

This is a story of two best friends who live next to each other.



Technology grows rapidly over time. What is the role of technology in our daily lives?

Technology and Its Importance

Humans are able to do various daily activities using our senses and parts of the body. However, there are limitations to our senses and parts of the body. Thus, we need to use technology.



What is the meaning of technology?

Technology is one of the applications of scientific knowledge to overcome human limitations.



Various tools have been invented to help overcome human limitations.

Microscopes help humans to observe microorganisms and tiny objects.



Telescopes enable humans to observe the Moon, other planets, and objects that are very far in space.



Microphones and loudspeakers amplify our voice to be heard clearly.



The human ears are not able to hear sounds with very low frequency. Stethoscopes enable humans to listen to heartbeats clearly.



stethoscope



telephone

mobile phone

Humans are only able to speak and listen to the voices of other people within a limited distance. Telephones enable long distance communication between humans.

Humans are only able to move within a short distance. Vehicles enable humans to move farther in a short time.



aeroplane

car

ship

The invention of technological equipment is vital to help overcome human limitations in our daily lives.

Based on your understanding, state the meaning of technology and its importance in our daily lives.



Development of Technology

Nowadays, we can enjoy various benefits from the development of technology.



How does development of technology in various fields help us in our daily lives?

The Development of Technology in Agriculture and Farming

The development of technology in agriculture is very important in providing a continuous food supply to humans.

The Invention of Agricultural Equipment



The use of drones to spray fertilisers and herbicides at agricultural sites.



The use of automatic chicken feeder at chicken farms.

The invention of modern equipment in agricultural and farming industries help to facilitate management, as well as save time and human resources.

Research



The research in sustainable agriculture technology improves the quality of crops.



The research in farming biotechnology improves the quality of feed for local livestock.

Research development in agriculture and farming industries has helped to improve the qualities and products of these industries.

The Development of Technology in Medicine

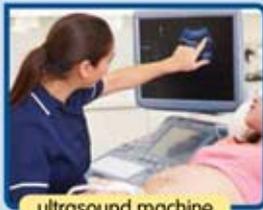
The development of technology in medicine plays an important role to improve the quality of public health.

The Invention of Medical Equipment

The invention of electron microscope enables humans to detect microorganisms that cause diseases. The invention of the ultrasound, X-ray, and MRI machines enables doctors and researchers to detect diseases inside the human body.



electron microscope



ultrasound machine



X-ray machine



MRI machine

The Invention of Medicine

The invention of medicines and vaccines, as well as the discoveries of new medical practices have helped to cure or prevent dangerous diseases.



vaccine



modern medicine

Development of Technology in Transport

The development of technology in air, land, and sea transport improves human movement from one place to another.

Development in Air Transport



aeroplane

Aeroplanes enable humans to save time when going to a far-off destination.



rocket

Rockets enable humans to explore outer space and beyond.

Development in Land Transport



light rail transit system (LRT)



bullet train

The varieties of transport service networks enable passengers to choose any modes of transport. The use of bullet trains can save time and prevent traffic congestion.

Development in Sea Transport



submarine

Submarines can strengthen a country's defence system.



cruise ship

Cruise ships open opportunities for travelling.

Development of Technology in Communication

The field of communication grows rapidly with the invention of broadband and Internet access. Information can be disseminated quickly regardless of borders.



online teaching
and learning



online meetings
and work



online shopping

Development of Technology in Construction

The development in constructions produces more efficient and durable structures.



The Stormwater Management and Road Tunnel (SMART) can reduce loss and traffic accidents caused by flash floods in the city.



Prefabricated houses are built in a shorter time and with a lower construction cost.

Presently, the construction of a building or structure can be completed quickly using the prefabricated method. It is a process of on-site assembling using various components of the building which are factory-made.

The development of technology in various fields such as agriculture, medicine, transport, construction, and communication enables humans to live comfortably.



Humans need the development of technology in various fields. Why?

Advantages and Disadvantages of Technology

The development of technology also brings advantages and disadvantages to our daily lives.



What are the advantages and disadvantages of technology?

Advantage of technology

The use of drones to spray pesticides on crops can help save time and human resources.



Disadvantage of technology

The battery life of drones is limited and can cause pollution when the batteries are discarded.

