Science and Elementary Technology

PRIMARY 4

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Message to my kid.....

Primary school children should be motivated to like science because it satisfies their **natural curiosity** about the world, develops crucial **life skills** like problem-solving and critical thinking, and provides a foundation for future opportunities in a technology-driven society.

Here is the scientific motivation for engaging primary school kids in science:

1. Harnessing Innate Curiosity.

Children are naturally curious explorers. Science provides the perfect avenue to channel this inherent desire to ask "why?" and "how?".

- **Understanding Daily Life:** Science explains phenomena they encounter every day, like why it gets dark, why ice melts, or how plants grow. This real-world relevance makes the subject immediately engaging.
- **Active Exploration:** It moves beyond abstract concepts by allowing kids to actively explore their environment through observation, questioning, and hands-on experiments (e.g., making a volcano with baking soda and vinegar, or studying the lifecycle of a butterfly).

2. Developing Essential Cognitive Skills

The process of scientific inquiry helps kids build a powerful cognitive toolkit that benefits all areas of their lives.

- **Critical Thinking & Logic:** Science teaches children to observe, ask questions, form hypotheses, test ideas, and draw conclusions based on evidence. This systematic approach builds logical reasoning and helps them think critically.
- **Problem-Solving & Resilience:** When experiments don't go as planned, children learn to troubleshoot, adjust their methods, and try again. This fosters an innovative mindset, creativity, and the resilience to learn from failure.
- **Observation and Attention to Detail:** Careful scientific investigation requires focused observation, which sharpens their attention to detail and patience.

3. Fostering a "Growth Mindset"

Science is not just about getting the right answer; it's about the process of discovery. This focus on "how we learn" encourages a growth mindset, where effort and curiosity are valued over innate ability, empowering children to tackle challenges with confidence.

4. Preparation for the Future

A strong foundation in science in primary school sets children up for future academic and professional success.

- **Foundation for STEM Careers:** Early exposure can spark a lifelong interest in STEM (Science, Technology, Engineering, and Mathematics) fields, which are crucial for innovation and offer high-demand career opportunities.
- **Informed Citizenship:** Scientific literacy helps children become informed citizens capable of making sense of important global issues, such as health, climate change, and technology.

In Summary

By making science a fun, interactive adventure rooted in their own curiosity, we empower children to become independent thinkers, effective problem-solvers, and engaged citizens who are ready to face the challenges and opportunities of the 21st century.

Introduction

Objects production means making things using our hands and simple materials.

Making different objects using simple materials like wire, clay, and paper helps us to be creative, learn new skills, and take care of the environment by reusing materials.

1.1 Making toys using wires

To make a wire toy, you need:

Soft wire (easy to bend)

Pliers (to help shape the wire)

Bottle caps (for wheels if you are making a car) A

little creativity!

Making a toy bicycle using wire

Toys are things that we play with.

You will need

- A soft wire and a wire cutter.

Wire toys can be shaped into cars, animals, bicycles, and many other things.

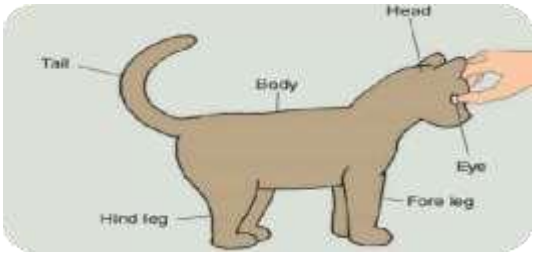
Wire toys are fun, creative, and good for the environment because they use recycled materials. Making your own toy is a great way to play and learn!

1.2 Making toys using clay

Making a cat from clay

You will need

- Natural clay
- Water
- Stones
- Knife
- Modelling clay



Clay is a soft material found in the ground. It is easy to shape and great for making toys like animals, people, pots, and cars.

To make a clay toy, you need:

Soft clay (you can find it near rivers or buy it)

Water (to keep the clay soft)

A flat surface to work on

Making a motorcycle from clay

You will need

Natural clay or modelling clay

Water Knife.

1.3. Making utility objects using sticks

Utility are objects that we can use

Making a basket using sticks

You will need

Soft sticks which can be bent and String

Some examples of utility objects that can be created include pencil holders, small baskets, simple toys, or decorative items.

1.4. Making utility objects using banana fibres

Making a mat using banana fibres

You will need

- Banana fibres
- A pair of scissors
- String

Making a dustbin using banana fibre

You will need

- Banana fibres
- A pair of scissors
- String

1.5. Maintenance of utilities and learning objects

Object type	Material	Maintenance tips
Wire toys	Wire	Clean with a dry cloth, avoid rust by keeping dry
Clay toys	Clay	Handle gently, clean with a dry or slightly wet cloth, avoid dropping
Mats/Baskets, ropes, ball Dustbin	Banana fibres	Keep in dry places, dust regularly, avoid water
Brushes/Tools, basket, chairs (agasongabugari) bloom, beehive	Soft sticks	Wipe with dry cloth, store safely, avoid bending or stepping on them

ANSWER THESE QUESTIONS TO REFLECT WHAT YOU LEARNT.

TOPIC: Making Objects and Toys from Simple Materials

PART A: MULTIPLE CHOICE QUESTIONS

(Tick the correct answer — A, B, C, or D)

1. Objects production means _____.A) Buying things B) Making things C) Throwing things D) Selling things
2. We can make objects using _____.A) Expensive machines B) Simple materials C) Computers D) Cars
3. Making objects helps us to _____. A) Waste materials B) Be creative C) Sleep D) Destroy nature
4. Which of these materials can make toys?
   A) Paper, wire, clay B) Iron, glass, plastic C) Water, air, salt D) None
5. Wire toys are made from _____. A) Hard stone B) Soft wire C) Paper D) Banana

6. What tool helps to cut or bend wire? A) Scissors B) Knife C) Pliers D) Stick
7. Bottle caps can be used to make _____. A) Wheels B) Doors C) Tables D) Houses
8. Toys are things we _____. A) Eat B) Play with C) Wear D) Clean
9. Making toys using old materials helps the _____.A) Environment B) Water C) House D) School
10. Clay is found in the _____. A) Air B) Ground C) Tree D) Water bottle
11. Clay is a _____ material. A) Hard B) Soft C) Plastic D) Metal
12. We add water to clay to make it _____. A) Hard B) Soft C) Dry D) Dirty
13. Which one is made from clay? A) Bicycle B) Cat toy C) Mat D) Dustbin
14. A tool used to shape clay is a _____. A) Spoon B) Knife C) Rope D) Wire
15. Where can we find clay? A) Near rivers B) On trees C) In the air D) On paper
16. Utility objects are things we _____. A) Use B) Eat C) Break D) Sell
17. To make a basket using sticks, we need _____.
18. A) Rope only B) Soft sticks and string C) Hard stones D) Metal rods
19. Sticks used for making objects must be _____.
20. A) Hard B) Soft and bendable C) Plastic D) Heavy
21. Which of these is a utility object? A) Car B) Pencil holder C) River D) Bag of rice
22. Banana fibres can be used to make a _____. A) Ball B) Mat C) Pen D) Glass
23. To cut banana fibres, we use _____. A) Spoon B) Scissors C) Knife D) Stick
24. We can make a dustbin using _____.A) Metal B) Banana fibres C) Plastic D) Stones
25. What helps banana fibres to hold together? A) Rope B) String C) Glue D) Water
26. Keeping toys dry helps to stop _____. A) Rust B) Fun C) Water D) Colour
27. Clay toys should be cleaned with _____. A) Much water B) Fire C) A dry cloth D) Sand
28. Banana fibre objects should be kept in _____. A) Water B) Wet places C) Dry places D) Mud
29. Wire toys should be kept _____. A) In water B) Dry C) Under rain D) In soil
30. We should not _____ clay toys. A) Drop B) Keep C) Play D) Paint
31. Sticks must be kept _____. A) Wet B) Dry and safe C) Broken D) On the floor
32. Making our own toys helps us to _____.
A) Learn and play B) Sleep C) Waste time D) Break things

PART B: OPEN-ENDED QUESTIONS

(Write your answers on the dotted lines)

1. What does "object production" mean?
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.....

2. Name two materials used to make objects.

.....

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3. How does making objects help us?

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4. Write two examples of things we can make using wire.

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5. What do we use pliers for?

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6. How can bottle caps be used when making a toy car?

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7. What are toys used for?

.....

8. Why are wire toys good for the environment?

.....

9. Where can we find natural clay?

.....

10. How can we keep clay soft?

.....

11. Name one toy that can be made from clay.

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12. Write two tools needed to work with clay.

.....

13. What is a utility object?

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14. Write one example of a utility object made from sticks.

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15. What materials are needed to make a basket using sticks?

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16. Why must sticks be soft?

.....

17. What can we make using banana fibres?

.....

18. Name one tool used when working with banana fibres.

.....

19. Why should banana fibre objects be kept dry?

.....

20. How can we take care of wire toys?

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21. What happens if we drop clay toys?

.....

22. Why should we not bend or step on stick-made objects?

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23. How do we clean banana fibre mats?

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24. Why is it important to reuse materials when making toys?

.....

25. Mention one benefit of making your own toy.

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26. Which material is used to make a mat?

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27. How can we protect wire toys from rust?

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28. Write one rule to care for clay toys.

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29. How many months does it take to learn making objects in class?

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30. What do you enjoy most about making toys and utility objects?

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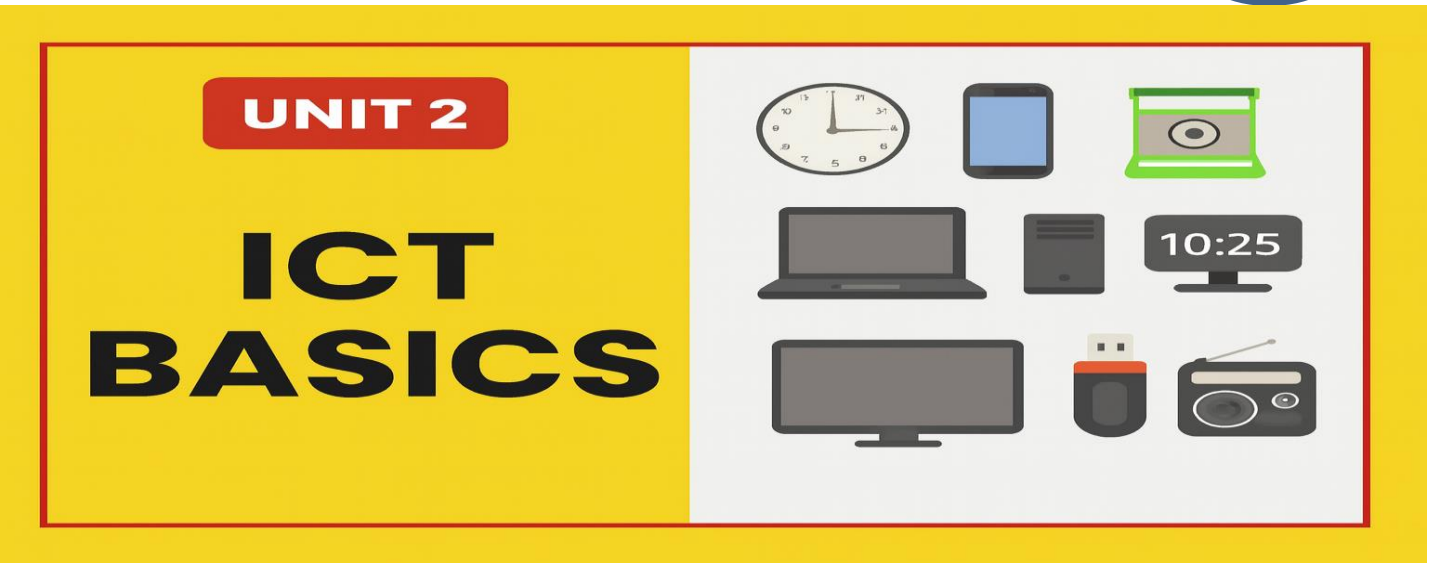


Introduction

In this unit, we will explore ICT and its importance in daily life. They will understand the meaning of ICT and identify common communication tools such as phones and computers. We will also examine two types of data through simple examples. Key internet-related terms, including Wi-Fi and websites, will be introduced along with their practical uses. Additionally, we will distinguish between hardware and software. They will use the Journal to save, open and manage their work and practice using a flash drive to store and share files securely.

2.1. Meaning of ICT

2.1.1Definition

ICT stands for **Information and Communication Technology**. It is about using computers, phones, and the internet to share information and talk to others.

2.1.2. Roles of ICT

ICT helps us in many ways in daily life:

- ✓ It helps people communicate.
- ✓ It helps teachers in teaching and pupils to learn.
- ✓ It helps people work, shop, and enjoy music or videos.

2.1.3. Communication tools and their use

Communication is the way people share information with each other.

ICT helps people to talk, call, or send messages.

The table below shows some examples of these tools and how they are used:

Tool	Use

2.2. Digital and analogue data

Phone	Calling people or sending text messages.
Computer	To write, send emails, and find information.
Tablet	To read, play games, or use apps.
Radio	To listen to news and music.
Television	To watch news, shows and learning program.

Digital data

Digital data is made of numbers (0s and 1s) and has clear, separate values, like text in a computer or a digital photo.

Picture 2.1. Digital thermometer Examples

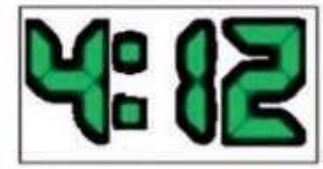
of digital data:

- **A computer typing letters:** the computer sees each letter as a number.
- **A digital clock:** it shows time in numbers like 10:30, without moving hands.
- **A phone taking a picture:** it saves the picture using tiny dots called **pixels**.

For computers to store digital data they use electricity. That is why without electricity digital devices such as computers cannot function.

An example of digital data is a digital clock which changes time by showing different numbers.

Analogue data



Picture 2.2. A digital clock

Analog data changes smoothly and can have many values, like the sound of a voice or the colors in a painting.

Examples of Analog Data:

- **Voice or sound**: When you speak, your voice changes in loudness and pitch, that is analog.
- **Thermometer reading**: The temperature pointer slowly goes up or down, it doesn't jump suddenly.
- **Clock hands**: The hands of the clock move smoothly around the clock, not in steps.

Analog data is **continuous**, it doesn't jump in steps like **digital data**, which changes in small bits.

For example when you talk to a friend, your voice is spoken continuously.

Picture 2.3. An analog clock

Some analog systems like analog clock work by using electricity but there are analog systems such as analog thermometer that work without electricity.

Differences:

Analog data is continuous and flows like a wave while digital data is discrete and has exact steps.

Analog Data	Digital Data
Changes smoothly	Changes in steps (0 or 1)
Flows like a wave	Very exact

Examples of devices:

- **Analog devices** include old radio, thermometer, old TV, tape recorders, etc..
- **Digital devices** include computer, smartphone, smartwatches, etc.

Note that: when we put data in order so that it is easy to understand, it becomes information

2.3. Internet related terms

2.3.1. Definitions

- **Internet:** It is a large group of computers that connect many computers to share information around the world.

- **Website:** It is a place on the internet that shows information.

  Example: www.reb.rw is the website of Rwanda Basic Education Board
- **Web browser**: A web browser is a program we use to look at websites on the internet.
- **WWW:** It stands for World Wide Web. It is a part of the internet where we find websites.
- **WI-FI**: It stands for Wireless Fidelity. It is a wireless signal that lets devices connect to the internet without cables.
- **Email**: It is a message sent from one computer or phone to another using the internet.
- **Server:** It is a powerful computer that stores websites and sends information to other computers.
- **Download:** It is a process of taking a file from the internet and saving it to your computer or phone.
- **Upload:** It is a process of sending a file from your computer or phone to the internet.

2.3.2. Use of each term in everyday life

Below are the daily uses of each term:

Wi-Fi: It connects your phone or laptop to the internet at home or school.

Internet: It helps to search for information, talk to people, or watch videos.

Email: It helps to send messages or documents to friends, teachers, or offices.

Website: It gives access to information, games, schoolwork, or news.

Web browser: It is used to open and view websites on the internet.

Server: It stores websites, files, or emails so we can open them anytime.

WWW: It helps people visit different websites online.

Download: It lets people save music, videos, or documents from the internet.

Upload: It lets people share their photos, videos, or work online.

2.4 Hardware and Software

2.4.1. Hardware

Hardware is the physical part of a computer. They are the parts you can touch.

Examples:

Mouse: It is a small device used to move the cursor and select items.

Keyboard: It is a device used for typing and entering commands.

Monitor: It is the screen that displays information.

2.4.2. Software

Software is a set of instructions or programs that tell the computer what to do.

Some common examples of software:

Picture 2.5. Some examples of software

Word Processor: Used for writing documents, like Microsoft Word.

Spreadsheet Software: Helps with data and calculations, like Microsoft Excel.

Presentation Software: Used to create slideshows, such as Microsoft PowerPoint or Google Slides.

Media Player: Plays music and videos, like VLC Media Player or Windows Media Player.

2.4.3. Differences between hardware and software

The table below shows some differences between hardware and software.

Hardware	Software
Can be touched.	Cannot be touched.
Example: Keyboard, mouse.	Example: Word program.
Needs electricity to work.	Needs hardware to run.
Can break or be damaged.	Can be deleted or updated.

2.5. Use of Journal

Journal is a tool in Sugar interface that helps you **save, organize**, and **open your work**. It keeps all the activities you do on the computer in one place.

2.5.1. Opening the Journal

The following are steps to open the Journal on XO laptop:

1. Turn on the XO laptop by pressing the power button.

2. Wait for the home screen. You will see a screen with many icons in a circle or in a grid.

3. Find the Journal icon. Look for the icon that looks like a book .

4. Click on the Journal icon. The Journal will open.

Picture 2.6. The Home screen in the Sugar interface

2.5.3. Closing Journal

The following are steps to close the Journal on XO laptop:

1. Look at the top of the screen. When the Journal is open, you will see a top bar.
2. Click on **Stop** button.

2.5.4. Managing activities in the Journal

Open a new activity

To open a new activity in the **Journal** of an **XO Laptop**, follow these steps:

1. Turn on the XO laptop by pressing the power button.
2. Wait for the home screen. You will see a screen with many icons in a circle or in a grid. That is the home view of the Sugar interface.
3. Find the **Journal icon**. Look for the icon that looks like a book.
4. **Right click** on the Journal icon and click on the **Start new**.
5. Journal will automatically create a new activity for it.

picture 2.7. Option for starting a new activity

Closing an activity

To close an activity in the Journal, follow these steps:

1. If you are inside an activity, click the Activity icon in the top left corner.

Picture 2.8. Option for closing an activity

2. Then click the **Stop** button ( ) on the menu.
3. The activity is now automatically saved and logged in the Journal.

Search an activity

Search an activity in Journal, follow these steps:

1. Open the Journal by clicking the **Journal icon** from the bottom of the Home view.
2. Scroll through the list or use the **search** box to locate it.

Picture 2.9. Searching in the Journal

Rename an activity:

- Click on the **title** or name of the activity.
- Type the new name you want.
- Press **Enter** to save the new name.

Delete an activity

To delete or remove an activity from the Journal, follow these steps:

1. Open the Journal from the **Home** view.
2. Scroll or search for the activity you want to remove.
3. Right click on the activity you want to delete.

4. Click the **Erase** icon at the bottom.
5. Confirm the deletion by clicking on Erase.

2.5.5. Management of files in Journal

Use the Journal carefully and respectfully. Follow these helpful rules:

- Only delete files if you are sure.
- Keep your work organized.
- Do not delete other pupils' files.
- Always use the Journal in a safe and respectful way.

2.6. Using a flash disk

2.6.1. What is a flash disk?

A **flash disk**, also called a **USB flash** drive or **memory stick** is a small portable device used to store and transfer files.

