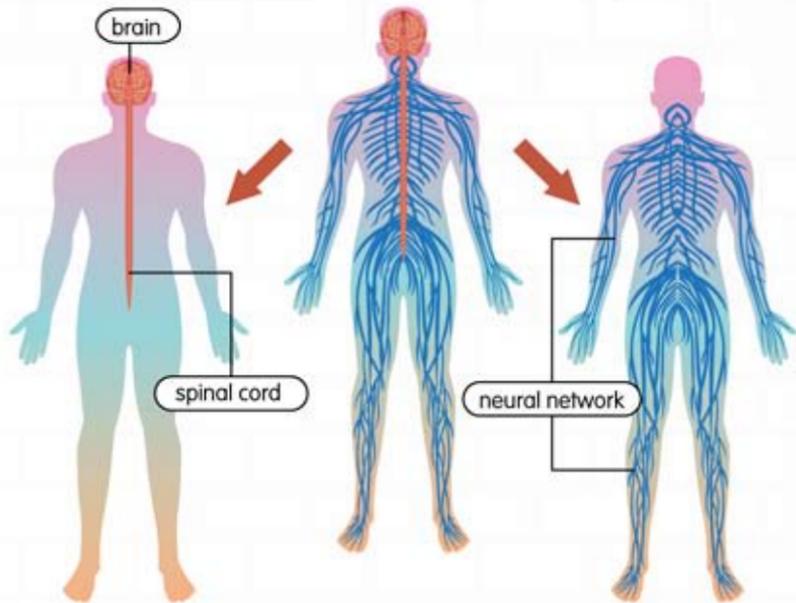
Body coordination is the regulation of bodily response towards any stimulus around us.

Types of Human Nervous System

The nervous system consists of the brain, the spinal cord, and a network of nerves throughout the body.



There are two types of the human nervous system. They are the **central nervous system** and the **peripheral nervous system**.



Central nervous system

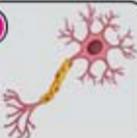
The central nervous system consists of the **brain** and the **spinal cord**.

Peripheral nervous system

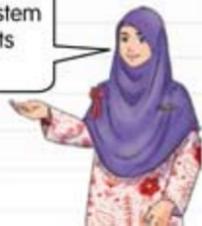
The peripheral nervous system consists of a **neural network**. It is controlled by the central nervous system.

SCIENCE INFO

The basic unit of the nervous system is known as a nerve cell or neuron.



State the types of human nervous system and the components that are involved.



Functions of the Human Nervous System

The nervous system controls and coordinates different functions of the organs and parts of the body. This system **detects** and **responds to stimulus**. The nervous system communicates with different parts of the body through **signal transmission**.

Functions of the Central Nervous System

The central nervous system acts as a **centre to receive information from the sensory organs** and **to coordinate responses**. Let us get to know the central nervous system.

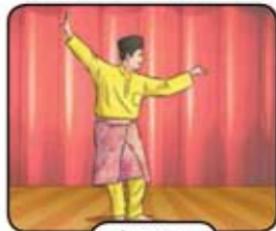


brain

The brain **coordinates both voluntary and involuntary actions**.

Voluntary Actions

Examples of voluntary actions are as follows:



dancing

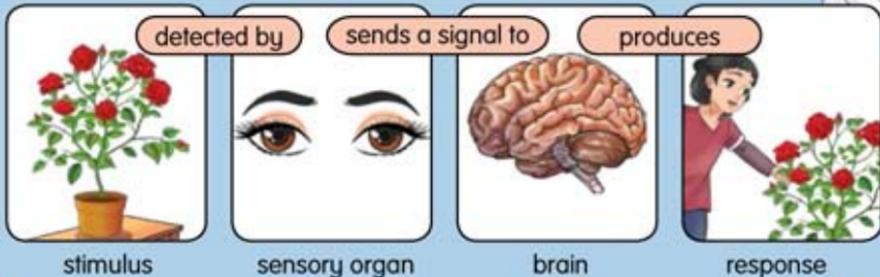


observing



eating

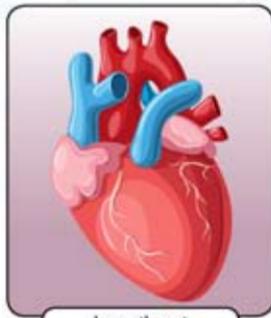
What happens when you look at a flower? Understand the pictures below that show the signal pathway that is controlled by the central nervous system.