Advantage of technology

The production of medicines can help treat patients and improve quality of health.



Disadvantage of technology

The abuse of medicines can cause addiction.

Advantage of technology

Forests can be developed to build houses.



Disadvantage of technology

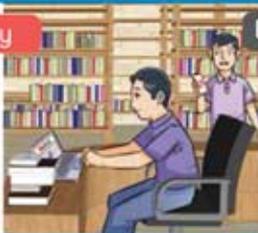
Flora and fauna will be destroyed due to deforestation for the purpose of building infrastructure.

SCIENCE INFO

Drones use lithium batteries which contribute to the increase of e-waste.

Advantage of technology

Information can be disseminated quickly and without limits. This can save time.



Disadvantage of technology

The intrusion of personal data can easily happen. The data can be exploited by irresponsible parties.

Advantage of technology

The increase in the number of vehicles facilitate movement from one place to another.



Disadvantage of technology

The emission of harmful gases contributes to air pollution.

Give other examples of the advantages and disadvantages of technology in our daily lives.



FUN ACTIVITY >>> Effects of Technology

Apparatus and materials: computer, Internet access

Steps:

1. Using the Internet, find information on the advantages and disadvantages of technology in various fields.
2. Discuss the information in groups.
3. Build a tree map using Microsoft PowerPoint from the information collected.
4. Present and discuss the tree map of your group in the class.



Questions:

1. State the advantages and disadvantages of technology in our daily lives.
2. Why do we need to invent new technologies?



Simple Telegraph Machine

Make a simple telegraph machine using a Morse code chart, two AA-sized dry cells, dry cell holder, buzzer, connecting wires, switch, A4-sized cardboard, and hot glue gun.

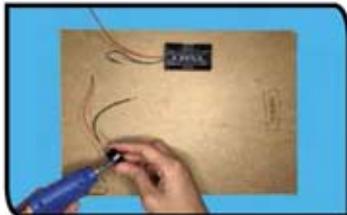
Steps:

1.



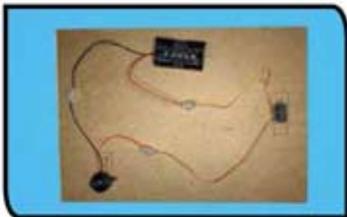
Sketch the position of each component for the telegraph machine on a cardboard.

2.



Paste the components such as the dry cell holder, buzzer, and switch on the sketches using a hot glue gun.

3.



Use connecting wires to connect each component in the telegraph machine.

4.



Put dry cells into the dry cell holder.

5.



Turn on and switch off the switch to produce sound from the buzzer. Long buzzing sounds refer to the lines in the Morse code chart. Whereas, short buzzing sounds refer to the dots (.) in the Morse code chart.



simple telegraph
machine



MIND REFLECTION

1. Technology is an application of scientific knowledge to overcome human limitations.
2. Humans invent various equipment to overcome their limitations. Among the inventions are as follows:

Human limitation	Invented equipment
• unable to see tiny objects	• microscope
• unable to see faraway objects	• telescope
• unable to speak with a loud voice	• microphone and loudspeaker
• unable to listen to sounds with low frequency	• stethoscope
• unable to speak over a long distance	• telephone and mobile phone
• unable to move quickly to a far-off destination	• land, water, and air transport

3. The development of technology in various fields such as agriculture, medicine, transport, communication, and construction enables humans to live comfortably.
4. The advantages and disadvantages of technology are as follows:

Advantage of technology	Disadvantage of technology
The use of drones to spray pesticides on crops can help save time and human resources.	The battery life of drones is limited and can cause pollution when the batteries are discarded.
The production of medicines can help treat patients and improve quality of health.	The abuse of medicines can cause addiction.
Forests can be developed to build houses.	Flora and fauna will be destroyed due to deforestation for the purpose of building infrastructure.
Information can be disseminated quickly and without limits. This can save time.	The intrusion of personal data can easily happen. The data can be exploited by irresponsible parties.
The increase in the number of vehicles can facilitate movement from one place to another.	The emission of harmful gases contributes to air pollution.



MIND TEST

Answer all questions in the Science exercise book.