Picture 2.11. Different flash disks

2.6.2. Use of a flash disk

A flash disk is used for:

- Saving files from the computer,
- Sharing files with others,
- Carrying files from school to home.

2.6.3. Inserting a flash disk into a computer

To insert a flash disk into a computer, do the following:

- Look at the side of the laptop.
- Find the USB port (it is a small rectangle hole).
- Hold the flash disk carefully.
- Gently push it into the USB port.

2.6.4. Open, View, and Save Files

Do the following to open, view, and save files:

- After putting it in the flash disk, wait a few seconds.

- The laptop will show a **USB icon**.
- Click the icon to see the files on the flash disk.

To save a file from the laptop:

- Open the file.
- Click **"Save As"** or **"Copy to"**.
- Choose the USB or flash disk as the place where to save.

2.6.5. Remove a flash disk safely

Do not just pull it out quickly. Follow the steps below:

- First, click the flash disk icon.
- Click on **"Remove"** (or Eject).
- Pull out the flash disk gently.

2.6.6Sharing files with a classmate

To share files with a classmate, follow the steps below:

- Put the file you want to share on the flash disk.
- Remove the flash disk safely.
- Give it to your classmate.
- They will put it into their laptop and open the file.

2.6.6. Take care of your flash disk

To keep your flash disk safe, follow these instructions:

- Keep it in a small bag or box.
- Do not drop it or sit on it.
- Do not play with it.
- Always remove it safely.

TOPIC: INTRODUCTION TO ICT END OF UNIT QUESTIONS

PART A: MULTIPLE CHOICE QUESTIONS (TICK THE CORRECT ANSWER)

1. ICT stands for _____.
   A) Internet Communication Tool B) Information and Communication Technology
   C) International Computer Term D) Internet Control Technology
2. ICT helps people to _____.
   A) Cook B) Talk and share information C) Sleep D) Run
3. A phone is used for _____.
   A) Writing B) Calling C) Cooking D) Painting
4. A computer helps people to _____.
   A) Swim B) Type and find information C) Eat D) Jump
5. A tablet is used for _____.
   A) Drawing and playing games B) Washing C) Sleeping D) Singing
6. A radio helps people to _____.
   A) Write B) Listen to news and music C) Eat D) Sleep
7. A television helps people to _____.
   A) Watch news and programs B) Read C) Type D) Play football
8. Digital data is made of _____. A) Words B) 0s and 1s C) Water D) Pictures
9. Digital data has _____ values.
   A) Many B) Clear and separate C) None D) Hidden
10. A digital clock shows time in _____.
    A) Pictures B) Numbers C) Letters D) Colours
11. A phone camera saves pictures using _____.A) Pixels B) Stones C) Lines D) Waves
12. Computers store digital data using _____A) Water B) Electricity C) Sunlight D) Wind
13. Analogue data changes _____. A) Quickly B) Smoothly C) Roughly D) Fast
14. When you talk, your voice is an example of _____ data.
    A) Digital B) Analogue C) Fake D) Hard
15. A thermometer that moves slowly up and down shows _____ data.
    A) Analogue B) Digital C) Hot D) Cold
16. A clock with hands shows _____ data. A) Digital B) Analogue C) Electric D) None
17. Digital data changes in _____. A) Steps B) Circles C) Colours D) Waves
18. Analogue data flows like a _____. A) Line B) Wave C) Rock D) Jump
19. An old radio is an example of a _____ device.
    A) Digital B) Analogue C) Modern D) None
20. A smartphone is a _____ device. A) Analogue B) Digital C) Mechanical D) Hard
21. The Internet connects _____.
    A) Schools only B) Computers around the world C) Houses only D) Phones only

22. A website is a place on the internet that shows _____.
A) Food B) Information C) Houses D) Trees

23. A web browser is used to _____.
A) Open websites B) Write letters C) Cook D) Clean

24. WWW stands for _____.
A) World Water Way B) World Wide Web C) World Work Web D) Wide World Web

25. Wi-Fi helps devices connect to the internet _____.
A) With cables B) Without cables C) With paper D) With CDs

26. An email is a _____.
A) Picture B) Message sent using internet C) Song D) Video

27. A server is a _____.
A) Person serving food B) Powerful computer storing websites C) Phone D) Cable

28. To download means _____.
A) To take a file from internet B) To delete C) To share D) To draw

29. To upload means _____.
A) To send a file to internet B) To close a file C) To copy a file D) To erase

30. Hardware is the part of computer you can _____.
A) Touch B) Hear C) Smell D) See only

31. Software is a set of _____. A) Toys B) Instructions C) Foods D) Tools

32. The mouse is used to _____.
A) Move cursor B) Write letters C) Play music D) Clean screen

33. The keyboard is used to _____.
A) Type letters B) Eat food C) Watch movies D) Sleep

34. The monitor shows _____. A) Music B) Information C) Houses D) Toys

35. Word Processor is used for _____.
A) Writing documents B) Watching movies C) Drawing D) Cooking

36. Spreadsheet software helps with _____.
A) Data and numbers B) Singing C) Pictures D) Drawing

37. Presentation software makes _____. A) Slideshows B) Chairs C) Letters D) Boxes

38. Media Player is used for _____.
A) Playing music or videos B) Writing C) Sleeping D) Eating

39. Hardware can be _____.
A) Touched B) Heard C) Smelled D) Dreamed

40. Software can be _____.
A) Deleted B) Touched C) Held D) Broken physically

41. Journal is a tool used to _____.
A) Save and open work B) Sleep C) Draw D) Play games

42. To open Journal, click on the icon that looks like a _____.
A) Book B) Pen C) Mouse D) Bag

43. To close Journal, click the _____ button. A) Start B) Stop C) Run D) Play

44. To search for a file in Journal, use the _____.
    A) Search box B) Keyboard only C) Mouse only D) Monitor
45. To rename a file, click on its _____.
    A) Name B) Size C) Colour D) Time
46. To delete a file, click the _____ icon.
    A) Erase B) Play C) Paint D) Print
47. A flash disk is also called a _____.
    A) Memory stick B) Battery C) Toy D) Cable
48. A flash disk is used to _____.
    A) Store and share files B) Play games C) Print D) Charge phone
49. Before removing a flash disk, we must click _____.
    A) Remove or Eject B) Delete C) Save D) Paint
50. We use a flash disk to share files with _____.
    A) Friends or classmates B) Trees C) Water D) Houses

PART B: OPEN-ENDED QUESTIONS

(Write your answers on the dotted lines)

1. What does ICT stand for?
   .....
2. What is the main use of ICT?
   .....
3. Write one ICT tool.
   .....
4. What is the use of a phone?
   .....
5. Name one use of a computer.
   .....
6. How does ICT help teachers?
   .....
7. What does "communication" mean?
   .....
8. Write one example of a communication tool.
   .....
9. What is digital data made of?
   .....
10. Give one example of digital data.
    .....
11. Write one example of analogue data.
    .....
12. What does a digital clock show?
    .....

13. How does analogue data change?

.....

14. Name one analogue device.

.....

15. Name one digital device.

.....

16. What is the Internet?

.....

17. What is a website?

.....

18. Write one example of a website.

.....

19. What is a web browser used for?

.....

20. What does WWW stand for?

.....

21. What is Wi-Fi used for?

.....

22. What is an email?

.....

23. What is a server?

.....

24. What does it mean to download a file?

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25. What does it mean to upload a file?

.....

26. What is hardware?

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27. What is software?

.....

28. Name two examples of hardware.

.....

29. Name one example of software.

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30. What is the use of a mouse?

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31. What is the use of a keyboard?

.....

32. What does a monitor do?

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33. What is a word processor used for?

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34. What is a spreadsheet used for?

.....

35. What is a presentation software used for?

.....

36. What is the use of a media player?

.....

37. What is the Journal used for?

.....

38. How do you open the Journal?

.....

39. How do you close the Journal?

.....

40. How do you search for a file in Journal?

.....

41. What must you do before deleting a file?

.....

42. Why should we not delete other pupils' files?

.....

43. What is a flash disk?

.....

44. Write one use of a flash disk.

.....

45. Where do we insert a flash disk in a computer?

.....

46. How do we open files from a flash disk?

.....

47. What should we do before removing a flash disk?

.....

48. Write one rule for using Journal safely.

.....

49. How can we share files with a friend using a flash disk?

.....

50. Why must we remove the flash disk gently?

.....

UNIT 3

GRAPHICS AND MULTIMEDIA

Introduction

This unit is about **using the Paint program to create simple drawings on the computer**. More precisely this unit covers *how to open, save, and close the program, and use tools like the pencil, brush, eraser, and colors to draw.*

In addition, the unit gives different multimedia programs that *are used to play music, watch videos, and view pictures.*

This unit will be learned by using the Paint Activity for XO laptops or Microsoft Paint for Windows computers.

3.1. Starting Paint application

Paint is a simple computer program. You can use it to draw, color, and change pictures. It helps to make your own art or designs.

3.1.1, Opening the Paint Activity

Click on the **Paint icon** on the home screen.

Picture 3.1. Home Screen

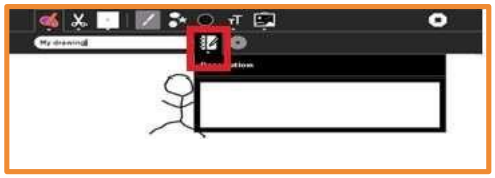
Wait for the Paint window to open.

3.1.2, Saving and Closing Paint Activity

Click on  icon. Type the name of the activity to save.

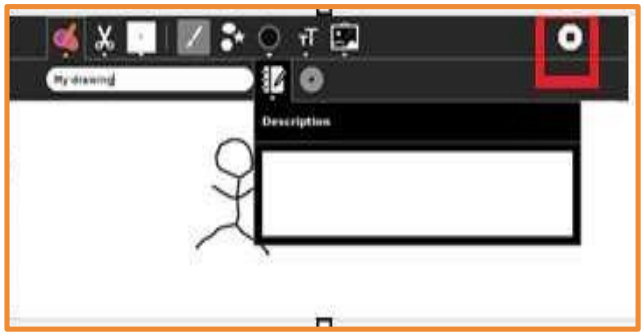
Picture 3.2. Naming Paint Activity

Click on  icon. Type a description about the activity.



Picture 3.3. Paint Activity Description

Click on  icon or press Ctrl+Q to close the activity.



Picture 3.4. Closing Paint Activity

The drawing will be saved in the Journal and Paint activity will be closed.

3.2, Paint environment

3.2.1, Common tools in Paint

The Paint activity window has many tools. Some tools are used more often than others.

The most commonly used tools are:

Picture 3.5. Paint Tools

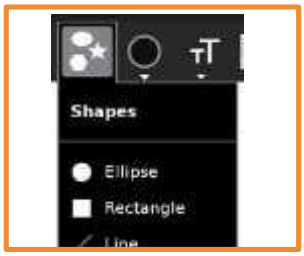
- **Brush Tool:** It is used to draw thin lines

Picture 3.6. Brush tools

- **Brush properties tool:** This tool helps to change brush properties. It makes the brush bigger or smaller, or changes the style (thin, thick, soft, hard).

Picture 3.7. Brush properties tools

- **Shape tool:** This tool helps to draw shapes like circles, squares, and triangles. It has shapes like ellipse, rectangle, line, polygon, etc.



Picture 3.8. Shape tool which gives a list of other shapes

- **Shape properties tool**: This tool is used to change the shape. It can change the color, the border, or make it thicker or thinner.

Picture 3.9. Shape properties tools

- **Text tool:** This tool helps to type words on a picture.

Picture 3.10. Text Tools

- **Image tool**: This tool helps to add a picture from a computer to a drawing.

Picture 3.11. Image tools

- **Stop:** This button is used to close the Paint activity.

3.3, Drawing with Freehand Tools

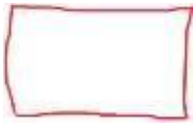
3.2.1, Drawing a simple rectangle

1. Open the **Paint**.
2. Select the **Brush/Pencil** tool  .

Picture 3.12. Brush tool selection

3, Click on the Brush properties tool  and select the brush size and color according to your drawing theme.

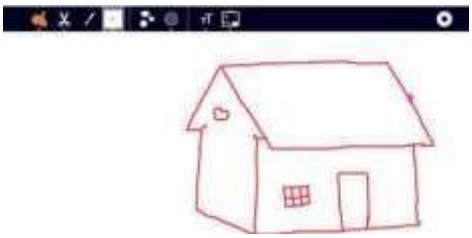
4. Hold the left mouse button down and drag it to draw a simple rectangle.



Picture 3.13. My Rectangle

3.3.2, Drawing a simple house

1. Open the **Paint**.
2. Select the **Brush/Pencil** tool  .
3. Click on the **Brush properties**  tool and select brush size and color to match the drawing theme.
4. Press the left mouse button and move it to draw a simple house.



Picture 3.14. A House drawn in Paint

5. Select the **Bucket** tool  and select the Bucket properties  and Select the color you would like to use to fill the house.

Picture 3.15. The final house after coloring it

Draw a sun like this:

3.4. Drawing using shapes

Shapes help to make nice drawings in Paint. Shapes make it easy to draw things like houses, trees, and cars.

a) Common shapes in Paint

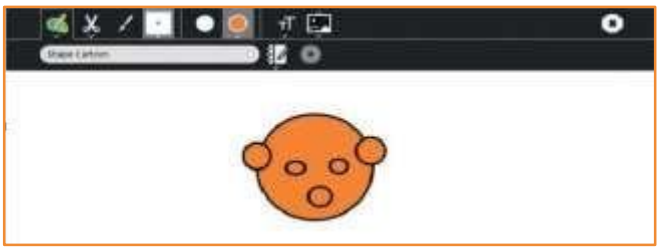
- **Rectangle**: for doors, tables, books
- **Circle**: for faces, sun, wheels
- **Triangle**: or roofs, mountains
- **Line**: for roads, walls, or sticks

b) Using Paint to draw a person

1. Open **Paint**.
2. Click the **Shapes** Tool and click on **Ellipse** so that you draw a head

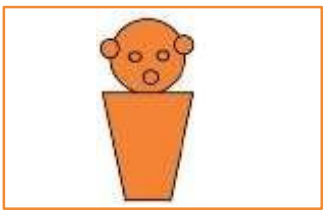
Picture 3.16. Choosing the shapes tool

3. Choose **Shapes properties** to set fill color and make the head red.
4. Draw **ellipses** of different sizes and arrange them to make a cartoon face.



Picture 3.17. Cartoon head filled in red

5. Then click on **Shapes** and select the **Trapezoid** tool for drawing cartoon body.

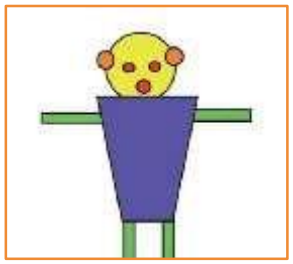


Picture 3.18. The body of the cartoon filled in red

6. Select the **Rectangles** shape tool for drawing cartoon hands and legs.

7. Select **Bucket** tool to fill color in the cartoon. The arms and body will be filled with a different color.

8. Now the cartoon is ready as this one.



3.5 Multimedia

3.5.1. Definition of multimedia

Multimedia is a way of sharing information using different things like words, sounds, pictures, moving pictures, or videos all together in one presentation.

3.5.2 Types of media in multimedia

Multimedia uses different types of media such as:

Text:	Words or sentences
Pictures:	Photos, drawings
Sound:	Music, voice, sound effects
Video:	A movie or a short video clip
Animation:	Moving cartoons or pictures

3.5.3, Multimedia tools

These are tools used to make or watch multimedia:

Tool	Use
Computer	To create and play multimedia.
Tablet	To watch videos or play games.
Projector	To show multimedia on a big screen.
Speakers	To hear the sound.
Camera	To take photos or make videos

Software	To make slides with text, images, and sound.

3.5.4, Importance of using multimedia in learning

Multimedia helps to:

- **Learn better**: It makes learning fun and easy.
- **See and hear**: Use eyes and ears to understand.
- **Remember more**: Pictures and videos help us remember.
- **Enjoy learning**: It is not boring.

3.5.5 Multimedia programs

Some programs help play music, videos, and pictures.

To use those programs, first install them on the computer. Then, open the media by clicking twice on it. Some common programs are:

Windows Media Player VLC Media Player

iTunes Spotify Windows Photo Viewer Google Photos KM Player

USING PAINT AND MULTIMEDIA PROGRAMS – Grade 4 Assessment

PART A: Multiple Choice Questions (Tick or Circle the Correct Answer)

1. Paint is used for _____.(a) Cooking (b) Drawing (c) Playing football (d) Sleeping
2. Which icon do we click to open Paint? (a) Journal (b) Paint (c) Clock (d) Music
3. Paint helps us to make our own _____(a) Food (b) Art (c) Games (d) Clothes
4. The **Brush Tool** is used to _____(a) Type words (b) Draw lines (c) Erase pictures (d) Print
5. The **Shape Tool** is used to draw
   (a) Songs (b) Circles and squares (c) Words (d) Games
6. The **Text Tool** is used to _____.
7. (a) Type words (b) Paint color (c) Erase (d) Take photo

8. The **Image Tool** helps to _____(a) Add a photo (b) Play a song (c) Watch a video (d) Eat food

9. The **Stop Button** is used to _____ Paint. (a) Open (b) Close (c) Start (d) Save

10. The **Bucket Tool** helps to _____
    (a) Color shapes (b) Type letters (c) Take pictures (d) Play games

11. The **Brush Properties Tool** changes the brush _____.
    (a) Size and color (b) Name (c) Sound (d) Shape only

12. Which shape can be used to draw the sun?
    (a) Rectangle (b) Triangle (c) Circle (d) Line

13. Which shape can be used for a roof?
    (a) Triangle (b) Circle (c) Rectangle (d) Ellipse

14. Which shape is good for drawing a door?
    (a) Circle (b) Rectangle (c) Line (d) Triangle

15. What tool is used to type your name in Paint?
    (a) Shape tool (b) Text tool (c) Brush tool (d) Bucket tool

16. Paint can be found in the _____(a) XO Laptop (b) Bag (c) Radio (d) Phone

17. The drawing is saved automatically in ___(a) Journal (b) USB (c) TV (d) File box

18. Multimedia means using _____ together.
    (a) Only text (b) Words, sounds, and pictures (c) Only games (d) Only color

19. Text in multimedia means _____(a) Photos (b) Words or sentences (c) Music (d) Animation

20. Sound means _____. (a) Photo (b) Voice or music (c) Color (d) Line

21. A video is a _____. (a) Picture (b) Movie (c) Book (d) Song

22. Animation means _____(a) Moving pictures (b) Music (c) Drawing (d) Letter

23. A **Computer** is used to _____ multimedia.
    (a) Cook food (b) Create and play (c) Sleep (d) Jump

24. A **Projector** helps to _____.

(a) Show multimedia on big screen (b) Take pictures (c) Make sound (d) Type

25. A **Speaker** helps to _____.

(a) Hear sound (b) Watch videos (c) Draw pictures (d) Save files

26. A **Camera** is used to _____.

(a) Take photos (b) Print papers (c) Erase files (d) Draw

27. Software helps us to _____.

(a) Make slides (b) Eat (c) Sleep (d) Run

28. **Windows Media Player** is used to _____.

(a) Play music or video (b) Draw (c) Write (d) Type letters

29. **VLC Player** is a _____.

(a) Media player (b) Browser (c) Toy (d) Shape tool

30. **Google Photos** is used to _____.

(a) View pictures (b) Play games (c) Type letters (d) Paint walls

31. **KM Player** plays _____.

(a) Music and videos (b) Games (c) Stories (d) Shapes

32. **iTunes** and **Spotify** are used to play _____.

(a) Music (b) Games (c) Drawings (d) Messages

33. **Paint** helps to make _____ drawings.