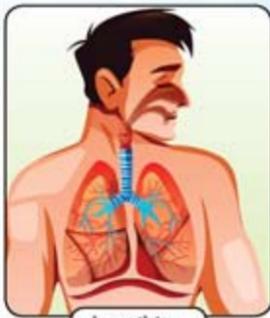
The order of the signal pathway from stimulus to **response**

Involuntary Actions

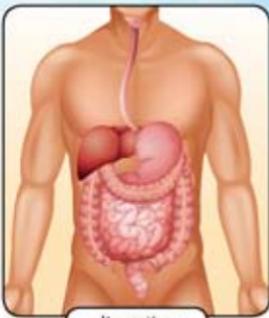
Examples of involuntary actions are as follows:



heartbeat



breathing

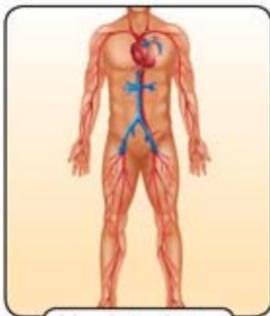


digestion

Based on your understanding, state the actions involved in each of the pictures below.



drinking



blood circulation



talking

SCIENCE INFO

A signal travels several hundred kilometres per hour. Thus, a signal takes less than one second to travel from head to toe.



- Voluntary action is an action that takes place with conscious control.
- Involuntary action is an action that takes place unconsciously.

spinal cord



The spinal cord is attached to the brain. It **carries information from the whole body to the brain** and **from the brain to the whole body**. The spinal cord **also controls some of the reflex actions**.

Reflex Actions

Reflex actions are quick unconscious actions. In certain situations, the spinal cord receives signals and commands the body to respond. Examples of situations involving reflex actions are as follows:



accidentally stepping on a sharp object

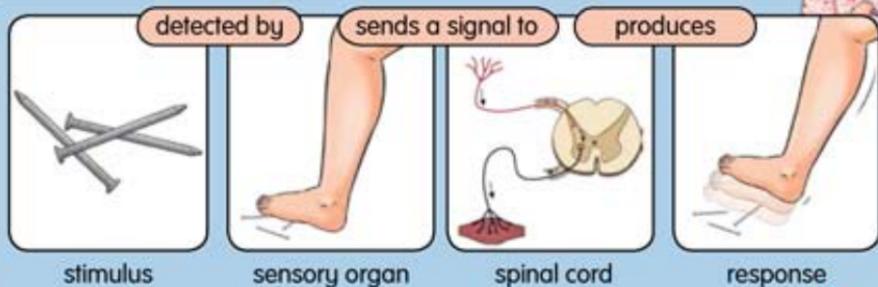


sneezing when dust enters the nostrils



accidentally touching a hot object

What happens when you accidentally step on a sharp object? Understand the pictures below that show the signal pathway that is controlled by the spinal cord.



The order of the signal pathway from stimulus to **response**

Describe the central nervous system and its functions.



A reflex action is an immediate unconscious response.

Functions of the Peripheral Nervous System

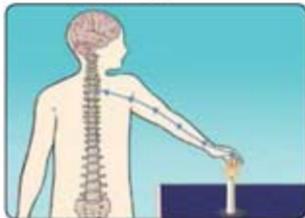
The peripheral nervous system consists of a network of nerves outside the brain and the spinal cord.

What is the function of the peripheral nervous system?



The peripheral nervous system **sends signals from the body to the central nervous system** and **sends command signals from the central nervous system to the whole body.**

Signal from the body is sent to the central nervous system.



Command signal from the central nervous system is sent to the rest of the body.



Dysfunctional Peripheral Nervous System

Damage to the peripheral nervous system may disturb the signal transmission between the brain and the spinal cord to the body parts.

Bell's palsy

Bell's palsy is a condition where the peripheral nerves that control the facial muscles are damaged. Control of the facial muscles is disrupted and causes one side of the face to droop. Patients will also have difficulty to smile or close their eyes.



Body imbalance problems



Damaged nerves in the legs may cause the body to lose balance and fall.

Predict other conditions that may occur if the peripheral nervous system is dysfunctional.



Taking Care of the Nervous System

The nervous system plays an important role in all aspects of our health. It coordinates our daily activities such as waking up from sleep, breathing, thinking, and reading. Therefore, we need to take good care of this system so that all other related systems will function well too.



How do we take care of our nervous system?