1. What is the meaning of technology?
2. Give examples of equipment that can be used to help overcome human limitations in the situations below.
 - (a) Syuhada cannot see microorganisms with her naked eyes.
 - (b) Mr Lim is not able to speak with a loud voice in front of the school assembly.
3. The picture below shows the development of technology in agriculture.



- (a) State the benefits of the development of technology in this field.
- (b) What is the relationship between the effects of using technology and the sustainability of human lives?

4. The pictures below show the development of technology.



- (a) State the specific field related to the development of technology as shown in the pictures.
- (b) Why do humans always invent new equipment in the field of technology that you have stated in 4(a)?
- (c) What is the advantage of this development of technology?

SUGGESTED ANSWERS

UNIT 1 SCIENTIFIC SKILLS

Mind Test (pages 11-12)

- Manipulated variable: methods of harvesting paddy plants
Responding variable: land area
Constant variable: type of plant
- (a) Observation: Mango B is heavier than mango A.
Inference: Mango tree B obtained sufficient basic needs such as water, air, sunlight, and nutrients.
(b) Mango B is bigger in size compared to mango A.
- The higher the concentration of the liquid, the longer the time taken for the liquid to flow out.
- (a) the animal's method of reproduction or other suitable characteristics
(b) eating habit or other suitable characteristics
(c) accept pupils' classification charts (accept any suitable characteristics)

UNIT 2 HUMANS

Mind Test (page 31-32)

- (a) Organ: testis
Function: a place where sperms are produced.
(b) Organ: penis
Function: transfers sperm into the female reproductive organ
- (a) The zygote divides itself to form multiple cells known as the embryo.
(b) A place where embryo develops to form foetus
(c) No. ovum is not produced.
- (a) (i) sperms (b) (i) swim
(ii) vagina (ii) ovum
(iii) fuse
(c) (i) ovum (d) (i) embryo
(ii) zygote (ii) foetus
(e) (i) foetus (f) (i) foetus
(ii) nine (ii) baby
- (a) central nervous system
(b) peripheral nervous system
- (a) Zaimi pulled his hand away when he touched a hot kettle. This requires an immediate unconscious response or reflex action. In this situation, the spinal cord receives the signal and produces a response from the body. The signal pathway is as follows.
(i) the skin receives the stimulus through the sense of touch
(ii) the sense of touch sends a signal to the spinal cord through the peripheral nerve
(iii) the spinal cord sends a signal to the hand
(iv) the hand is instantly pulled away



- (b) Siti heard her phone ring. This response is a voluntary action which involves the central nervous system controlled by the brain and peripheral nervous system. The signal pathway is as follows:
(i) the ears receive the stimulus through the sense of hearing

- (ii) the sense of hearing sends a signal to the brain through the peripheral nerves
- (iii) the brain sends signal to the hand
- (iv) the hand picks up the phone



UNIT 3 MICROORGANISMS

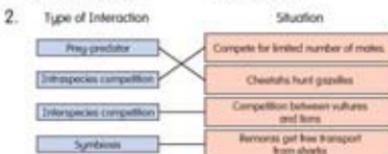
Mind Test (page 50)

- (a) virus (b) algae
(c) protozoa (d) fungi
(e) bacteria
- (a) Paramecium
(b) The position of the Paramecium changes.
(c) Because the Paramecium moves
- (a) Dough C is the largest in size.
(b) Dough C is the largest in size because the most amount of yeast was added to dough C or because the largest amount of gas was released by the yeast in dough C.
(c) breath
(d) The size of the dough increases because the dough itself provides nutrients for the yeast to become active and able to breathe.
- Accept any suitable answers.

UNIT 4 INTERACTION AMONG LIVING THINGS

Mind Test (page 66)

- (a) relationship (b) depend



- (c) crabs - barnacles

	Type of Symbiosis		
	Mutualism	Parasitism	Commensalism
Benefits both organisms	Benefits one organism but harms the other	Benefits one organism but does not benefit nor harm the other	
Example: crocodile and bird	Example: cat and tick	Example: remora and shark	

- The types of interactions among plants are:
(a) Competition to obtain water, sunlight, space, and nutrients.
(b) There are two types of symbiosis. They are commensalism and parasitism.
(i) Commensalism
Bird's-nest ferns grow on large trees. They depend on the host plants to obtain support and sunlight but do not harm them.
Orchids grow on the trunk of the host plant for support, sunlight, and nutrients from their surrounding. At the same time, the host plant is not harmed nor does it gain any benefits.

iii Parasitism

The *Rafflesia* does not undergo the photosynthesis process. Instead, it grows on a host plant to obtain water and nutrients which harms the host plant. Indian willow grows on a host plant to obtain water and nutrients from it. This interaction harms the host plant.