(a) Simple (b) Hard (c) Moving (d) Big

34. The **Ellipse shape** is like a _____.

(a) Circle (b) Triangle (c) Line (d) Square

35. To color a drawing, we use the _____.

(a) Bucket Tool (b) Text Tool (c) Shape Tool (d) Stop Button

36. **Turtle Art** is used for _____.

(a) Drawing with blocks (b) Playing songs (c) Writing words (d) Cooking

37. The **Line shape** is used for drawing _____.

(a) Roads or walls (b) Circles (c) Songs (d) Houses

38. **Multimedia tools** include _____.

(a) Computer and speakers (b) Book and pen (c) Car and bag (d) None

39. **Animation** is used in _____.

(a) Cartoons (b) Songs (c) Houses (d) Books

40. **Paint program** is also called _____.

(a) Art tool (b) Cleaning tool (c) Cooking tool (d) Music tool

41. The **Rectangle** shape can make _____.

(a) Books and doors (b) Clouds (c) Trees (d) Wheels

42. **Circle** shape can be used for _____.

(a) Sun and wheels (b) Houses (c) Roads (d) Mountains

43. **Triangle** is used for _____.

(a) Roofs and mountains (b) Roads (c) Tables (d) Clouds

44. The **Text tool** helps to write _____.

(a) Letters (b) Colors (c) Numbers (d) Sounds

45. **Journal** helps to _____ your drawings.

(a) Save and open (b) Eat (c) Delete (d) Erase

46. You can use **Shapes Tool** to draw a _____.

(a) House (b) Poem (c) Song (d) Book

47. The **Brush Tool** can draw __(a) Lines and designs (b) Songs (c) Photos (d) Music

48. **Paint activity** is found in _____(a) XO laptop (b) Radio (c) TV (d) Bag

49. **Multimedia** helps learning to be ___(a) Fun and easy (b) Hard (c) Slow (d) Sad

50. **VLC** can be used to play _____(a) Music and videos (b) Games (c) Notes (d) Pictures only

51. **Turtle Art** can also be used on __(a) XO laptop (b) Notebook (c) Radio (d) Book

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PART B: Open-ended Questions

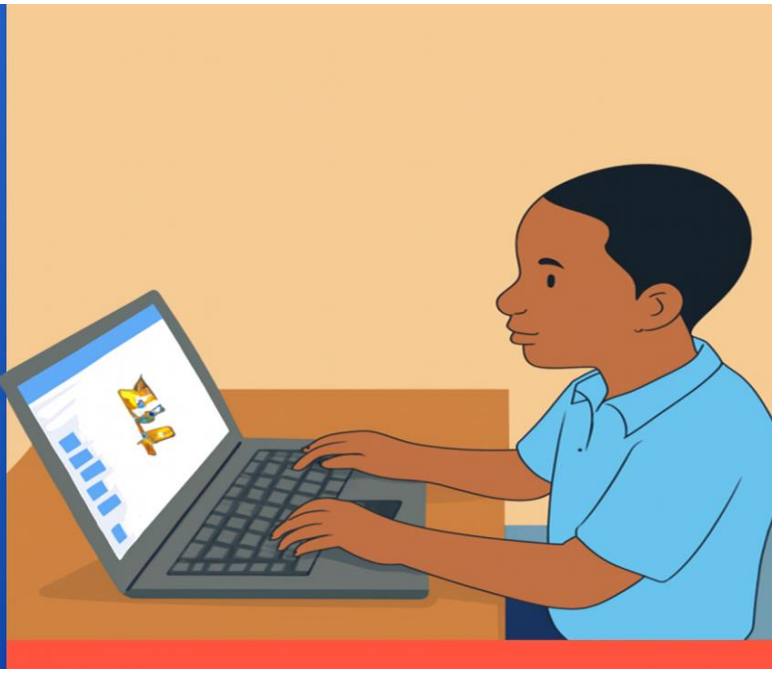
1. What is Paint? .....

2. What can you do with Paint? .....
3. Name one tool used to draw in Paint. .....
4. What is the Brush Tool used for? .....
5. What does the Shape Tool do? .....
6. Name two shapes you can draw in Paint. .....
7. What does the Bucket Tool do? .....
8. What can you do with the Text Tool? .....
9. How do you open Paint? .....
10. What happens when you click the Stop button? .....
11. What is Multimedia? .....
12. Write two examples of media used in multimedia. .....
13. What is the use of a computer in multimedia? .....
14. What is the use of a projector? .....
15. What does a speaker help us to do? .....
16. What is a camera used for? .....
17. Name one program used to play music. .....
18. Name one program used to play videos. .....
19. What is the meaning of animation? .....
20. Write one use of multimedia in learning. .....
21. Which shape can be used to draw the sun? .....
22. Which shape can be used to draw a roof? .....
23. What can you make using Turtle Art? .....
24. What is the use of Journal in Paint? .....
25. How can you fill color in your drawing? .....

26. What does the Image Tool do? .....
27. What do you use to write words in Paint? .....
28. What can you do with the Brush Properties tool? .....
29. What is the use of the Line shape? .....
30. Why is Paint important? .....
31. Write one example of a multimedia tool. .....
32. What is sound in multimedia? .....
33. Write one example of a multimedia program. .....
34. What does VLC do? .....
35. What is text in multimedia? .....
36. Write one importance of multimedia in school. .....
37. What type of program is Turtle Art? .....
38. What can you draw in Paint? .....
39. Write two examples of shapes in Paint. .....
40. What do you need to open Paint on the computer? .....
41. How can you save your work in Paint? .....
42. Where is your work saved after closing Paint? .....
43. Write one example of animation. .....
44. What is the use of software in multimedia? .....
45. What does a multimedia computer help to do? .....
46. Write two types of media. .....
47. What is a line used for? .....
48. What helps you to see your drawings on the screen? .....
49. What helps you to hear sound in multimedia? .....
50. Why do you like using Paint? .....

UNIT 4

PROGRAMMING FOR CHILDREN



- **Scratch** which is a program that is used to create animations and games. It is in XO laptops but it can be downloaded from the internet and installed on a Windows computer.
- **Pictoblox** which is a program used to learn how to program robots.

  You can install it on a Windows computer to try different robot commands in a virtual environment

In Turtle Art, *the turtle is a drawing tool that uses blocks to draw shapes while using loops to repeat actions.*

For *Scratch, we use blocks for making the sprite making the sprite walk, talk, change backgrounds and tell a short story.*

For robots, it is about how to give them simple commands to move or move things.

Opening, saving and closing Turtle Blocks

Turtle Art is a simple program for making colorful pictures.

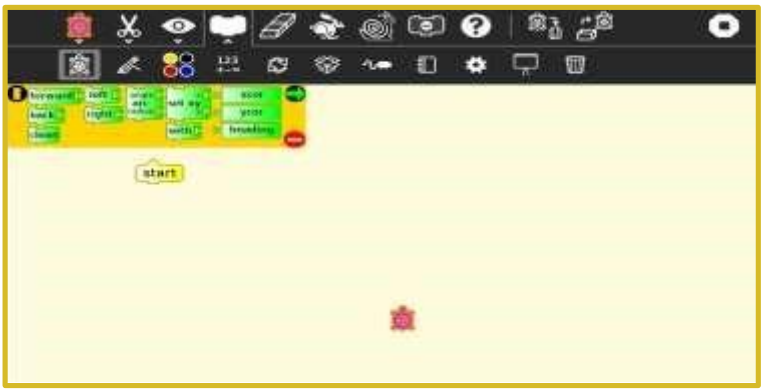
In Turtle Art, a turtle follows commands to draw shapes.

The turtle moves and draws when given commands. It works like a robot pencil which makes pictures when told to make them.

Opening Turtle Art Activity:

To open a **Turtle Art activity**, do the following:

1. **Turn on** your XO laptop.
2. Wait for the **home screen** to load.
3. Find the **Turtle Art**  icon on the laptop and click it one time. Immediately Turtle Art gets opened.

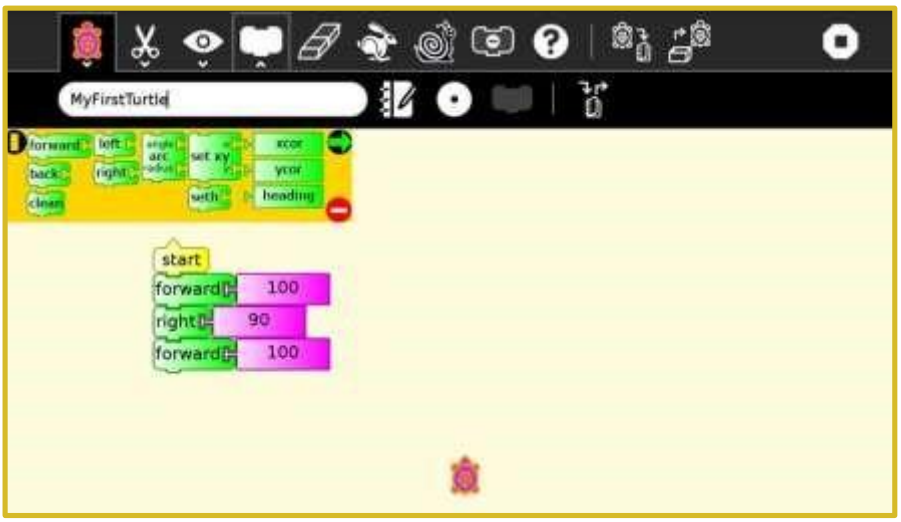


Picture 4.2. Turtle Art window

Saving Turtle Art Activity

To save a **Turtleart activity**, do the following:

1. Click the "Turtle "  icon at the top. Type a **name**. For example "**MyFirstTurtle**".



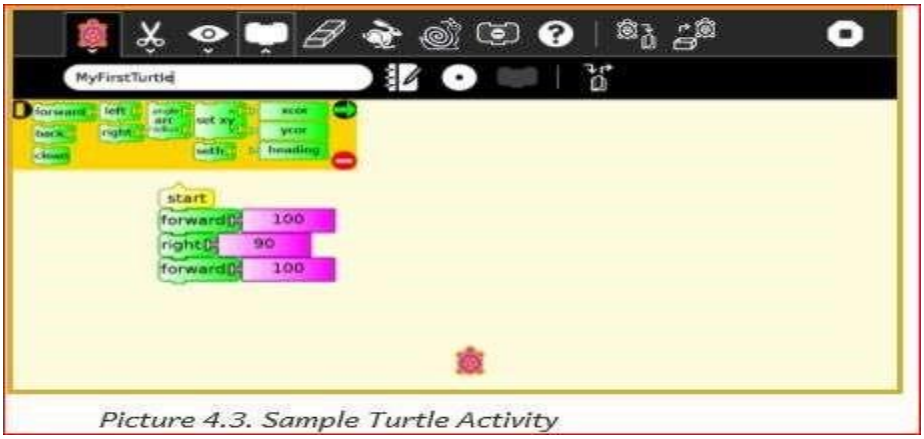
Picture 4.3. Sample Turtle Activity

2. The task will be saved automatically in Journal.

Saving Turtle Art Activity

To save a Turtleart activity, do the following:

1. Click the "Turtle "  icon at the top. Type a name. For example "**My First Turtle"**



Picture 4.3. Sample Turtle Activity

2. The task will be saved automatically in journal

Closing Turtle Art activity

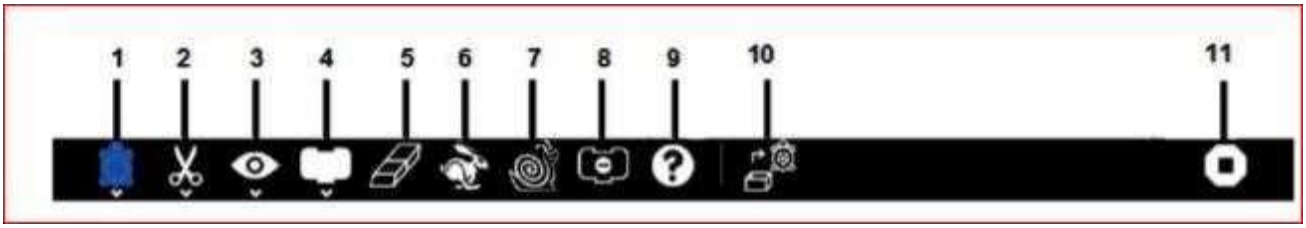
1. To close a TurtleArt activity, do the following:
2. Click "**Stop**"  button in the top-right corner.

The work will be saved automatically in the Journal, and you will return to the home screen.

4.2, Elements of the Turtle Art window

The Turtle Art window has the following elements.

- **Main toolbar**



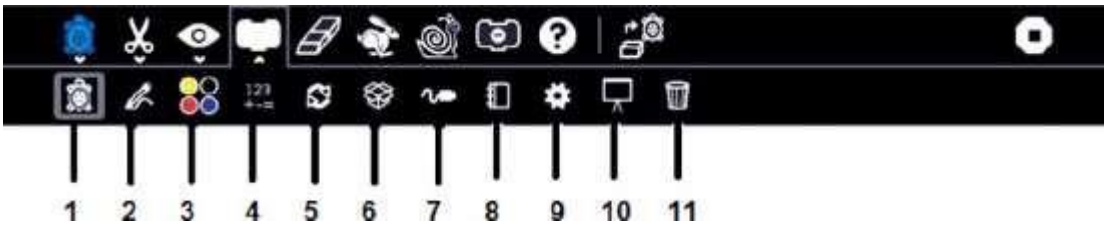
Picture 4.4. Turtle main Toolbars

- **From left to right:**

1. **Activity toolbar**: Is used to save the activity.
2. **Edit toolbar**: Is for copying and pasting blocks.
3. **View toolbar**: Show the angles on the screen. 4. **Palette toolbar**: Shows all the blocks to use.
5. **Erase canvas**: Clears the screen (removes the drawing).
6. **Run project fast (rabbit)**: Makes the turtle run quickly through the blocks.
7. **Run project slow (snail)**: Makes the turtle move slowly so you can watch

8. **Hide blocks**: Hides blocks to see only the drawing.
9. **Help**: Gives information about blocks and how they work.
10. **Load examples**: Opens ready-made projects you can try or learn from.
11. **Stop activity**: Closes Turtle Art completely.

 Palette toolbar



Picture 4.5. Turtle Palette Toolbars

The palettes toolbar consists of the following palettes:

1. **Turtle Palette**: The **Turtle Palette blocks** are used to **control the movement** of the turtle on the screen. To access **the blocks** of Turtle Palette, do the following, click on **Turtle Palette**  tool.

Picture 4.6. Turtle Palette

2. **Pen palette:** The **Pen Palette blocks** are used to control how the turtle draws on the screen. To access blocks of Pen Palette, click on **Pen Palette**  tool.

Picture 4.7. Pen Palette

3. **Color Palette:** The **Color Palette blocks** are used to change the color of the lines or shapes that the turtle draws. To access these blocks, click on Color Palette tool.

Picture 4.8. Color Palette

4. **Number Palette**: The **Number Palette Blocks** help to **use numbers** in **our drawings**. To access these blocks, click on **Number Palette** tool.

Picture 4.9. Number Palette

5. **Flow Palette:** The Flow Palette blocks help to tell the turtle to repeat or control what happens in the program. They help the turtle follow the steps again and again. To access these blocks, click on **Flow Palette**  tool.

Picture 4.10. Flow palette

6. **Blocks Palette:** The **Blocks Palette** is where to find all the blocks needed to make a program. To access these blocks, click on **Blocks Palette**  Tool.

Picture 4.11. Blocks palette

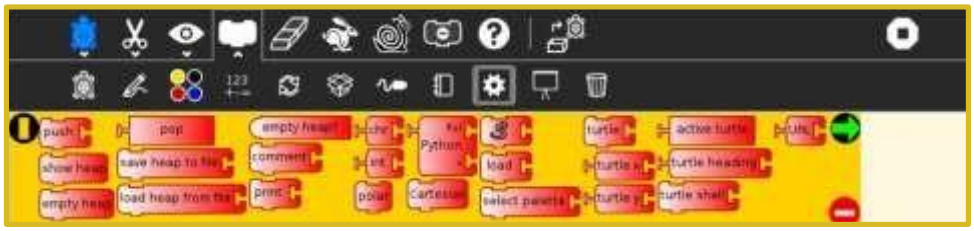
7. **Sensors Palette**: The Sensors Palette blocks help the turtle know or feel what is happening. To access these blocks, click on the **Sensors Palette** tool.

Picture 4.12. Sensor's palette

8. **Media Palette**: The Media Palette blocks help the turtle play sounds and show pictures. To access these blocks, click on **Media Palette** tool.

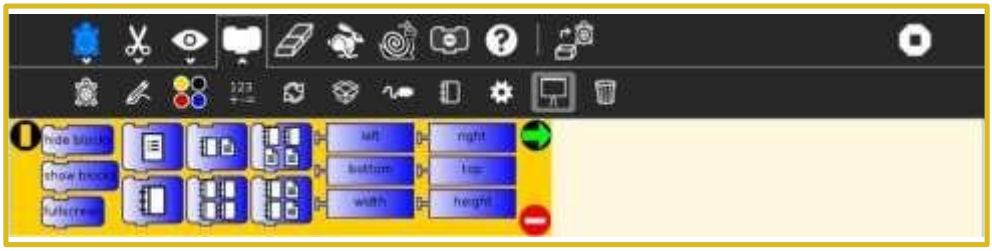
Picture 4.13. Media palette

9. **Extras Palette**: blocks add special features to a project. These blocks are not always needed, but they make the program more interesting or smart. To access those blocks, click **Extras Palette tool**



Picture 4.14. Extra Palette

10. **Portfolio Palette:** The Portfolio Palette Blocks help to save, organize, and share your work. To access these blocks, click on **Portfolio Palette** tool.



Picture 4.15. Portfolio Palette

11. **Trash Palette**: The Trash palette helps to **remove** blocks that you do not need anymore. To access this block, click on **Trash Palette** tool.

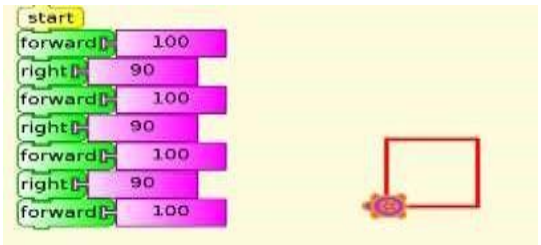
Picture 4.16. Trash palette

4.3, Drawing shapes using Turtle Art

a. Drawing a square

Use these blocks to draw a square:

1. Move the turtle forward 100 spaces.
2. Then turn the turtle right 90 degrees.
3. Move the turtle forward 100 spaces.
4. Then turn the turtle right 90 degrees.
5. Move the turtle forward 100 spaces.
6. Then turn the turtle right 90 degrees.
7. Move the turtle forward 100 spaces.
8. Now the turtle comes to its original position and forms a square. To draw a bigger square, change the number of spaces.

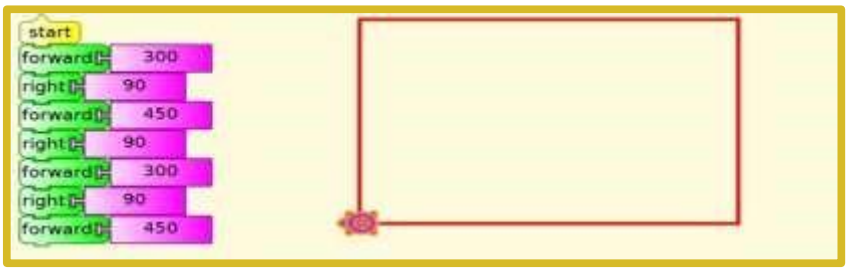


Picture 4.17. Square shape

b. Drawing a rectangle

Use these blocks to draw a rectangle:

1. Move the turtle forward 300 spaces.
2. Then turn the turtle right 90 degrees.
3. Move the turtle forward 450 spaces.
4. Then turn the turtle right 90 degrees.
5. Move the turtle forward 300 spaces.
6. Then turn the turtle right 90 degrees.
7. Move the turtle forward 450 spaces.
8. Now the turtle comes to its original position and forms a rectangle.