Eat a balanced diet

A balanced diet containing vitamin B complex and minerals is important for our nerves.



Avoid drinking alcoholic beverages

The habit of drinking alcoholic beverages may slow down the transmission of signals within the nervous system.

HEALTHY LIVING



WITHOUT ALCOHOL

Get enough sleep

Sleeping between seven to eight hours a day can strengthen our neural network system. It can also strengthen our memory.



Wear protective gears

Wearing protective gears such as a helmet when riding a motorcycle can prevent brain damage in case of an accident.



Maintain good posture while doing daily activities

Maintaining good posture while standing, sitting, and doing our daily activities can avoid damage to our nervous system.



back body protector

Observe the back body protector used by the man. How does this protective gear protect the nervous system?





FUN ACTIVITY

The Nervous System Signalling Activity



Apparatus and materials: flip chart paper, scissors, glue, strings, adhesive tape, marker pen, and pictures of the human brain, spinal cord, and organs



Be careful when using scissors.

1.



Ask a friend to lie down on the flip chart paper. Draw the outline of your friend's body using a marker pen.

2.



Cut and paste the pictures of the human brain and spinal cord. Then, cut and paste the strings to indicate the peripheral nerves.

3.



Paste the pictures of organs accordingly.

4.



Start the activity. The activity will show the signal pathway that would take place in a particular situation. For example, your group would choose a situation such as "smelling food being cooked". Each group member will call out the pathway that the signal will follow while showing the organs and nerves involved.

5. Choose a different situation to continue the activity.

Questions:

1. State the types of human nervous system.
2. Define the central nervous system and explain its functions.
3. Define the peripheral nervous system and explain its functions.



Ask the pupils to find the pictures needed using various sources before class.



Let us play Bingo based on the process of human fertilisation. We need A4 paper, marker pens, and rulers. This game is suitable for two to five pupils.

Steps:

1. Each player gets an A4 paper. Then, divide the paper into 25 squares.
2. The teacher prepares 25 terms or clues related to the human reproduction.
3. All players write the terms and clues in the squares randomly.
4. A player will cross out a square with the term or clue and say out the meaning.
5. Other players will cross out the same term or clue on their own paper.
6. Repeat steps 4 and 5 for each player.
7. The player who successfully crosses out five squares in a line vertically, horizontally or diagonally and says "Bingo", becomes the first winner.
8. The game continues on to find the next winner.

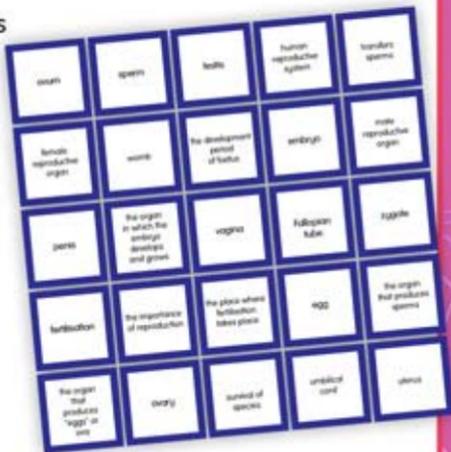
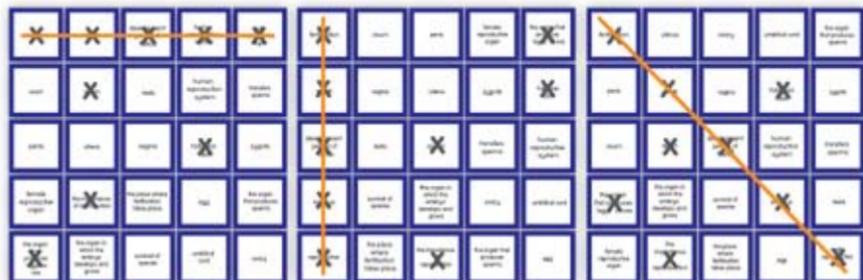


figure 1



horizontal

vertical

diagonal



MIND REFLECTION

Human Reproduction System

1. The male reproductive system consists of the following organs:

Organ	Function
testis	the organ that produces sperms
penis	transfers sperms into the female reproductive organ

2. The female reproductive system consists of the following organs:

Organ	Function
vagina	a channel that receives sperms from the penis
uterus	the organ in which the embryo develops and grows
Fallopian tube	the fertilisation process between a sperm and an ovum takes place here
ovary	the organ that produces "eggs" or ova (ovum) every month.