UNIT 5 PRESERVATION AND CONSERVATION

Suggested Answer for HOTS (page 71)

Large animals are more likely to be at risk of extinction because they need a large habitat to continue living compared to small animals.

Mind Test (page 86)

1. Preservation means keeping animals and plants in their original and balanced state. Conservation means returning animals and plants to their natural conditions.
2. (a) The number of elephants decreased from 2015 to 2017 and increased from 2017 to 2019.
(b) (i) The number of elephants decreased because of illegal hunting or any suitable answers.
(ii) The number of elephants increased because they are undergoing conservation process.
(c) (i) Gazetting forest X as a forest reserve.
(ii) Enforcing a stricter law to protect the elephants from facing a threat of extinction.
3. (a) X: Dodo bird Y: Hornbill
(b) Bird X cannot be conserved because it has become extinct.
(c) The conditions of bird Y can be conserved by:
(i) Reforestation to increase the habitat of bird Y.
(ii) Setting up a conservation centre for bird Y.
(iii) Gazetting more forests as protected areas.
(iv) Enforcing laws protecting bird Y.
(v) Educating the communities on the importance of protecting bird Y from the threat of extinction. (accept any three answers)

UNIT 6 FORCE

Suggested Answer for HOTS (page 89)

Earth's gravitational force is a pulling force because this force pulls all objects towards the centre of Earth.

Mind Test (pages 111-112)

1. (a) pulling force and pushing force
(b) pushing force
(c) pulling force
2. (a) changes the shape of an object
(b) changes the direction of movement of an object
(c) moves a stationary object
3. (a) Box P takes a longer time to be moved because the frictional force produced by box P is greater than box Q.
(b) The type of surface that are in contact.
(c) The time taken for box P and Q will increase as the frictional force increases.

4. (a) causes palms to become warm
(b) erases writings on paper
(c) tires become worn out
5. (a) using lubricating oil
(b) using chalk
(c) using lubricating oil
6. (a) and (c)
7. (a) Climbers use oxygen tanks because oxygen is less at the peak of the mountain.
(b) The air pressure at the peak of the mountain is low.
(c) The higher the elevation of the mountain from the sea level, the lower the air pressure.

UNIT 7 SPEED

Suggested Answer for HOTS (page 115)

Since the distance of a car moves is farther, thus it is measured in kilometres. Therefore, the most suitable unit of speed is km/h rather than cm/s.

Suggested Answer for HOTS (page 121)

The lorry remains stationary. The speed of the lorry is 0 km/h.

Mind Test (pages 125-126)

1. cm/s, m/s, and km/h
2. (a) and (d)
3. (a) Vehicle T is the fastest while vehicle U is the slowest
(b) Speed of vehicle R = 50 km/h; Speed of vehicle S = 40 km/h; Speed of vehicle T = 60 km/h; Speed of vehicle U = 25 km/h
4. (a) 2400 m or 2.4 km (b) 1500 s or 25 minutes
(c) 8 minutes
5. fast; faster; farther; time
6. (a) To investigate the relationship between the speed and the time taken for an object to move. / To investigate the relationship between the number of books and the time taken for a toy car to move.
(b) the distance of the plane and the mass of the toy car.
(c) The higher the number of books, the shorter the time taken for the toy car to move.
(d) 0.5 m/s
7. 900 km/h
8. 70 km
9. 100 minutes

UNIT 8 FOOD PRESERVATION TECHNOLOGY

Mind Test (page 146)

1. Apples: change in texture and colour, and become mouldy
Chicken: looks blackish, smells bad, and becomes slimy
Milk: tastes sour, smells bad, and becomes bubbly and lumpy
Lettuce: change in texture and colour
2. (a) Drying
(b) To remove water content from the food and to prevent the growth of microorganisms.
3. (a) Freezing
(b) Temperature. Microorganisms cannot grow in a very low temperature.