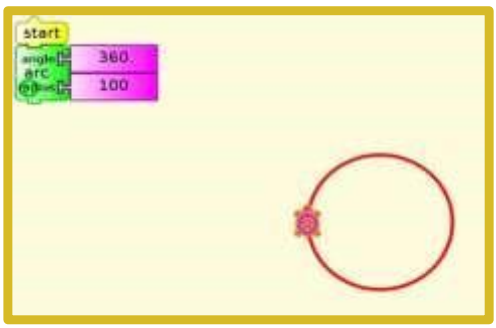
Picture 4.18. Rectangle shape

c) Drawing a circle

For drawing a circle, use the **Arc** block then write the angle size and give the radius.

Arc the turtle right 360 degrees with radius 100 spaces.

Picture 4.19. Circle shape



4.4, Opening, saving, and closing projects in Scratch

Scratch *is a simple program for making games, stories and animations.*

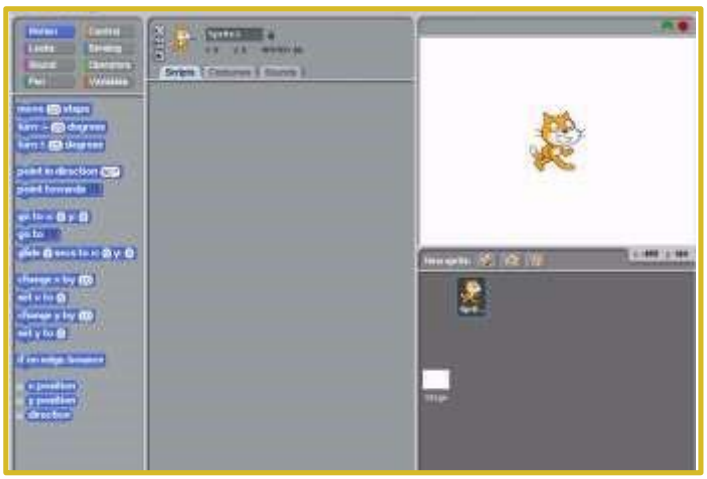
With Scratch, you can:

- Make a sprite (character) move, talk, or dance.
- Make games with points and levels.
- Tell a story with different backgrounds.
- Make animations with sound and action.

a) Opening scratch application To open the scratch, do the following:

1. Turn on your computer.
2. Click on **Scratch application** icon.

The scratch window is opened and looks like this:

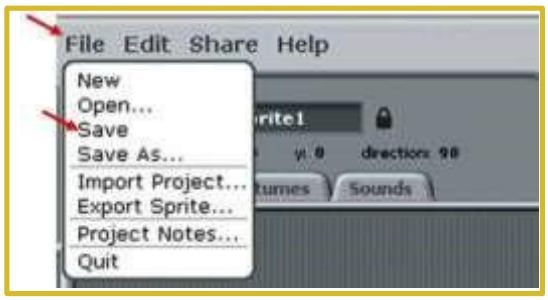


Picture 4.20. Scratch window

b) Saving scratch project

To save the scratch project, do the following:

1. Click on **File** menu. A drop-down **list box** appears.
2. Choose **Save** option. The **Save Project** dialog box appears.



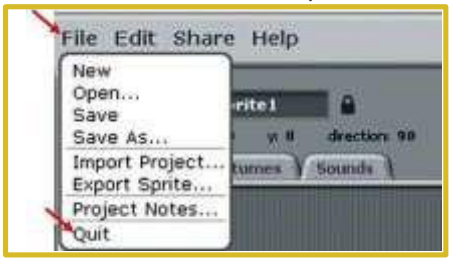
Picture 4.21. Options for saving a Scratch project

3. Choose the location where to save the project. Type the file name in the **New Filename** box. Write the name of the **Projector author**. Write **About this project**.
4. Click on **OK** button.

c) Closing Scratch project

Follow these steps to close a project:

1. Click on **File** menu. A Drop-down **List box** will appear.
2. Choose **Quit** option. Your scratch activity will be closed.

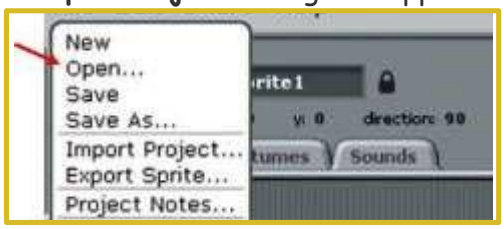


Picture 4.22. Options for closing Scratch

d) Opening a saved Scratch project

For opening a project that was saved before, follow these steps:

1. Open the **Scratch** program
2. Click on **File**
3. Choose **Open** option. The **Open Project** dialog box appears.

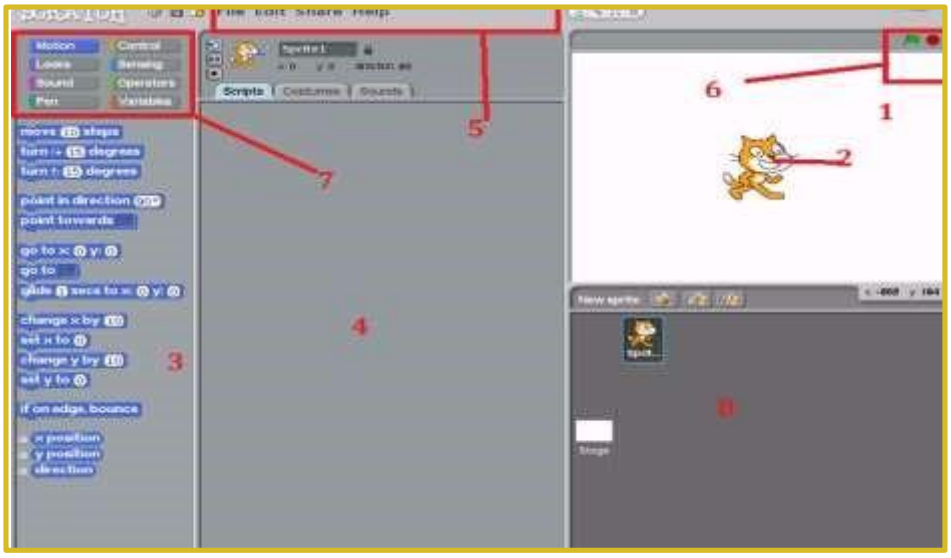


Picture 4.23. Options for opening a saved project

4. Select the location where the project is saved. Double click on the saved project. Your project will be opened.

4.4.1, Main parts of the Scratch window

When you open Scratch, you will see a window like on which the parts have been added:



Picture 4.24. Parts of the Scratch window

The parts shown in the picture above have the following names:

1. **Stage:** Where you see the sprite move or act.
2. **Sprite**: The character or object you control (ex: Cat).
3. **Blocks**: Where you find all the coding blocks.
4. **Scripts area (Script Pane):** Where you drag and connect blocks.
5. **Toolbar**: Buttons to save, open, or make a new project.
6. **Green Flag** & **Stop Button**: Start or stop the project.
7. **Blocks Palette**: Contains categories of coding blocks, also known as **commands**.
8. **Thumbnail Pane:** Displays small preview images (thumbnails) of all the sprites and backdrops in your project.

The **sprite** is the cat that moves by following the instructions and the **stage** is where that cat moves.

4.4.2, Different categories of coding blocks

Scratch has colored blocks for different actions:

1. **Motion:** Moves the sprite. For example: move 10 steps.
2. **Events:** Starts when something happens. For example: When green flag is clicked
3. **Looks:** Changes how the sprite looks. For example: Next costume
4. **Control:** Repeats or wait (e.g., repeat 10 times).
5. **Sound:** Plays sounds (e.g., play meow).
6. **Operators:** Do mathematical operators or check conditions.

7. **Sensing:** Detects touching, mouse, or key press.

4.4.3, Connecting blocks to make commands

In Scratch, blocks give commands to a sprite. Connecting blocks creates a list of actions, like a story or instructions.

To connect **coding blocks** in Scratch, do the following:

- Click and drag a coding block from the block palette
- Move the blocks to the script area (in the middle of the screen).
- Take another block and drag it under or above the first block.
- When the blocks are clicked, the program (blocks) will run in order from top to bottom.

4.5, Making animations in Scratch

Animation in Scratch means making pictures or sprites move and act like they are alive.

It can show:

- A character walking, jumping, or dancing.
- A sun rising or a car driving.
- A story where things change and move.

To make animation in scratch, do the following:

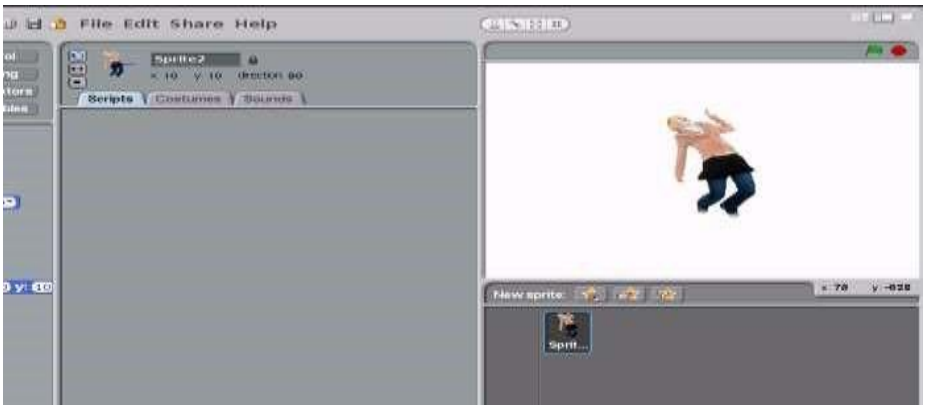
1. Open **Scratch** window
2. Click on **Costume** then click on **Choose a Sprite**.

Picture 4.25:. Select a sprite

3. Under costumes, select "People" folder. And click on "OK" button.

Picture 4.26. Costume window

4. In the images, select Anjuli-2 sprite and click on "OK" button.
5. The new sprite is inserted into Stage pane.



Picture 4.27. Adding a new costume to the stage

6, Click on **Control**.

- Drag the block: **When flag clicked**

7, Click on **Motion**

- Drag the block: **move 10 steps**.
- Drag the block: **turn right 15 degrees**.

8, Click on **Looks**

- Drag the block: **say hello for 2 seconds**.
- Change hello into "I love you!" and 2seconds into 10seconds.
- Drag the block: next costume.

9, Click the **green flag** to play the animation.

10, Watch the sprite move and talk on the Stage.

A background (also called a **backdrop**) is the picture behind a sprite on the stage.

It shows where the story or game happens like in a park, a classroom, space, or a house.

The **stage** is the big white space in Scratch. It is where the sprite moves and your story or animation happens.

An example of how to switch the background in a Scratch project.

1. Open the Scratch window.
2. Look under the stage.
3. Click the button that says "**Choose a Backdrop**".

4. Pick three backgrounds from the list (e.g., Bedroom1, school, basketball1).
5. Write a short story.

Your sprite goes on a journey:

- Starts in the Bedroom1
- Walks to the school
- Ends at basketball1

6. Add these blocks to your Sprite:

- When green flag clicked

- Switch backdrop to Bedroom1
- Say "I'm starting in the Bedroom." for 5 seconds
- Wait 3 second
- Switch backdrop to school
- Say "Now I'm at school!" for 5 seconds
- Wait 3 second
- Switch backdrop to basketball.
- Say "Time to play basketball." for 5 seconds
- Click on your blocks to see the res

Picture 4. 30. A Scratch program to change the background

4.7, Robotics

***A robot** is a machine that can do work by itself.*

Robots can move, listen, see, and follow instructions.

Robots are different from normal machines because they can think and can make decisions.

Example of robots: Cleaning robot (vacuum)

a) Parts of a robot

Robots have different parts that help them to work:

Part	What it does
Sensor	Feels things like touch, light, sound
Motor	Help the robot move
Wheels	Help the robot roll or turn
Brain (Control unit)	Tell the robot what to do
Battery	Gives the robot power to work

b) Controlling a robot's movement

Robots can **move forward, backward, turn left, or turn right**. They move using **wheels** or **legs**. To move a robot, programmers use **commands**. Robots follow those commands step by step in order to move. Robot commands can be written in Pictoblox.

Example of simple robot commands:

- **Move forward:** This command makes the robot go straight.
- **Turn right:** This command makes the robot turn to the right.
- **Turn left:** This command makes the robot turn to the left.
- **Stop:** This command makes the robot stop moving.

TAKE YOUR TIME TO ANSWER CORRECTLY THESE ANSWERS

Part A: Multiple Choice Questions (MCQs)

(Choose the correct answer and circle it)

1. **Scratch is a program used to make: a) Cakes b) Games and animations c) Cars d) Clothes**
2. **Pictoblox is used to: a) Paint pictures b) Learn programming robots c) Watch movies d) Draw shapes**
3. **Turtle Art uses a: a) Cat b) Turtle c) Dog d) Robot**
4. **To open Turtle Art, you first: a) Turn on your XO laptop b) Write a story c) Draw a circle d) Close the program**
5. **The turtle in Turtle Art is like a: a) Pencil robot b) Car c) Cat d) Chair**
6. **To save a Turtle Art activity, you click: a) Stop b) Turtle icon c) Trash d) Color palette**
7. **To close Turtle Art, you click: a) Stop button b) Green flag c) File menu d) Motion block**
8. **The main toolbar in Turtle Art helps to: a) Eat food b) Control blocks and activities c) Make sounds d) Turn off computer**
9. **The palette toolbar shows: a) Blocks to use b) Food c) Movies d) Letters**
10. **Pen Palette is used to: a) Change colors b) Draw with the turtle c) Play music d) Open Scratch**
11. **Color Palette is used to: a) Make sound b) Change line colors c) Move turtle d) Stop the project**
12. **Number Palette is used to: a) Count numbers b) Draw shapes c) Play games d) Close Scratch**

13. Flow Palette is used to: a) Repeat steps b) Turn off computer c) Move mouse d) Erase screen
14. Blocks Palette is where you find: a) All coding blocks b) Music c) Movies d) Food
15. Sensors Palette helps the turtle: a) Draw pictures b) Feel or detect things c) Dance d) Move background
16. Media Palette helps the turtle: a) Eat b) Play sounds and show media c) Sleep d) Turn off
17. Extras Palette gives: a) Special features to the project b) Food c) Movies d) Games
18. Portfolio Palette helps to: a) Save, organize, share work b) Erase c) Draw d) Play music
19. Trash Palette is used to: a) Remove blocks b) Draw shapes c) Save project d) Open Scratch
20. To draw a square, the turtle moves: a) Forward 100 spaces b) 10 steps c) 50 steps d) 200 steps
21. To draw a rectangle, the turtle moves: a) Forward 300 and 450 spaces b) 10 and 20 spaces c) 100 and 200 spaces d) 50 and 50 spaces
22. To draw a circle, the turtle uses: a) Arc block b) Pen block c) Color block d) Flow block
23. Scratch can make: a) Games, stories, animations b) Only drawings c) Music d) Photos
24. In Scratch, a sprite is: a) A character or object b) A turtle c) A robot d) A number
25. In Scratch, the stage is: a) The place where sprite moves b) A book c) A music player d) A background
26. Blocks in Scratch are used to: a) Give commands b) Eat c) Sleep d) Jump
27. Scripts area in Scratch is used to: a) Connect blocks b) Draw c) Erase d) Watch movies
28. Green Flag button in Scratch: a) Starts the project b) Stops the project c) Saves d) Opens
29. Motion blocks in Scratch help to: a) Move the sprite b) Change color c) Play music d) Close Scratch
30. Looks blocks in Scratch help to: a) Change sprite appearance b) Move c) Stop d) Erase
31. Sound blocks in Scratch help to: a) Play sounds b) Draw c) Move d) Close
32. Control blocks in Scratch help to: a) Repeat or wait b) Draw c) Save project d) Turn off computer
33. Operator blocks in Scratch help to: a) Do math b) Eat c) Move turtle d) Change color

34. Sensing blocks in Scratch help to: a) Detect touches or keys b) Erase c) Draw d) Move
35. Animation in Scratch means: a) Making pictures move b) Sleeping c) Eating d) Drawing shapes
36. To add a new sprite: a) Click Costume → Choose Sprite b) Turn off c) Draw d) Close Scratch
37. Background or backdrop is: a) The picture behind a sprite b) A robot c) A number d) A block
38. A robot is: a) A machine that can do work by itself b) A cat c) A turtle d) A pen
39. Robots can: a) Move, listen, see, follow instructions b) Sleep c) Draw only d) Eat
40. A sensor in a robot: a) Feels touch, light, sound b) Draws c) Eats d) Talks
41. A robot motor helps it to: a) Move b) Draw c) Save d) Open Scratch
42. Robot wheels help to: a) Roll or turn b) Draw c) Talk d) Play music
43. Robot brain helps to: a) Tell robot what to do b) Draw c) Play music d) Eat
44. Robot battery: a) Gives power b) Draws c) Plays music d) Opens files
45. Robot commands can be written in: a) Pictoblox b) Scratch c) Pen palette d) Turtle Art
46. Simple robot command "Move forward" makes robot: a) Go straight b) Stop c) Turn left d) Turn right
47. Simple robot command "Turn left" makes robot: a) Turn left b) Move forward c) Stop d) Turn right
48. Simple robot command "Stop" makes robot: a) Stop moving b) Move forward c) Turn left d) Turn right
49. Air is: a) All around us b) Only in balloons c) Only in houses d) Only in cars
50. Wind is: a) Moving air b) A type of robot c) A sound d) A sprite

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Part B: Open-ended Questions

(Leave space for answers)

1. What is Scratch used for?

---

2. What is Pictoblox used for?

---

3. What does Turtle Art use to draw shapes?

---

4. How do you open Turtle Art?

---

5. What is the turtle like in Turtle Art?

6. How do you save your Turtle Art work?

7. How do you close Turtle Art?

8. Name one toolbar in Turtle Art.

9. What does Pen Palette do?

10. What does Color Palette do?

11. What does Number Palette help with?

12. What does Flow Palette do?

13. What is Blocks Palette used for?

14. What does Sensors Palette help the turtle do?

15. What does Media Palette do?

16. What is Extras Palette for?

17. What does Portfolio Palette help with?

18. What does Trash Palette do?

19. How do you draw a square in Turtle Art?

20. How do you draw a rectangle in Turtle Art?

21. How do you draw a circle in Turtle Art?

22. What can you make with Scratch?

23. What is a sprite?

24. What is the stage in Scratch?

25. What do blocks do in Scratch?

26. Where do you connect blocks in Scratch?

27. What does the green flag do in Scratch?

28. What do motion blocks do?

29. What do looks blocks do?

30. What do sound blocks do?

31. What do control blocks do?

32. What do operator blocks do?

33. What do sensing blocks do?

34. What is animation in Scratch?

35. How do you add a new sprite?

36. What is a background in Scratch?

37. What is a robot?

38. Name one thing a robot can do.

39. What does a sensor in a robot do?

40. What does a robot motor do?

41. What do robot wheels do?

42. What does the robot brain do?

43. What does a robot battery do?

44. Where do we write robot commands?

45. What does the "Move forward" command do?

46. What does the "Turn right" command do?

47. What does the "Turn left" command do?

48. What does the "Stop" command do?

49. What is air?

50. What is wind?

5.0. Introduction

Air is all around us. We cannot see it, but we can feel it. We need air to live. **Wind is moving air**, and it helps us in many ways. Sound helps us hear and communicate, but too much noise can hurt our ears. In this unit, we will learn about the uses and dangers of air, wind, and sound, and how to protect ourselves.