3. The process of human fertilisation until the baby is born is as follows:
- the penis releases sperms into the vagina
 - sperms move towards the ovum
 - a sperm fertilises the ovum and forms a zygote
 - the zygote divides to form an embryo
 - the embryo develops to form a foetus
 - the mother gives birth to the foetus which is now known as a baby
4. The importance of reproduction to humans is to increase the population and to avoid extinction.

Human Nervous System

1. The human nervous system consists of two systems:
- The central nervous system consists of the brain and spinal cord.
 - The peripheral nervous system consists of a neural network.
2. The central nervous system functions as a centre to receive information from the sensory organs and to coordinate response.
- Brain: Coordinates both voluntary and involuntary actions.
 - Spinal cord: Carries information from the whole body to the brain and from the brain to the whole body. It also controls the reflex actions.
3. The functions of the peripheral nervous system are to send signals from the body to the central nervous system, and to send signals from the central nervous system to other parts of the body.

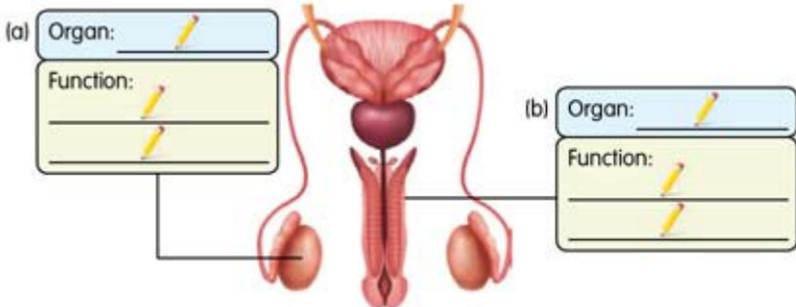
4. A dysfunctional nervous system may cause conditions such as Bell's palsy and other body imbalance problems.
5. The nervous system can be taken care of by practising the following steps:
 - eat a balanced diet
 - avoid drinking alcoholic beverages
 - get enough sleep
 - wear protective gears
 - maintain good posture while doing daily activities



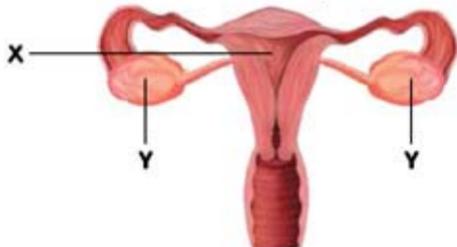
MIND TEST

Answer all questions in the Science exercise book.

1. Label the male reproductive organs below and state their functions.



2. The diagram below shows the female reproductive organs.

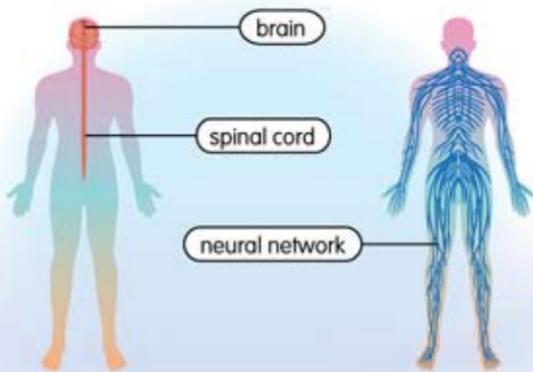


- (a) What happens after an ovum that is produced by Y fuses with a sperm?
- (b) What happens in X?
- (c) Due to health problems, a woman had to have both of her Y removed. Does she have an opportunity to give birth to a child? Explain your answer.

3. Complete the process of human fertilisation until birth.

- (a) The penis of the male parent releases (i) _____ into the (ii) _____ of the female parent.
- (b) The sperms (i) _____ towards an (ii) _____ and one sperm will (iii) _____ with the ovum.
- (c) The (i) _____ that has been fertilised by a sperm is known as a (ii) _____.
- (d) The (i) _____ develops in the uterus of the mother to form a (ii) _____.
- (e) The (i) _____ remains in the uterus of the mother for about (ii) _____ months until its organs are completely developed.
- (f) The mother gives birth to the (i) _____ which is now known as a (ii) _____.

4. Name the human nervous system below.



(a) _____ (b) _____

5. Explain the type of nervous system and the signal pathway involved in each situation.

Situation A: Zaimi immediately pulled his hand away when he touched a hot kettle.

Situation B: Siti heard her phone ring and she picked it up.