3. Tomatoes: bottling, canning, waxing, boiling, cooling
 Shrimps: drying, freezing, vacuum packing
 Guavas: cooling, vacuum packing, canning, pickling, waxing
5. Freezing, vacuum packing, and smoking.

UNIT 9 WASTE MATERIALS

Suggested Answer for HOTS (page 158)

Accept any suitable answers.

Mind Test (page 164)

- Plastic: plastic bottles, plastic bags
 Paper: magazines, newspapers, egg trays, boxes
 Glass: aluminium cans, drinking glasses, mirrors
 Metal: aluminium cans, milk cans, food cans
- (a) Biodegradable waste is materials that can be decomposed by microorganisms.
 (b) Non-biodegradable waste is materials that cannot be decomposed by microorganisms.
- (a) metal, paper, plastic, rubber, glass
 (b) According to common characteristics determined by the pupils.
 (c) These waste materials may cause environmental pollution.
 (d) Carry out 5R programmes.

UNIT 10 ECLIPSE

Suggested Answer for HOTS (page 171)

During an eclipse of the Moon, the light from the Moon is safe to be observed because the Moon does not emit its own light but reflects light from the Sun to Earth.

Mind Test (pages 177-178)

- Total eclipse of the Moon; Partial eclipse of the Sun;
 Total eclipse of the Sun; Partial eclipse of the Moon
- (a) and (d)
- (a) Total eclipse of the Sun
 (b) The Moon is between the Sun and Earth in a straight line and the shadow of the Moon's umbra is formed on Earth's surface.
 (c) Special glasses, suitable filters or pinhole camera.
- Sun; a straight line; new moon
- (a) Total eclipse of the Moon
 (b) Shadow A is umbra and shadow B is penumbra.
 (c) Sunlight travels in a straight line and cannot pass through opaque objects such as Earth and the Moon.
 (d) Eclipse of the Sun
- (a) The level of the sea tides rises.
 (b) The surrounding conditions becomes darker and the surrounding temperature decreases.

UNIT 11 GALAXY

Mind Test (pages 190-192)

- (a) The galaxy consists of millions of stars, gases, dust, and other matter.
 (b) Spiral-shaped galaxy
- (a) galaxy; barred spiral
 (b) The Sun; seven; The Milky Way
 (c) sizes; shapes

- (a) The Milky Way galaxy
 (b) Barred spiral
- P: Barred centre of the galaxy
 Q: Spiral arm of the galaxy
- (a) X : Solar System; Y : The Milky Way galaxy
 (b) The Sun
- (c) and (d)
- (a) The Milky Way galaxy
 (b) This galaxy is a barred spiral-shaped galaxy and the Solar System is located in it.
- thin disc, bulges

UNIT 12 STABILITY AND STRENGTH

Mind Test (page 210)

- Flowerpot B, because it is shorter than flowerpot A.
- (a) The stability of objects and structures is the ability of the objects and structures to remain stable or for the objects to return to their original positions.
 (b) The strength of objects and structures is the ability of the objects and structures to withstand a force that could damage or change their structural shapes.
- Factors affecting the stability of objects and structures are base area and height. Factors affecting the strength of objects and structures are type of material and shape of a structure.
- (a) Wooden block B
 (b) Wooden block B is less stable.
 (c) The base area of wooden block B can be increased by changing its orientation.
 (d) As the height of the wooden block increases, its stability decreases.
- Strong and stable structures are not easily damaged, can be used for a long time, low maintenance cost, and safe to be used.

UNIT 13 TECHNOLOGY

Mind Test (page 222)

- Technology is an application of scientific knowledge to overcome human limitations.
- (a) Microscope
 (b) Loudspeaker and microphone
- (a) The use of technology to spray fertilisers and pesticides makes farming easier and can save time, as well as human resources.
 (b) This technology can help maintain the quality and improve crop production.
- (a) In the field of medicine
 (b) New medical devices are being invented to enable efficient diagnosis and treatments.
 (c) An improved quality of healthcare and well-being of humans can be achieved.

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