5.1, Main properties of air

Air is what everybody breathes.

It is a mixture of gases.

Air composition	Uses
Nitrogen (78%)	Stops things from burning too fast. Helps make fertilizers for plants.
Oxygen (21%)	People, animals, and plants need it to breathe. Helps seeds grow. Helps fire burn.
Carbon dioxide (0.04%)	Plants use it to make food. Makes soft drinks. Puts out fire.
Other gases such as Carbon monoxide (0.86%)	No known helpful use. Comes from burning charcoal, wood, or fuel in closed places

It has no smell, no color, and it helps people, animals, and plants to live.

Air has the following properties:

a) **Air occupies space:** When you blow air into a balloon, it gets bigger. This shows that air occupies space.

b) **Air has weight:** Two balloons filled with air balance each other. When one bursts, the side with air goes down. This means air has weight.

c) **Air can be pressed (compressed):** When you try to push air inside a closed syringe, it is hard to push. This shows that air can be compressed.

5.2, Composition of air

Air is a mixture of various gases. Each component of air has important roles and uses in nature and human activities. Here's a breakdown of the **uses of the main components of air**:

5.3 . Dangers of components of air

Dangers of some components of air

1. ***Carbon dioxide (CO_2)***

- This is a **greenhouse gas**.
- It is released by **charcoal stoves**, **factories**, **vehicles**, and **bushfires**.
- **Danger:** It **traps heat** from the earth and causes **global warming**. This increases temperature on earth. **Prevention from global warming**

global warming *Is rising atmospheric temperature*

Ways to prevent the atmosphere from global warming are the following:

1. Reduce fuel consumption.
2. Walk, use bicycle or take public transport.
3. Encourage people to plant trees to preserve the rainforests.
4. Use solar and wind energy.
5. Maintain your vehicle properly.
6. Turn off your vehicles at the traffic lights.
7. Buy energy-efficient appliances.

2. Carbon monoxide (CO)

It is a **poisonous gas**.

It is released from **burning fuel**, **charcoal stoves**, **factories**, and **vehicles**.

It is invisible, has no **smell** or **taste**.

Danger: Breathing it can cause **headache, nausea**, **suffocation** and even **unconsciousness**.

It can kill if inhaled in large amounts.

Warning: Never use charcoal stoves in closed rooms.

Picture 5.2. Dangers of carbon monoxide

5.4. Wind and its types Wind

is moving air.

It blows from a particular direction.

Movement of air depends on the change in pressure and temperature of the atmosphere. Winds may be light, breezy or stormy.

a) Light wind

The soft and pleasant movement of air is called **light wind**. Light wind can be noticed by smoke rising.

b) **Breeze: wind** with a gentle feeling on a warm day is called **breeze wind**. It blows at a certain speed.

c) Storm wind

When wind blows very fast, it is called **storm**. A storm can uproot trees and blow away temporary houses. It can also damage bird's nests, sheds, and crops. We must not go out of our homes during a storm.

5.5, Uses of air and wind

Air and wind are very important in our daily lives: We need air to breathe and stay alive. Wind helps us in many ways, such as

1. **Used for breahing**
2. **drying clothes,**
3. **helping birds to fly**,
4. **moving boats on water**.
5. **Winnowing** Farmers use wind to separate grains from husks
6. **Rain formation:** Wind also helps to move clouds that bring rain
7. **produce electricity** by turn turning windmill.

By learning about air and wind, we understand how to use them wisely and stay safe during strong winds

Dangers of wind and its prevention

Wind helps us in many ways. But sometimes it is very dangerous.

The following are some dangers of wind:

1. Strong winds can **uproot the plants** and electric poles.
2. It can **damage our houses** and other properties.
3. It can **damage our crops**.
4. On a stormy day, an airplane can lose its control and may crash.
5. Strong wind can make **a boat sink**.

We can prevent dangers of wind in the following ways:

Plant many trees to reduce the wind speed.

Remove some parts of the branches of trees. It allows the wind to pass through. It lowers the chance of trees falling.

Avoid travelling during a strong winds or storms.

Tie down loose items like clothes, tents, or garden tools.

Listen to weather news and follow safety advice.

SOUND

5.7. Nature and production of sound

Sound is a kind of energy that we hear.

It comes from many places like people talking, birds singing, radios playing, or cars moving. Even our breathing makes a small sound.

Sound is made when something vibrates (shakes very fast).

For example, when you hit a drum, it shakes and makes sound. These fast movements are called **vibrations.**

Sound **needs a medium to travel**. It **cannot travel in empty space(vacuum)**. That means we need air to hear the sound. Sound can be **loud or soft, high or low**, and it always comes from something

5.8, Propagation and Reflection of sound

- Sound travels from one place to another through vibrations.
- When something makes a sound, it shakes and sends vibrations through the air.
- These vibrations move like waves and reach our ears.

Picture 5. 8. Propagation of sound waves

 Sound can move **through air, water, and even solids**.

For example, we can hear music in the air, a bell in water, or a voice through a string and cups. This is how sound moves or transmits through different things.

Sometimes, when sound hits a wall or big empty space, it bounces back to us. This is called **reflection of the sound**

The returning sound is called an echo. You can hear an echo in a large hall or when you shout near a mountain or an empty building. **Echo is the reflection of sound**, just like a mirror reflects light.

5.9, Noise and its effects

We hear different types of sound in our daily life. Some of them are pleasant to hear. Others are unpleasant to hear.

The sounds which are *pleasant to hear are pure or musical sounds*. Musical sounds are produced by the **regular vibrations**. All musical instruments produce regular vibrations, for example, strings of guitar and violin.

The sounds ***which are unpleasant to hear are called noise***. **Irregular vibrations produce noise**. *Examples:* Grinding machine, hammer, motor vehicles and crackers produce irregular vibrations.

Picture 5.10. Noise (unpleasant sound) consists of irregular and sharp sound waves

We hear sound or noise through our ears. Prolonged exposure to noise has various harmful effects.

1. Loud noise can damage our ears.
2. Loud noise can also affect your ear tinnitus. When one suffers from tinnitus, he or she always hear repeated ringing or buzzing in the ears or head.
3. Noise leads to emotional and behavioural stress. This is where your mood is affected.
4. Noise increases chances of diseases like headache, blood pressure and heart failure.
5. Noise leads to noise pollution.

5.10. Protection of ears from noise

Noise can harm our ears and affect our health. To keep our ears safe, we should take the following precautions:

1. Avoid loud noises

Stay away from very loud sounds like firecrackers, loudspeakers, or machinery.

If possible, lower the volume of music or television.

2. ear protection

Wear **earplugs** or **earmuffs** in noisy places like construction sites or during concerts.

3. Limit the use of headphones

Do not listen to music at high volume through earphones or headphones.

Follow the 60/60 rule: Listen at 60% volume for no more than 60 minutes at a time.

4. **Create quiet zones**

Keep noise levels low at home, especially in study and sleep areas.

Plant trees or install curtains to absorb sound in noisy neighborhoods.

5. **Regular hearing check-ups**

Visit a doctor if you feel discomfort, pain, or ringing in your ears after being in a noisy place.

6. **Raise awareness**

Educate others about the harmful effects of noise and ways to protect hearing.

TAKE YOUR TIME TO REVISE AND ANSWER THESE QUESTIONS CORRECTLY

Part A: Multiple Choice Questions (MCQs)

(Circle the correct answer)

1. Air is made mostly of: a) Oxygen b) Carbon dioxide c) Nitrogen d) Hydrogen
2. Nitrogen helps to: a) Make fertilizers b) Breathe c) Burn faster d) Make sound
3. Oxygen is needed for: a) People, animals, plants to breathe b) Making drinks c)
4. Burning slowly d) Both a and c
5. Carbon dioxide helps: a) Plants make food b) People breathe c) Stop fire d) Both a and c
6. Air occupies space. You can see this when: a) Balloon gets bigger b) Balloon disappears c) Balloon flies d) Balloon breaks
7. Air has weight. This is shown when: a) Two balloons balance b) Air moves c) Air disappears d) Air makes noise
8. Air can be compressed. This means: a) It can be pushed into a small space b) It grows bigger c) It disappears d) It moves slowly
9. Carbon dioxide is dangerous because: a) It traps heat b) It is sweet c) It is invisible d) It blows wind
10. Global warming means: a) Rising temperature of the earth b) Cold weather c) Rain d) Earthquake
11. To prevent global warming, we can: a) Walk or use bicycle b) Burn more fuel c) Cut trees d) Waste energy
12. Carbon monoxide is: a) Poisonous gas b) Helpful gas c) Water d) Air
13. Carbon monoxide comes from: a) Burning fuel, charcoal b) Trees c) Water d) Wind

14. Breathing carbon monoxide can cause: a) Headache b) Nausea c) Unconsciousness d) All of the above
15. Strong wind can: a) Uproot trees b) Sink boats c) Damage houses d) All of the above
16. Light wind is: a) Soft and pleasant b) Very fast c) Dangerous d) Loud
17. Breeze is: a) Gentle wind on a warm day b) Strong wind c) Storm d) Noise
18. Storm wind is: a) Very fast b) Gentle c) Pleasant d) Quiet
19. Wind helps to: a) Dry clothes b) Fly birds c) Move boats d) All of the above
20. Wind helps to: a) Produce electricity b) Move clouds c) Bring rain d) All of the above
21. To prevent wind dangers, we should: a) Plant trees b) Tie loose items c) Avoid going out in storm d) All of the above
22. Sound is: a) A kind of energy b) Water c) Air d) Soil
23. Sound is made when: a) Something vibrates b) Nothing moves c) Air disappears d) Sun shines
24. Sound cannot travel in: a) Vacuum b) Air c) Water d) Solids
25. Sound can travel through: a) Air, water, solids b) Only air c) Only water d) Only solids
26. Reflection of sound is called: a) Echo b) Music c) Wind d) Noise
27. Musical sounds are: a) Pleasant b) Unpleasant c) Dangerous d) Poisonous
28. Noise is: a) Unpleasant sound b) Musical sound c) Air d) Water
29. Loud noise can: a) Damage ears b) Affect mood c) Cause health problems d) All of the above
30. We can protect ears by: a) Wearing earplugs b) Avoid loud sound c) Limit headphone use d) All of the above
31. The 60/60 rule is: a) Listen at 60% volume for 60 minutes b) Drink water 60 times c) Sleep 60 minutes d) Walk 60 steps
32. Soil is: a) Top layer of earth where plants grow b) Water c) Air d) Stone
33. Soil is made of: a) Rock, air, water, dead plants and animals b) Only sand c) Only clay d) Only water
34. Loam soil is: a) Best for growing plants b) Not good for plants c) Only sand d) Only clay
35. Loam soil is made of: a) Sand, clay, humus b) Only rocks c) Only water d) Only plants

36. Air helps plants to: a) Grow b) Sleep c) Eat d) Move
37. Wind helps farmers to: a) Winnow grains b) Water crops c) Cook food d) Build houses
38. Plants need carbon dioxide to: a) Make food b) Fly c) Move d) Sleep
39. Air is important for: a) Breathing b) Dancing c) Singing d) Driving
40. Wind can be dangerous during: a) Storm b) Breeze c) Light wind d) Calm day
41. Noise can cause: a) Headache b) High blood pressure c) Heart problems d) All of the above
42. Musical sounds come from: a) Regular vibrations b) Irregular vibrations c) Carbon monoxide d) Air
43. Noise comes from: a) Irregular vibrations b) Regular vibrations c) Water d) Soil
44. Strong wind can: a) Damage crops b) Move clouds c) Bring rain d) Help birds fly
45. Air is needed to: a) Breathe b) Eat c) Sleep d) Dance
46. Sound needs: a) Air b) Nothing c) Water only d) Soil only
47. Reflection of sound is like: a) A mirror reflects light b) Sun shines c) Rain falls d) Wind blows
48. Storms can make: a) Boats sink b) Trees fall c) Houses damaged d) All of the above
49. To reduce wind danger, we should: a) Plant trees b) Remove parts of branches c) Listen to weather news d) All of the above
50. Carbon dioxide is used to: a) Make soft drinks b) Fly c) Run cars d) Build houses
51. Oxygen helps fire to: a) Burn b) Stop c) Move d) Sleep

Part B: Open-ended Questions

(Leave space for answers)

1. What is the main gas in air?

---

2. What does nitrogen help with?

---

3. Why do people and animals need oxygen?

---

4. How do plants use carbon dioxide?

---

5. How do you show that air occupies space?

6. How do you show that air has weight?

7. How do you show that air can be compressed?

8. Why is carbon dioxide dangerous?

9. What is global warming?

10. How can we prevent global warming?

11. What is carbon monoxide?

12. Where does carbon monoxide come from?

13. What happens if you breathe too much carbon monoxide?

14. Name one danger of strong wind.

15. What is light wind?

16. What is a breeze?

17. What is a storm wind?

18. Name two uses of wind.

19. How can wind help produce electricity?

20. How can we stay safe from wind danger?

21. What is sound?

22. How is sound made?

23. Can sound travel in empty space?

24. Name two things that sound can travel through.

25. What is echo?

26. What are musical sounds?

27. What is noise?

28. Name one effect of loud noise.

29. Name one way to protect your ears from noise.

30. What does the 60/60 rule mean?

31. What is soil?

32. What is soil made of?

33. Which soil is best for growing plants?

34. What is loam soil made of?

35. How does air help plants?

36. How does wind help farmers?

37. Why do plants need carbon dioxide?

38. Why is air important for us?

39. When is wind dangerous?

40. Name two harmful effects of noise.

41. Where do musical sounds come from?

42. Where does noise come from?

43. Name two things strong wind can damage.

44. Why do we need air?

45. What does sound need to travel?

46. How is echo like a mirror?

47. Name one effect of a storm on boats.

48. Name two ways to reduce wind danger.

49. Name one use of carbon dioxide.

50. How does oxygen help fire?

Introduction

Soil is one of the non-living things. It is useful to plants, people and other animals. Plants grow in soil. People and other animals depend on plants for food.

Definition and types of soil

Soil is the top layer of the earth where plants grow.

It is made up of tiny pieces of rock, air, water, dead plants and animals.

There are three main types of soil:

1. **Loam soil**: Is the best soil for growing plants. It is a mixture of sand, clay and humus (dead plants and animals). Loam soil feels soft and a little wet. It holds water well but also allows extra water to drain. This makes it very good for farming and gardening.
2. **Clay soil**: Is made of very tiny particles that stick together. It feels sticky when wet and becomes very hard when it dries. Clay soil holds a lot of water, but it does not drain quickly. Farmers do not like to grow many crops in clay soil because it can be too wet for roots. However, it is good for making pots, tiles and bricks.
3. **Sand soil**: Is made of large, rough particles. It feels dry and gritty. Water passes through it quickly, so it does not hold water well. Sandy soil is not very good for farming, but it is useful for building and construction work.

Loam soil Clay soil Sand soil

Picture 6.1. Types of soil

6.2, Composition of soil

Soil is made up of four main parts

1. **Tiny Rocks (Minerals):** These are small pieces that come from broken big rocks. They give soil its rough or smooth feel. For *example: Sand and gravel found on roads or in gardens.*
2. **Air:** Soil has tiny spaces that hold air. Plant roots need air to breathe and grow well. For *example: When you dig in dry soil, you can feel the loose spaces filled with air.*
3. **Water:** Water in the soil helps carry food to the roots of plants. It also keeps the soil moist. For *example: After rain, the soil feels wet and soft because of the water inside.*
4. **Humus (Dead Plants and Animals):** Humus is made from dead leaves, plants and small animals. It makes the soil rich and dark. For *example: Black soil found under trees, full of old leaves and small branches.*

6.3, Uses of soil

Soil is very important in our daily lives.

- **It helps plants grow** by giving them water and nutrients.
- Soil is also used to **build houses**, roads, make bricks and pots. **(Used in Building)**
- Animals like worms, ants and rabbits live in the soil.(**Home for animals)**
- Soil helps to clean and store rainwater. Without soil, people, animals and plants would not survive.

6.4, Characteristics of fertile soil

Fertile soil is soil that helps plants grow well and produce healthy crops like maize, beans, sweet potatoes and vegetables.

Characteristics of fertile soil

- **It is rich in nutrients**
    - Fertile soil has important plant foods like nitrogen, phosphorus and potassium. These nutrients help plants grow strong and give good harvests.
- **It holds enough water**
    - Fertile soil keeps water so that plant roots can absorb water when they need to. It is not too dry or too wet.
- **It has good feel (texture)**
    - Fertile soil is soft and breaks easily. It is easy for roots to grow through it and for air to move in the soil.
- **It has living things**
    - Fertile soil has worms, ants and tiny insects that help mix the soil and keep it healthy.
- **It has dark colour**
    - Fertile soil is usually dark brown or black. This colour shows it has humus (rotted plants and animals) which adds nutrients.

Soil erosion and its causes

Soil erosion is the process where soil is carried away by wind or water or Is removing of topmost layer of earth surface.

It makes the soil lose its nutrients, and this can lead to poor crop growth for farmers. For example, when water is poured on soil, some soil washes away. This shows how erosion happens.

a) Agents of soil erosion

There are many factors that are responsible for soil erosion. These are **called agents of soil erosion.**

These are the things that cause soil erosion:

- **Water:** When rainwater flows, it can carry away the topsoil, especially on hills.
- **Wind:** Strong wind blows away dry and loose soil.

b) Causes of soil erosion (HUMAN ACTIVITIES)

Soil erosion is caused by any activity that makes the soil uncovered(bare). The following are different causes of soil erosion.

I, Deforestation: Deforestation is the cutting down of trees.

When the trees are cut down the soil is left uncovered. This causes it to be carried away easily.

ii) Overgrazing: Too many animals eat the grass and plants leaving the soil uncovered and expose the soil to erosion.

iii) Burning of bushes or bushfires: Burning bushes destroy plant cover, exposing the soil to erosion

6.6, Types of erosion

There are different types of soil erosion:

1. **Splash erosion:** When raindrops hit the ground, they break the soil into small pieces and make it jump or splash.
2. **Sheet erosion:** When water flows gently over the land, it carries away a thin layer of soil like a sheet.
3. **Rill erosion:** When water makes small channels or lines in the soil as it flows down a slope.
4. **Gully erosion:** When water forms big, deep holes or ditches in the ground

6.7, Prevention of soil erosion

These are various methods to prevent soil erosion. **1.**

1..Planting grass and trees

The roots of plants hold the soil together and protect it from erosion.

2. Terracing on hills

Farmers make steps called terraces. These steps slow down water so it doesn't wash the soil away. For example: In Rwanda, many farmers use terraces on hillsides to protect their soil.

3. Avoid cutting down trees (Deforestation)

Trees protect the soil. Cutting them down leaves the soil bare and easy to wash away.

4. **Avoid overgrazing**

   Too many animals eating grass can remove the plants that protect the soil. This means that Farmers should move animals to different areas, so grass has time to grow back.

5. **Avoid Burning Bushes (Bushfires)**

   Fires destroy plants that hold the soil. Without them, the soil can be easily washed or blown away.

TAKE YOUR TIME TO REFLECT WHAT YOU LEARNT BY ANSWERING THESE QUESTIONS ACCURATELY AND CORRECTLY

Part A: Multiple Choice Questions (MCQs)

(Circle the correct answer)

1. Clay soil feels: a) Sticky when wet b) Dry and rough c) Soft like loam d) Smooth like water
2. Clay soil becomes hard when: a) It dries b) It rains c) It moves d) It is mixed with sand
3. Clay soil holds: a) A lot of water b) No water c) Only air d) Only sand
4. Farmers do not like clay soil because: a) Roots get too wet b) It is dry c) It has no minerals d) It is sandy
5. Clay soil is good for: a) Making pots, tiles, bricks b) Growing crops c) Making juice d) Making music
6. Sand soil feels: a) Dry and gritty b) Sticky c) Soft d) Smooth
7. Water passes through sand soil: a) Quickly b) Slowly c) Not at all d) Sometimes
8. Sand soil is good for: a) Building and construction b) Growing crops c) Making juice d) Planting trees
9. Soil is made of: a) Rocks, air, water, humus b) Only water c) Only air d) Only plants
10. Rocks in soil are called: a) Minerals b) Humus c) Sand d) Clay
11. Air in soil helps: a) Roots breathe b) Plants sleep c) Soil burn d) Soil grow rocks
12. Water in soil helps: a) Carry food to roots b) Kill plants c) Make rocks d) Remove air
13. Humus is made of: a) Dead plants and animals b) Stones c) Water d) Sand
14. Fertile soil helps: a) Plants grow strong b) Soil disappear c) Make buildings d) Make roads
15. Fertile soil is usually: a) Dark brown or black b) White c) Red d) Yellow
16. Fertile soil has: a) Nutrients b) No water c) Rocks only d) Air only
17. Fertile soil holds: a) Enough water for plants b) No water c) Only sand d) Only clay

18. Fertile soil has: a) Living things like worms and ants b) Rocks only c) Sand only d) Water only
19. Soil erosion is: a) Top soil being carried away b) Soil becoming dark c) Soil growing plants d) Soil holding water
20. Water can cause soil erosion by: a) Carrying soil away b) Making soil grow c) Making soil dark d) Removing air
21. Wind can cause soil erosion by: a) Blowing loose soil away b) Making soil wet c) Making soil sticky d) Adding nutrients
22. Deforestation causes soil erosion because: a) Soil is left bare b) Soil becomes dark c) Soil grows plants d) Soil becomes soft
23. Overgrazing causes soil erosion because: a) Plants are eaten b) Soil gets water c) Soil gets humus d) Soil becomes fertile
24. Burning bushes causes soil erosion because: a) Plants are destroyed b) Soil gets nutrients c) Soil becomes wet d) Soil gets dark
25. Splash erosion happens when: a) Raindrops hit the ground b) Wind blows c) Sun shines d) Soil dries
26. Sheet erosion happens when: a) Water flows gently c) Soil dries b) Soil moves by wind d) Plants grow
27. Rill erosion happens when: a) Water makes small channels b) Soil dries c) Soil becomes clay d) Wind blows
28. Gully erosion happens when: a) Water makes deep holes b) Plants grow c) Soil becomes wet d) Soil becomes sandy
29. Planting grass helps prevent erosion because: a) Roots hold soil together b) Soil gets dry c) Soil disappears d) Soil becomes clay
30. Terracing helps prevent erosion by: a) Slowing down water b) Speeding water c) Burning soil d) Removing rocks
31. Cutting down trees causes: a) Soil erosion b) Fertile soil c) Dark soil d) Humus
32. Moving too many animals in one place can: a) Cause soil erosion b) Improve soil c) Make soil dark d) Add water
33. Burning bushes can: a) Cause soil erosion b) Make soil fertile c) Add humus d) Make soil wet
34. Soil is used to: a) Build houses and roads b) Make food c) Fly kites d) Make music
35. Animals like worms and ants: a) Live in soil b) Fly in air c) Swim in water d) Climb trees
36. Fertile soil has good texture. This means: a) It is soft and easy for roots to grow b) It is hard and rough c) It is sandy d) It is dry
37. Dark color in soil shows: a) It has humus b) It is sandy c) It is clay d) It is wet
38. Sand soil drains water: a) Quickly b) Slowly c) Not at all d) Sometimes
39. Clay soil drains water: a) Slowly b) Quickly c) Not at all d) Sometimes
40. Soil helps plants because it gives: a) Water and nutrients b) Rocks c) Sand d) Air only

41. Soil erosion can make crops: a) Grow poorly b) Grow well c) Water faster d) Soil dark
42. Terraces are made on: a) Hills b) Flat land c) Roads d) Rivers
43. Planting trees helps prevent: a) Soil erosion b) Storm c) Noise d) Sand
44. Overgrazing happens when: a) Too many animals eat plants b) No animals eat c) Trees grow d) Soil dries
45. Bushfires can cause: a) Soil erosion b) Soil growth c) Fertile soil d) Water holding
46. Rill erosion forms: a) Small channels b) Big holes c) Dark soil d) Rocks
47. Gully erosion forms: a) Deep ditches b) Soft soil c) Small holes d) Fertile soil
48. Soil is important because it: a) Helps plants, animals, and people survive b) Makes noise c) Moves wind d) Creates sound
49. Humus makes soil: a) Dark and rich b) White and dry c) Sticky d) Sandy
50. Soil texture helps: a) Roots grow easily b) Plants fly c) Soil moves fast d) Soil dries

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Part B: Open-ended Questions

(Leave space for answers)

1. What is clay soil like when wet?

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2. What happens to clay soil when it dries?

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3. Why do farmers not like clay soil?

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4. Name one use of clay soil.

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5. How does sand soil feel?

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6. Does sand soil hold water well?

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7. Name one use of sand soil.

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8. What are the four main parts of soil?

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9. Why do plant roots need air in the soil?

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10. How does water in soil help plants?

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11. What is humus made of?

12. Why is fertile soil important?

13. Name two characteristics of fertile soil.

14. Why is dark color in soil good?

15. What is soil erosion?

16. Name two agents of soil erosion.

17. Why does deforestation cause soil erosion?

18. How does overgrazing lead to soil erosion?

19. Why is burning bushes harmful for soil?

20. What is splash erosion?

21. What is sheet erosion?

22. What is rill erosion?

23. What is gully erosion?

24. How does planting grass prevent soil erosion?

25. How does terracing prevent soil erosion?

26. Why should we avoid cutting down trees?

27. How can overgrazing be avoided?

28. How can bushfires be prevented?

29. Name two uses of soil in daily life.

30. Name two animals that live in soil.

31. How does soil help clean rainwater?

32. What nutrients are in fertile soil?

33. Why is soil texture important for roots?

34. How does fertile soil hold water?

35. How does humus make soil rich?

36. Why does soil erosion reduce crop growth?

37. Name one thing farmers can do to protect soil on hills.

38. Name one way wind can cause soil erosion.

39. Name one way water can cause soil erosion.

40. Why is dark soil good for farming?

41. Name one characteristic of loam soil.

42. Name one characteristic of clay soil.

43. Name one characteristic of sand soil.

44. Why is soil important for animals?

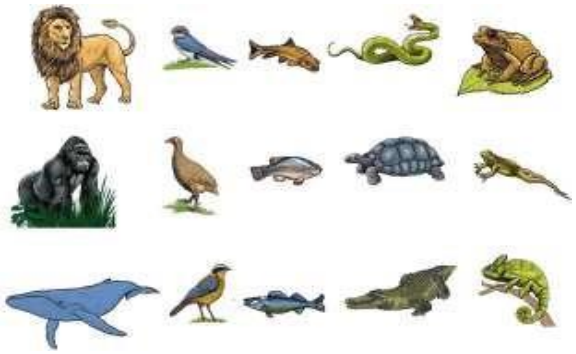
45. Why is soil important for humans?

46. Why do farmers use terraces?

47. How does planting trees reduce soil erosion?

48. What happens when too many animals eat the grass?

UNIT7



Key unit competence:

Introduction

49. How does burning bushes expose soil to erosion?

50. Give one reason why soil is important in our lives.

There are different types of animals in the world we live in. Many animals are quite similar to each other. Others are quite different. Animals can be classified based on their similarities.

7.1, Identification of various animals

Animals are living things that can move, eat, breath and produce young ones.

Some live on land, some live in water and others fly in the air. We can identify animals by looking at where they live, how they move, what they are covered with and the sounds they make.

1. **Common animals**

Cow, goat, dog, cat, hen, lizard, frog, fish, butterfly, eagle, snake, ant, etc.

2. **Identification of animals based on where they live**

- **Land animals:** Cow, goat, lion, elephant, dog
- **Water animals:** Fish, crab, octopus
- **Air animals (mostly flying):** Bird, bat, butterfly, eagle

3. **Identification of animals by body covering**

- **Fur or hair:** Dog, cat, lion.
- **Feathers:** Birds like hen, eagle, parrot
- **Scales:** Fish, snake, lizard

- **Shell:** Tortoise, snail

7.2, Classification of animals according to the backbone

Animals can be grouped into two main types based on whether they have a **backbone**.

1. **Animals with a backbone (Vertebrates):**

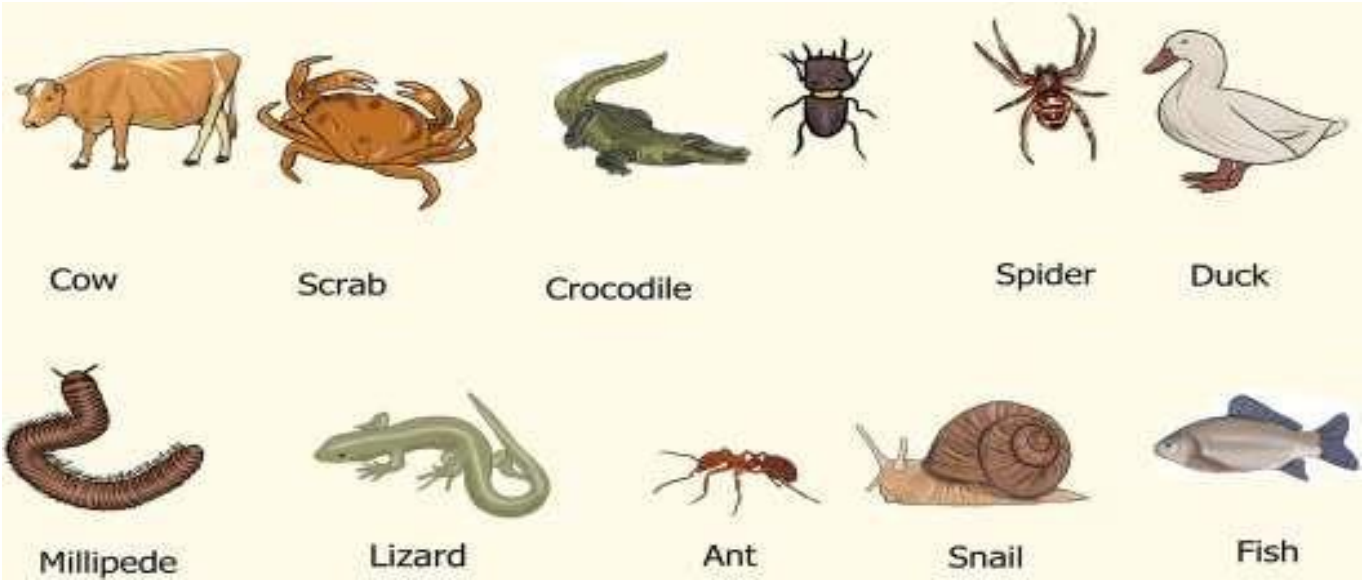
- These animals have a strong spine or backbone inside their body.
- They have bones and a skeleton.

Examples: Dog, Fish, Bird, Frog, Snake, Cow, human.

2. **Animals without a backbone (Invertebrates):**

- These animals **do not** have a backbone.
- Most have soft bodies, and some have hard shells.

Examples: Insect (like a butterfly and ant), Snail, Spider, Worm, Crab



7.3, Classification of animals according to how they breathe (respiration mode)

Animals breathe in different ways, depending on where they live and how their bodies are made. Based on their breathing organs, animals are classified into various categories.

a) Animals that breathe through lungs

- These animals live on land. They use lungs to take in oxygen from the air.

Examples: Dog, cow, goat, human, lion

b) Animals that breathe through gills

- These animals live in the water. They use gills to breathe. Gills take oxygen from water

Examples: Fish, Tadpoles

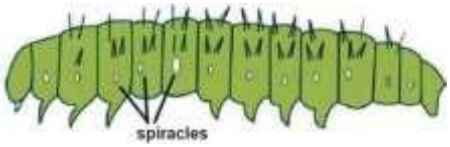
c) Animals that breathe through skin

- Some animals have moist skin that helps them breathe. Oxygen passes through the wet skin into their body

Examples: Earthworm, frog (when in water), sea star

d) Animals that breathe through spiracles

- These are tiny holes on the sides of the body of insects. Air enters through spiracles and goes into small tubes inside the body. Examples: Butterfly, grasshopper, caterpillar, housefly



Picture 7.2. Spiracles in caterpillar

e) Animals that breathe through both lungs and skin

- Some animals use both lungs and skin to breathe, depending on where they are. They use lungs when on land and moist skin when in water.

Example: Frogs, tortoise

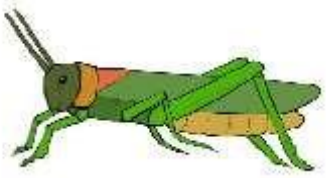
7.4, Classification of animals according to how they move (locomotion mode)

Look at the picture below and answer the questions

Bird

Lizard

Grasshopper



Human

Fish

Dragonfly

Animals move from one place to another.

This movement is called **locomotion**. Different animals move in different ways. We can classify animals based on how they move:

a) Flying animals

- some animals fly in the sky using wings. Birds have light bones and strong chest muscles to help them fly.

Examples: Birds, butterflies, bees

b) Crawling animals

- Some animals move close to the ground using short legs on many legs which make their bodies stay close to the ground. This is called crawling.

Examples: Lizards, crocodiles, tortoises, ants

c) Jumping or hopping animals

- Some animals move by jumping. They have strong back legs that help them to jump or hop far. Their back legs are longer than the front ones.

Examples: Rabbits, frogs, grasshoppers

d) Walking animals

- Some animals walk on the ground using their legs. They put one foot in front of the other to move.

Examples: Goats, dogs, elephants, human.

e) Swimming animals

- Some animals live in water and move by swimming by using tails and fins for fish,

f) webbed feet for ducks and tails for crocodiles. **Examples:** Fish, ducks, crocodiles

7.5, Classification of animals according to what they eat (feeding mode)

Animals are grouped based on the kind of food they eat. These groups are:

1. **Herbivores**

Animals that eat only plants. They feed on grass, leaves, fruits and vegetables.

Examples: Cow, goat, rabbit, zebra

2. **Carnivores**

Animals that eat only meat. They hunt and eat other animals.

Examples: Lion, leopard, eagle, crocodile

3. **Omnivores**

Animals that eat both plants and meat. They can eat fruits, vegetables and other animals.

Examples: Human beings, pig, bear, hen

4. **Insectivores**

Animals that feed mainly on insects. They help control the number of insects in the environment.

Examples: Frog, Chameleon, anteater, bat.

5. **Granivores**

Animals that feed mainly on grains and seeds. They have strong beaks or teeth to crack seeds.

Examples: Chicken, pigeon, parrot, squirrel

7.6, Classification of animals according to their reproductive mode

All animals give birth to their young ones to continue their own existence on earth. This process is known as reproduction.

Animals can be grouped based on how they give birth or lay eggs.

There are **two main groups**:

1. **Animals that lay eggs**

    - The babies grow and hatch from the eggs.
    - The eggs may be laid on land or in water.
    - Some animals like birds build nests to lay their eggs.

Examples: Hen, Duck. Fish, Frog, Butterfly, Snake.

2. **Animals that give birth to babies**

- The babies grow inside the mother's body before they are born.
- The mother feeds and protects the baby inside her body.
- The baby is usually cared for after birth

Examples: Human beings, Cow, Cat, Dog, Elephant, Goat.

Rabbit and chicken management is the proper care of these animals to keep them healthy and productive. It involves feeding, housing, disease control and breeding. Rabbits and chicken provide meat, eggs, income and manure. They are making them useful and easy to rear at home or on farms.

TAKE YOUR TIME TO REVISE ENOUGH AND ANSWER CORRECTLY

SCIENCE – ANIMALS AND THEIR CLASSIFICATION

SECTION A: MULTIPLE CHOICE QUESTIONS (Choose the correct answer)

Tick (✓) or circle the correct letter.

1. Animals are _____ things. a) living b) non-living c) hard
2. Animals can _____. a) fly b) move c) both a and b
3. A cow lives on _____. a) land b) water c) air
4. A fish lives in _____. a) tree b) water c) land
5. Birds mostly live in the _____. a) ground b) air c) water
6. Animals that live on land are called _____ animals.
   a) land b) air c) water
7. A crab is a _____ animal. a) land b) air c) water
8. A bird is covered with _____. a) fur b) feathers c) scales
9. A cat is covered with _____. a) feathers b) hair c) shell
10. A fish has _____. a) scales b) feathers c) hair
11. A snail has a _____. a) shell b) feather c) fur
12. Animals with a backbone are called _____.
    a) invertebrates b) vertebrates c) insects
13. A dog is a _____. a) vertebrate b) invertebrate c) fish
14. Animals without a backbone are called _____.
    a) vertebrates b) invertebrates c) birds
15. A butterfly is an _____. a) insect b) fish c) bird
16. A frog is a _____. a) reptile b) amphibian c) insect
17. A fish breathes through _____. a) lungs b) gills c) skin
18. A cow breathes through _____. a) lungs b) spiracles c) skin
19. An earthworm breathes through its _____.a) skin b) mouth c) gills
20. Insects breathe through _____. a) gills b) spiracles c) lungs
21. Frogs breathe through both _____ and skin.
    a) gills b) lungs c) both lungs and skin

22. Movement of animals from place to place is called _____.
    a) breathing b) locomotion c) eating

23. Birds move by _____. a) walking b) flying c) crawling

24. Fish move by _____. a) flying b) swimming c) walking

25. Lizards move by _____. a) jumping b) crawling c) swimming

26. Rabbits move by _____. a) jumping b) flying c) crawling

27. Goats move by _____. a) swimming b) walking c) jumping

28. Ducks swim using _____. a) fins b) tails c) webbed feet

29. Frogs move by _____. a) flying b) hopping c) crawling

30. Animals that eat only plants are called _____.
    a) carnivores b) herbivores c) omnivores

31. Animals that eat meat are called _____.
    a) herbivores b) carnivores c) omnivores

32. Humans are _____. a) carnivores b) herbivores c) omnivores

33. Animals that eat both plants and meat are _____.
    a) omnivores b) herbivores c) carnivores

34. A lion eats _____. a) plants b) meat c) fruits

35. A cow eats _____. a) grass b) meat c) fish

36. A frog eats _____. a) grains b) insects c) leaves

37. Animals that eat insects are called _____.
    a) granivores b) insectivores c) herbivores

38. A parrot eats _____. a) seeds b) meat c) grass

39. Animals that eat grains are _____a) carnivores b) omnivores c) granivores

40. Hens mostly eat _____. a) grains b) meat c) leaves

41. Animals that lay eggs are called _____.
    a) mammals b) egg-laying animals c) insects

42. A hen lays _____. a) seeds b) eggs c) babies

43. Animals that give birth to babies are called _____.
    a) egg-laying b) mammals c) birds

44. A cow gives birth to a _____. a) calf b) kid c) chick

45. A dog gives birth to _____. a) puppies b) chicks c) cubs

46. A frog lays its eggs in _____. a) land b) water c) air

47. A butterfly comes from an _____. a) egg b) seed c) shell

48. A goat is a _____. a) carnivore b) herbivore c) omnivore

49. Rabbits and chickens give us _____. a) meat b) air c) water

50. We keep rabbits and chickens to get _____.
a) food and income b) toys c) cars

SECTION B: OPEN-ENDED QUESTIONS

Answer the following questions in the spaces provided.

1. What are animals?
.....
.....

2. Name any three animals that live on land.
.....

3. Name two animals that live in water.....

4. Name two animals that can fly.....

5. How can we identify animals?
.....

6. Write two animals covered with fur.....

7. Write two animals covered with feathers.....

8. Write two animals covered with scales.....

9. What is a backbone?
.....

10. What are animals with a backbone called?.....

11. What are animals without a backbone called?.....

12. Give two examples of vertebrates.....

13. Give two examples of invertebrates.....

14. How do fish breathe?.....

15. How do humans breathe?.....

16. How do insects breathe?.....

17. Name one animal that breathes through skin.
.....

18. How do frogs breathe when in water?

.....

19. What is locomotion?

.....

20. Give two animals that fly.

.....

21. Give two animals that crawl.

.....

22. Give two animals that walk.

.....

23. Give two animals that jump.

.....

24. Give two animals that swim.

.....

25. What do herbivores eat?

.....

26. What do carnivores eat?

.....

27. What do omnivores eat?

.....

28. Give two examples of herbivores.

.....

29. Give two examples of carnivores. .....

30. Give two examples of omnivores.....

31. What do insectivores eat? .....

32. Give one example of an insectivore.....

33. What do granivores eat?

.....

34. Give one example of a granivore.

.....

35. What is reproduction?

.....

36. Name the two groups of animals by reproduction.

.....

37. Give two examples of egg-laying animals.

.....

38. Give two examples of animals that give birth to babies.

.....

39. Where do most birds lay their eggs?.....

40. What do we get from chickens? .....

41. What do we get from rabbits?

.....

42. Why do we keep rabbits and chickens?

.....

43. Mention one use of animal manure.

.....

44. What is the main food of a cow?

.....

45. What helps fish to swim?

.....

46. What do birds use to fly?

.....

47. What helps frogs to jump?

.....

48. What protects a snail?

.....

49. Which animal has moist skin for breathing?

.....

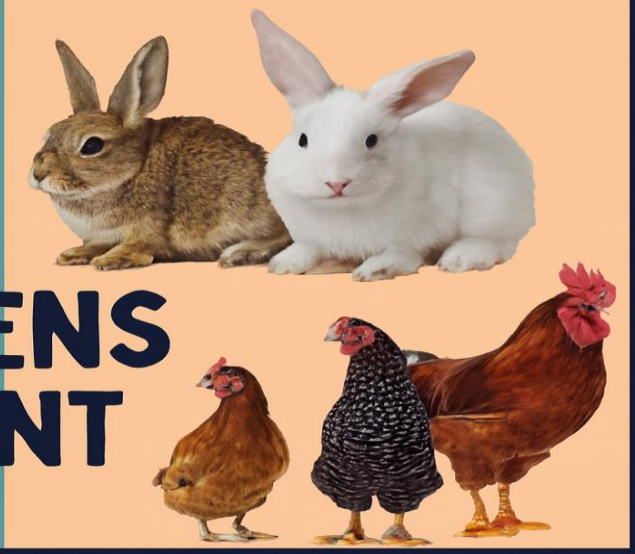
50. Why are animals important to people?

.....

.....

UNIT 8

RABBITS AND CHICKENS MANAGEMENT



A. Rabbit farming house

8.1 Conditions of a good rabbit (hutch)

A **rabbit hutch** *is the house where a rabbit lives.* It must be a **safe, clean and comfortable** place for the rabbit to grow well and stay healthy.

Here are the important **conditions** of a good rabbit hutch:

1. **Clean and dry**: Keep the hutch clean and free from waste.
2. **Well ventilated**: Allow fresh air to flow in and out.
3. **Weather-proof:** Protect the rabbit from rain, sun and wind.
4. **Spacious and comfortable**: Enough room for the rabbit to move around.
5. **Strong and safe:** Built with strong materials to keep predators away.
6. **Food and water areas:** Have clean places for food and water.

8.2, Characteristics of good rabbits

The characteristics of good rabbit to rear are the following:

- **Clean and shiny fur**: The rabbit's body is covered with smooth and healthy hair.
- **Bright eyes:** The eyes should be clear and not sick or dirty.
- **Strong and straight legs:** The rabbit can move easily and stand well.
- **Active and alert:** A good rabbit moves around and pays attention to sounds.
- **Good size and body shape:** The rabbit is not too thin or too fat.
- **Eat and drink well:** It eats food and drinks water regularly.

- **No signs of sickness:** The rabbit does not have wounds, running nose, or wet bottom.

Both female and male rabbits have some special characteristics.

- **Female rabbit (doe):** Big body, gives a lot of milk, has many babies, healthy, and has good fur.
- **Male rabbit (buck):** Grows fast, strong, active, healthy, and can father many babies.

Criteria for choosing a rabbit to rear

When choosing a rabbit to rear, we must look at the following:

1. **Breed:** Choose the right type depending on what you want:

- For meat
- For fur/wool
- For pets

2. **Color and coat:** Pick a rabbit with hair that is easy to clean and care for.
3. **Age:** A rabbit should be at least 8 weeks old to be strong and healthy.
4. **Health:** Choose a rabbit that is clean, active and not sick.
5. **Environment:** Pick a rabbit from a clean and safe place. Good rabbits grow well, stay healthy and are easier to care for.

8.4, Proper feeding of rabbits

1. Types of food rabbits eat

- **Fresh grass:** Rabbits love to eat fresh grass. It is good for their stomachs.
- **Vegetables**: They enjoy vegetables like carrots, cabbage and leafy greens.
- **Pellets**: These are special rabbit food made from plants and grains in factories. They give rabbits energy.
- **Clean water**: Rabbits must always have clean water to drink.

Note: It is good to wash grass and vegetables before feeding the rabbit.

2, Things to avoid

- Do not give rabbits dirty or spoiled food.
- Do not feed them too many sweet fruits or human food.
- Avoid giving them food with chemicals or salt.

3, Feeding tips

- Feed your rabbit at the same time every day.

- Give them the right amount of food not too much, not too little.
- Always keep their feeding area clean.

8.5. Rabbit health and common diseases

Rabbit health

Rabbits can have health problems.

The following are some measures to be taken for good health of rabbit:

1. Clean the cages once in a week.
2. Clean the feeding and watering troughs daily to avoid contamination.
3. Feed the rabbits at least twice a day at the right time.
4. Give them scope for enough physical exercise and mental stimulation by providing time to play outside the cage.
5. Isolate sick rabbits for treatment.
6. De-worm the rabbits at regular intervals.
7. Keep the surroundings of the rabbit cage weed-free.

Common diseases in rabbits

Like other living animals, rabbits can suffer from diseases.

The common diseases of rabbits are ear scabies, tapeworm, pneumonia, coccidiosis. When a rabbit is sick, you may see on it the following signs:

- Loss of appetite
- Loss of weight
- Rough hair
- Brown scab inside the ear canal.
- Fever.
- Difficulty in breathing.
- Shaking of the head.
- Slow growth.
- Worms in droppings.

Prevention/Treatment Isolate the affected rabbit.

- Keep the hutch clean.
- Before feeding, wash all the food items.
- Invite a vet for treatment.

8.6, Importance of rabbit farming

Rabbit farming means keeping rabbits at home or on a farm to get benefits from them. Many families in Rwanda keep rabbits because they are small, easy to care for and very useful.

1. **Rabbits provide meat**

- Rabbit meat is soft, tasty and healthy.
- It gives us **protein** to help our bodies grow strong.

2. **Rabbits multiply quickly**

- A rabbit can give birth to many babies (kits) at once.
- This helps farmers get more rabbits in a short time.

3. **Rabbits bring money**

- Farmers can **sell rabbits or rabbit meat** to earn money.
- The money helps families pay for food, school, or clothes.

4. **Rabbits do not need a lot of space**

- You can keep rabbits in small cages at home.
- This makes it easy for people in villages and towns to raise them.

5. **Rabbit droppings are good manure**

 Rabbit poop can be used in the garden to help crops grow well. It is a **natural fertilizer**.

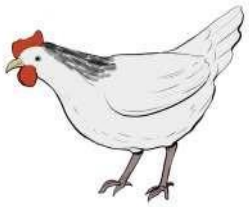
6. **Rabbits are easy to feed**

- They eat grass, vegetable leaves and small food scraps.
- This means they are **cheap to feed**.

7. **Rabbits are quiet and clean**

- They do not make a loud noise.
- They are clean animals when cared for well.

B. Chicken farming



8.7, Conditions of good chicken house

Chicken should be housed properly to protect them from harsh weather conditions and predators.

The following are the good conditions of good chicken house:

1. It should have enough space
2. It should be **protected** from bad weather, thieves and wild animals.
3. It is should be **well- ventilated**
4. It should be **clean and dry**
5. It should be **sterilized with proper disinfectants** 6. It should have **suitable drainage system**
7. It should have **clean water supply**
8. It should have **suitable temperature**

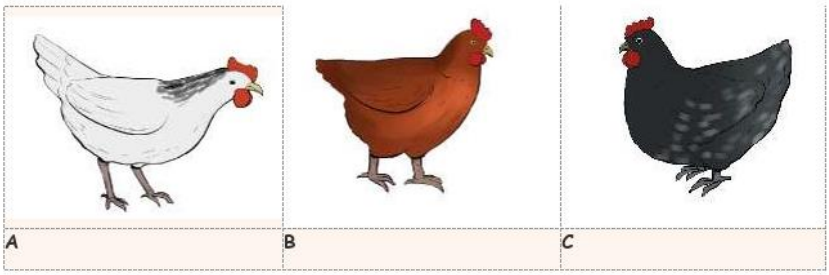
8.8, Types of chicken breeds

Observe the following pictures and answer the questions

There are **three main types of chicken breeds**:

1. **Egg-laying breeds (Layers):**

- Kept mainly for **eggs**.
- They are **light in weight**.



2. **Meat-type breeds (Broilers):**

- Kept mainly for meat.

- They grow fast and are heavy.

3. Dual-purpose breeds:

- Kept for both eggs and meat.
- They are medium in weight.

8.9. Reproduction of chicken

Reproduction in chicken involves laying eggs followed by incubation.

After the incubation period is over *chicks hatch from the eggs.* **a)**

Mating for fertilization

A rooster (boychicken) and a hen (girl chicken) meet and the rooster puts sperm inside the hen. Then the hen lays the fertilised eggs.

B, Laying eggs

- Hens are the ones that lay eggs.
- The eggs should be laid in nests.
- If there are a lot of chicken, the eggs should be collected at least three times a day. This way, the eggs cannot get dirty or be broken

c) Incubation

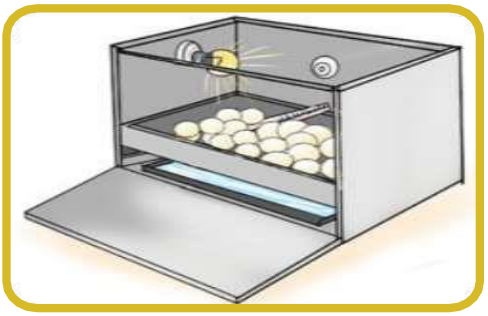
Incubation of eggs means keeping eggs under conditions that allow them to hatch into chicks.

Incubation is also known as brooding.

There are two methods of incubating eggs. These are artificial incubation and natural incubation.

Artificial incubation/ Brooding

In this type of brooding, the eggs are put in a special machine called an incubator for them to hatch.



Picture 8.13. An incubator.

Natural incubation

Natural incubation is when a broody hen sits on eggs for **21 days** for them to hatch.

A broody hen is one that shows a natural tendency to sit on eggs for them to hatch. For natural incubation to be successful, it is necessary to provide the following conditions:

A clean dry nest, made of soft materials. The nest should be free of parasites.

A place with dim light and free from disturbance.

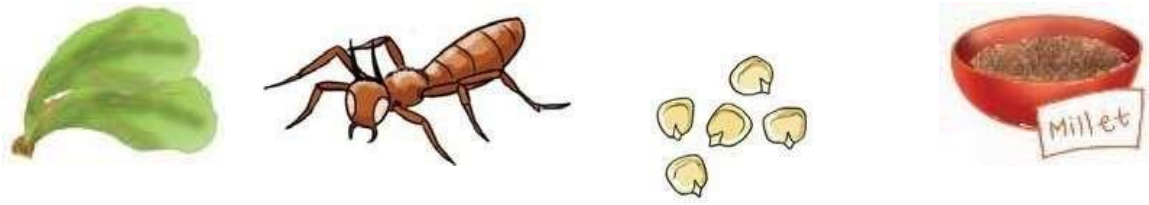
Clean water and feeds.

d. Hatching

After about 21 days of incubation the chick inside the egg develops enough to hatch out of the shell.

8.10. Proper feeding of chickens

Chicken can be fed on a variety of feeds. Examples of common chicken feeds include **grains like maize and millet, crushed cereals, small insects and soft vegetation.**



Green leaves Ant Maize seeds Millet

Picture 8.15. Some chicken feeds.

Apart from feeds that can be obtained locally, chicken can be fed on commercial feeds. Commercial feeds are also known as **concentrates**.

8.11. Chicken diseases and their prevention

Just like people, chicken can get sick. Some diseases are caused by small insects or worms (called parasites), and others are caused by germs (like viruses or bacteria). It is important to take care of chicken, so they stay healthy.

When chicken are sick you may see the following signs;

- Grow slowly
- Chicken become thin
- Chicken are weak and sleepy
- Sneezing
- Diarrhea **Prevention:**
- Keep the chickens house clean and dry.
- Give clean water and food to chicken.
- Don't mix old and young chicken.
- Vaccinate chicken and the invite the vet for treatment.

8.12. Importance and process of chicken farming

8.12.1, Importance of chicken farming

Chicken farming is very useful for people. Chicken give us food and help people earn money.

a) Nutritional importance (food)

- Chicken give us eggs and meat, which are full of protein.
- Eggs are cheap and easy to find, so many people eat them.

b) Economic importance (Money and jobs)

Farmers sell eggs and chicken to earn income.

- People get jobs in chicken farms and factories.
- Feathers can be used to make crafts, pillows and duvets.

c) Agricultural importance (farming)

- Chicken droppings are used as manure to grow crops.
- Chicken eat harmful insects that destroy crops.
- Bones and eggshells can be made into animal feed.

Summary: *source of Employment, income, meat and eggs, manure, feathers used in decoration and in costumes in traditional music and dance.*

8.12.2. Chicken farming process

Chicken can be reared in small or large areas. They grow fast and are easy to keep. There are different ways to keep them. Methods of rearing chicken

Method	Description
Free-range system	Chicken walk freely and feed on their own.
Deep litter system	Chicken live inside a house with clean feed and water.
Fold system	Chicken stay in a small house that is moved daily.
Battery system	Chicken are kept in cages and fed in their space.

Picture 8.16. Free range system *Picture 8.17. Deep litter system* *Picture 8.18. Traditional fold system* *Picture 8.19. Battery system*

TAKE YOUR TIME TO DO THESE EXERCISES

Rabbit and Chicken Farming – 50 MCQs

(Answers can be written horizontally with A–D options)

1. A rabbit house is called a _____. A) Cage B) Nest C) Hutch D) Barn
2. A good rabbit hutch should be _____. A) Dirty B) Clean C) Wet D) Dark
3. A rabbit hutch must protect rabbits from _____.A) Books B) Rain C) Toys D) People
4. Rabbits need a place that has _____ air. A) No B) Cold C) Fresh D) Hot
5. A rabbit hutch should be _____. A) Weak B) Strong C) Small D) Open
6. Rabbits eat _____. A) Stones B) Grass C) Meat D) Plastic
7. Rabbits also eat _____. A) Shoes B) Vegetables C) Ice D) Bread
8. Rabbits drink _____. A) Milk B) Clean water C) Juice D) Soda
9. Good rabbits have _____ fur. A) Dirty B) Rough C) Shiny D) Broken
10. Good rabbits have _____ eyes. A) Red B) Bright C) Closed D) Dark
11. A female rabbit is called a _____. A) Buck B) Doe C) Hen D) Kid
12. A male rabbit is called a _____. A) Doe B) Buck C) Cow D) Hen
13. A doe gives _____. A) Eggs B) Milk C) Wool D) Corn
14. Rabbits must be fed at _____ times every day. A) Random B) The same C) Any D) Night
15. Rabbits should not eat _____ food. A) Clean B) Spoiled C) Green D) Dry
16. Rabbits need space to _____. A) Sleep only B) Play and move C) Hide D) Sit
17. A sick rabbit should be _____. A) Left alone B) Played with C) Isolated D) Ignored
18. One sign of a sick rabbit is ___A) Jumping B) Shaking head C) Eating more D) Bright eyes
19. Rabbit droppings can be used as _____. A) Water B) Food C) Manure D) Toys
20. Rabbit meat is rich in _____. A) Water B) Protein C) Sugar D) Salt
21. Rabbits can have many _____ at once. A) Babies B) Wings C) Tails D) Shells
22. Rabbits are _____ animals. A) Loud B) Clean C) Noisy D) Lazy
23. Rabbits bring _____ to farmers. A) Money B) Dust C) Water D) Stones
24. A good rabbit to rear should be _____. A) Weak B) Healthy C) Sick D) Dirty
25. A rabbit should be at least _____ weeks old to rear. A) 2 B) 8 C) 1 D) 3
26. A chicken house should be _____.A) Small and dark B) Clean and dry C) Open D) Hot
27. A chicken house should protect from _____. A) Rain B) Toys C) Books D) Roads
28. Chickens need _____ to breathe well. A) No air B) Ventilation C) Heat D) Walls
29. Layers give us _____. A) Meat B) Eggs C) Milk D) Wool
30. Broilers are kept for _____. A) Eggs B) Meat C) Fur D) Feathers
31. Dual-purpose chickens give both _____ and _____.
    A) Water and food B) Eggs and meat C) Wool and milk D) Dust and air
32. A male chicken is called a _____. A) Hen B) Rooster C) Chick D) Doe
33. A female chicken is called a _____. A) Hen B) Buck C) Doe D) Cock
34. Chickens reproduce by _____. A) Giving birth B) Laying eggs C) Splitting D) Digging
35. It takes _____ days for eggs to hatch. A) 5 B) 10 C) 21 D) 30

36. An incubator is used in _____ incubation. A) Natural B) Artificial C) Manual D) Eggless
37. A broody hen sits on eggs for _____. A) Decoration B) Fun C) Hatching D) Sleeping
38. Chickens eat _____. A) Stones B) Maize and millet C) Plastic D) Soil
39. Commercial chicken food is called ____A) Vegetables B) Concentrates C) Drinks D) Leaves
40. Chickens get sick if the house is _____. A) Clean B) Dirty C) Bright D) Cool
41. A sick chicken may have _____.
    A) Smooth feathers B) Diarrhea C) Shiny eyes D) Strong legs
42. We must ____ chicken to prevent diseases A) Ignore B) Vaccinate C) Hide D) Play with
43. Chicken droppings are used as _____. A) Fertilizer B) Food C) Bedding D) Toys
44. Chicken feathers are used for _____.
    A) Music instruments B) Crafts and pillows C) Water D) Food
45. Chicken give us _____ to eat.
    A) Eggs and meat B) Wool and milk C) Stones and grass D) Bread and tea
46. Chicken help farmers by eating _____.A) Fruits B) Harmful insects C) Seeds D) Water
47. Free-range chickens walk _____. A) Freely B) In cages C) On walls D) Underwater
48. In battery system, chickens are kept in _____. A) Cages B) Fields C) Trees D) Houses
49. Deep litter system means chickens stay _____.
    A) Outside B) Inside with clean feed C) In trees D) In water
50. Chicken farming gives people _____. A) Work and money B) Toys C) Sand D) Air

---

✍ **Open-Ended Questions (50)**

(Leave space with dotted lines for answers)

1. What is a rabbit hutch?
   ……
2. Mention two things that make a good rabbit hutch.
   ……
3. Why must a rabbit hutch be clean?
   ……
4. Write two foods that rabbits eat.
   ……
5. Why should rabbits have clean water?
   ……
6. What is the name of a female rabbit?
   ……
7. What is the name of a male rabbit?
   ……
8. How can you tell that a rabbit is healthy?
   ……
9. Write two signs of a sick rabbit.
   ……
10. What should we do when a rabbit is sick?
    ……

11. Write two reasons why people keep rabbits.

    ……

12. What do we get from rabbit droppings?

    ……

13. Why is rabbit meat good for us?

    ……

14. How can you keep a rabbit hutch safe?

    ……

15. What kind of food should we avoid giving rabbits?

    ……

16. What is one use of rabbit farming to a family?

    ……

17. Why do rabbits multiply quickly?

    ……

18. How often should rabbits be fed each day?

    ……

19. What should we do before feeding rabbits?

    ……

20. What can you use to build a rabbit hutch?

    ……

21. Name two conditions of a good chicken house.

    ……

22. Why must a chicken house be dry?

    ……

23. What do chickens eat?

    ……

24. What do layers give us?

    ……

25. What do broilers give us?

    ……

26. What are dual-purpose chickens used for?

    ……

27. What is the name of a male chicken?

    ……

28. What is the name of a female chicken?

    ……

29. How do chickens reproduce?

    ……

30. What helps eggs to hatch into chicks?

    ……

31. How many days does it take for eggs to hatch?

    ……

32. Name two chicken diseases.

……

33. Write one sign of a sick chicken.

……

34. How can we prevent chicken diseases?

……

35. What is vaccination?

……

36. Why should we keep chicken houses clean?

……

37. What is the use of chicken droppings?

……

38. How do chickens help farmers' crops?

……

39. Write two things we get from chickens.

……

40. What is an incubator used for?

……

41. What is the difference between natural and artificial incubation?

……

42. Write one importance of chicken feathers.

……

43. What kind of food do commercial feeds provide?

……

44. What is the free-range system of keeping chickens?

……

45. What is the battery system?

……

46. What is the deep litter system?

……

47. How do chickens help people earn money?

……

48. Why are chickens easy to keep?

……

49. Write two things we should not do when keeping chickens.

……

50. Why is it important to keep animals healthy?

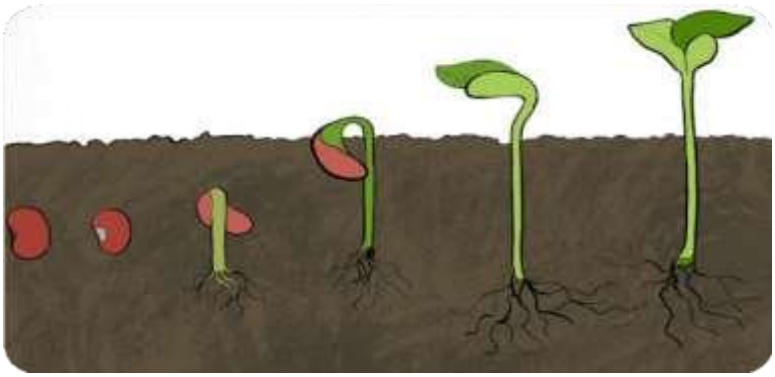
……

Introduction

Plants grow from seeds. Germination is the process where a seed starts to grow into a new plant. In this unit, you will learn what a seed needs to grow, the steps of germination, the parts of a plant and their uses.

9.1. Seed germination and its conditions

Germination is the process where a **seed starts to grow** into a **new plant**. *Or Process by which seeds grow into new plants (seedling).* When a seed is planted in the soil, it begins to grow if the conditions are right.



Conditions necessary for seed germination

For a seed to grow into a plant (germinate), it needs the **right conditions**.

1. **Water**

- The seed needs water to **soften the seed coat**.
- Water helps the seed to **start growing**.

2. **Warmth (Heat) suitable temperature**

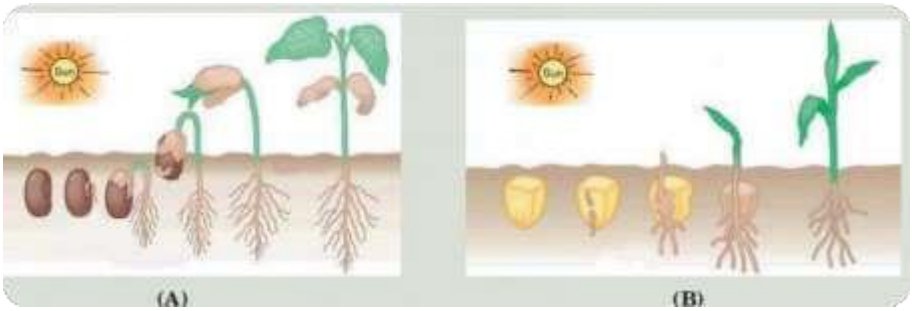
- Seeds need a **warm place** to grow well.
- Warmth helps the seed to use food stored inside.

3. **Air (Oxygen)**

- Seeds need air to **breathe**.
- They use oxygen to get **energy to grow**.

Note: Seeds **do not need sunlight** during the first stages. Sunlight is needed **after** the seed has grown leaves.

9.2. Types of germination



When we plant a seed in the soil, it begins to grow. This process is called germination. Germination helps the seed to grow into a new plant. There are two types of seed germination:

1. **Epigeal germination**

- This is a type of germination where the seed leaves **(cotyledons) come out of the soil**.
- The seed leaves can be seen above the ground; this happens in seeds like beans and gram.

For example: When you plant a bean, you can see the seed leaves growing above the soil.

2. Hypogeal germination

- This is a type of germination where the seed leaves (**cotyledons) stay under the soil**.
- You cannot see the seed leaves above the ground, this happens in seeds like maize,
- rice and corn.

Example: When you plant maize, the seed leaves remain under the soil.

9.3. Stages of germination

There are four main stages of seed germination:

1. **The seed takes in water**

   When we plant a seed in moist soil, it absorbs water.

   The seed becomes soft and swollen.

2. **The root comes out**

   The root is the first part to grow.

   It goes down into the soil to hold the plant and find water

3. **The shoot comes out**

   The shoot grows upward and comes out of the soil.

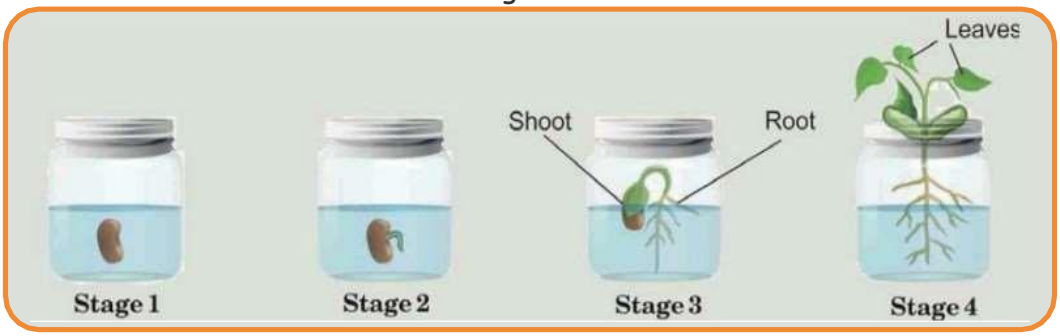
   It will become the stem of the plant.

4. **Leaves appear**

   Small green leaves grow on the shoot.

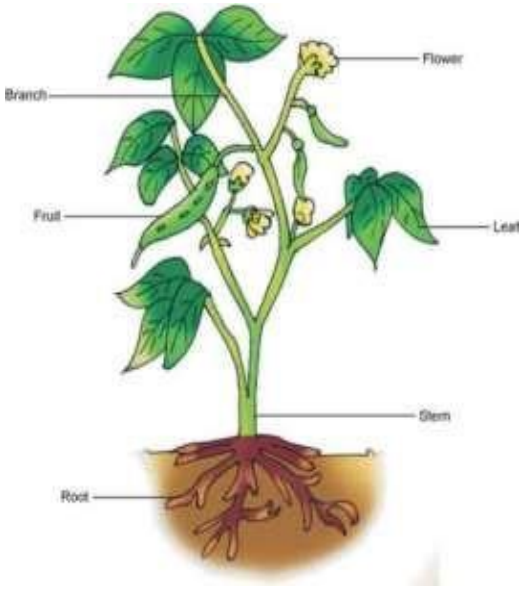
   The plant can now make its own food using sunlight.

Note that: Water + soil + warmth = germination



9.4. Parts of a plant

Plants are living things that grow in the soil. Just like people who have different body parts, plants also have different parts as shown in the diagram below.



Functions of parts of the plant

Plants have different parts, and each part has an important job that helps the plant to live, grow and make food.

Below are the different functions of the parts of a plant:

a) Root

It is *the underground part of the plant.*

It has the following functions:

1. Roots fix the plant into the soil.
2. They absorb water and minerals from the soil. Water and minerals are important for plants to grow healthy.
3. In some plants, roots store extra food. For example, carrot, radish and beetroot. **b)**

Stem

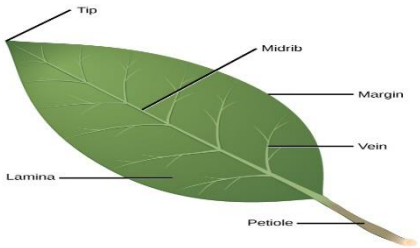
It is part *of a plant above the ground.*

It has the following functions:

1. The stem supports branches which bear leaves, buds, flowers and fruits.
2. It transports water and minerals from the roots to the leaves and fruits.
3. In some plants, stems store extra food. We eat these stems. For example, Irish potato, ginger and sugarcane.

c) Leaf

It is the most important part of a plant. Most plants have green leaves.



Some functions of a green leaf are:

1. A green leaf makes food for the plant.
2. Air and water vapor go in and out of the leaf. Thus, it helps the plant to breathe.
3. In some plants, leaves store extra food. We eat these leaves. For example, spinach, cabbage and coriander.

Picture 9.3. Leaves that store extra food

d) Flower

Flowers are colorful and pretty. They are the reproductive parts of a plant. Some functions of the flower are:

1. **Flowers turn into fruits.**
2. They give off a sweet smell. So, they are used to decorate houses and gardens.
3. Flowers like pyrethrums are natural insecticides.
4. We eat some flowers, for example, cauliflower and broccoli.

Fruits

Fruits are produced from flowers. Fruits like mango and coconut are one seeded.
Other fruits like pawpaw and guava are many seeded. Some functions of fruits are:

1. Fruits protect the seeds.
2. Fruits are a part of our diet.
3. Fruits are rich in minerals and vitamins. They keep us healthy.
4. Fruits bear seeds which help in reproduction.
5. Seeds of some fruits like black pepper are used as medicines and spices.

DO THESE EXERCISES CORRECTLY AND BE SURE ABOUT WHAT YOUR ANSWERS

SUMMARY

Unit 9: Seed Germination and Parts of a Plant

Introduction

Plants grow from seeds.
Germination is the process where a seed starts to grow into a new plant.

In this unit, we learn:

- ☑ What a seed needs to grow
- ☑ The steps of germination
- ☑ The parts of a plant and their uses

9.1. Seed Germination and Its Conditions

Germination:
Is the process by which a seed grows into a new plant (seedling).

When a seed is planted in the soil, it begins to grow if the **conditions are right**.

🌾 **Conditions necessary for germination:**

1. **Water**
    - Softens the seed coat.
    - Helps the seed to start growing.
2. **Warmth (Heat)**
    - Seeds need a warm place to grow well.
    - Warmth helps the seed use the food stored inside.
3. **Air (Oxygen)**
    - Seeds need air to breathe.
    - Oxygen gives energy for growth.

💡 *Note:* Seeds do not need sunlight at first.
Sunlight is needed **after** leaves grow.

9.2. Types of Germination

There are **two main types** of germination:

1️⃣ **Epigeal Germination**

- Seed leaves (**cotyledons**) come **above** the soil.
- Seen in **beans** and **grams**.
- Example: When you plant beans, you can see seed leaves above the soil.

2️⃣ **Hypogeal Germination**

- Seed leaves (**cotyledons**) stay **under** the soil.
- Seen in **maize**, **rice**, and **corn**.
- Example: When you plant maize, the seed leaves remain under the soil.

9.3. Stages of Germination

There are **four main stages** of seed germination:

1. 🌧️ **The seed takes in water**
    - The seed absorbs water from the moist soil.
    - It becomes soft and swollen.
2. 🌱 **The root comes out**
    - The root is the first part to grow.
    - It goes down into the soil to hold the plant and find water.

3. **The shoot comes out**
    - The shoot grows upward and comes out of the soil.
    - It becomes the stem of the plant.
4. **Leaves appear**
    - Small green leaves grow on the shoot.
    - The plant now makes its own food using sunlight.

Formula:
Water + Soil + Warmth = Germination

9.4. Parts of a Plant

Plants are living things that grow in the soil.
Just like people have body parts, plants also have **different parts** with special functions.

Main parts of a plant:

1. **Root**
2. **Stem**
3. **Leaf**
4. **Flower**
5. **Fruit**

Functions of Parts of the Plant

(a) Root

- Grows underground.
- **Functions:**
    1. Fixes the plant in the soil.
    2. Absorbs water and minerals.
    3. Stores food in some plants (e.g., carrot, radish, beetroot).

(b) Stem

- Grows above the ground.
- **Functions:**
    1. Supports branches, leaves, buds, flowers, and fruits.
    2. Transports water and minerals.
    3. Stores food in some plants (e.g., Irish potato, ginger, sugarcane).

(c) Leaf

- Usually green and flat.
- **Functions:**
    1. Makes food for the plant.
    2. Allows air and water vapor to pass in and out.
    3. Stores food in some plants (e.g., spinach, cabbage, coriander).

(d) Flower

- The colorful and pretty part of a plant.
- **Functions:**
    1. Helps the plant reproduce (produces fruits).
    2. Used for decoration due to their sweet smell.
    3. Some flowers act as natural insecticides (e.g., pyrethrum).
    4. Some are edible (e.g., cauliflower, broccoli).

(e) Fruit

- Develops from the flower after fertilization.
- **Functions:**
    1. Protects the seeds.
    2. Provides food (vitamins and minerals).
    3. Helps in reproduction (bears seeds).
    4. Seeds of some fruits (like black pepper) are used as medicine or spices.

Summary

Plant Part	Main Function	Examples
Root	Absorbs water and holds plant	Carrot, beetroot
Stem	Supports and transports nutrients	Sugarcane, potato
Leaf	Makes food for plant	Cabbage, spinach
Flower	Reproduction and beauty	Rose, pyrethrum
Fruit	Protects seeds and provides food	Mango, guava

Application Activities

Activity 9.1:
Label parts of a plant diagram (Root, Stem, Leaf, Flower, Fruit).

Activity 9.2:
Observe bean and maize seedlings. Identify which has **epigeal** and **hypogeal** germination.

Activity 9.3:
Experiment — plant three seeds: one without water, one without warmth, and one with all conditions. Observe which one grows.

PERFECT 👍 HERE IS YOUR **GRADE 4-FRIENDLY SCIENCE TEST** BASED ON THE TOPIC **"SEED GERMINATION AND PARTS OF A PLANT"** — WRITTEN IN SIMPLE ENGLISH. IT INCLUDES:

✅ **50 Multiple Choice Questions (MCQs)** arranged **horizontally**
✅ **50 Open-ended Questions** with **enough space (dots)** for learners to write answers

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🧚 PRIMARY 3 SCIENCE – UNIT 9: SEED GERMINATION AND PARTS OF A PLANT

Marks: 100 Time: 1 hour 30 minutes

Name: _____ **Date:** _____

A. MULTIPLE CHOICE QUESTIONS (Choose the correct answer)

1. Germination is the process where a seed _____.
   a) Sleeps b) Dies c) Starts to grow d) Changes color
2. Plants grow from _____. a) Soil b) Leaves c) Seeds d) Roots
3. For a seed to germinate, it needs _____.
   a) Food b) Toys c) Water, warmth and air d) Stones
4. Seeds need water to _____. a) Fly b) Soften the seed coat c) Make noise d) Sleep
5. Seeds need air to _____. a) Breathe b) Dance c) Sleep d) Sing
6. Seeds need warmth to _____. a) Die b) Grow well c) Freeze d) Sleep
7. Seeds do not need _____ at the first stage. a) Sunlight b) Water c) Air d) Warmth
8. The process where a seed grows into a new plant is called _____.
   a) Planting b) Germination c) Digging d) Breathing
9. The seed becomes _____ when it takes in water.
   a) Hard b) Soft and swollen c) Dry d) Dead
10. The first part of the plant to grow is the _____.a) Leaf b) Stem c) Root d) Flower
11. The root grows _____. a) Up b) Down c) Sideways d) Out
12. The shoot grows _____. a) Down b) Up c) Sideways d) In
13. The shoot becomes the _____. a) Root b) Stem c) Flower d) Leaf
14. Small green _____ appear after the shoot comes out.
    a) Stems b) Roots c) Leaves d) Fruits
15. Water + soil + warmth = _____. a) Food b) Growth c) Germination d) Flower
16. In epigeal germination, seed leaves come _____ the soil.
    a) Above b) Under c) Inside d) Beside
17. Epigeal germination happens in _____. a) Maize b) Beans c) Rice d) Corn

18. In hypogeal germination, seed leaves stay _____ the soil.
    a) Above b) Under c) On top d) Beside
19. Hypogeal germination happens in _____. a) Beans b) Gram c) Maize d) Sunflower
20. The part of the plant that grows underground is the _____.
    a) Leaf b) Stem c) Root d) Flower
21. Roots fix the plant into the _____. a) Water b) Air c) Soil d) Sun
22. Roots absorb _____ and _____ from the soil.
    a) Water and minerals b) Air and light c) Food and juice d) Heat and dust
23. The stem grows _____ the ground. a) Under b) Above c) Inside d) Below
24. The stem supports _____.a) Stones b) Branches, leaves and flowers c) Worms d) Air
25. The stem carries _____ from roots to leaves.
    a) Food b) Water and minerals c) Air d) Dust
26. Some stems store _____. a) Sand b) Extra food c) Air d) Stones
27. We eat stems of _____.
    a) Beans and maize b) Potato, ginger, sugarcane c) Rice and wheat d) None
28. The most important part of a plant is the _____.a) Leaf b) Stem c) Root d) Flower
29. A green leaf makes _____ for the plant. a) Noise b) Food c) Water d) Soil
30. Air and water vapor go in and out through the _____. a) Stem b) Leaf c) Root d) Flower
31. Some leaves store _____. a) Food b) Stones c) Dust d) Water
32. We eat leaves like _____.
    a) Spinach and cabbage b) Mango and guava c) Carrot and beetroot d) Potato and maize
33. Flowers are _____ and pretty. a) Ugly b) Colorful c) Boring d) Black
34. Flowers help in _____. a) Breathing b) Reproduction c) Running d) Sleeping
35. Flowers turn into _____. a) Roots b) Fruits c) Leaves d) Branches
36. Some flowers are used for _____.
    a) Decoration b) Cleaning c) Building d) Sleeping
37. Some flowers are _____. a) Edible b) Poison c) Paper d) Sand
38. Fruits come from _____. a) Flowers b) Leaves c) Roots d) Stems
39. Fruits protect the _____. a) Soil b) Seeds c) Leaves d) Flowers
40. Fruits are rich in _____.a) Dust b) Vitamins and minerals c) Water only d) Sugar only
41. Fruits help in _____. a) Reproduction b) Breathing c) Sleeping d) Drinking
42. One-seeded fruits include _____.
    a) Mango and coconut b) Pawpaw and guava c) Orange and lemon d) Apple and grape
43. Many-seeded fruits include _____.
    a) Mango and coconut b) Pawpaw and guava c) Rice and maize d) Wheat and beans
44. Seeds of black pepper are used as _____.
    a) Toys b) Medicine and spices c) Stones d) Food only

45. Roots of _____ store extra food.
    a) Carrot and beetroot b) Cabbage and spinach c) Mango and guava d) Potato and ginger
46. The part that transports water is the _____. a) Leaf b) Stem c) Flower d) Root
47. The plant part that makes food is the _____. a) Root b) Leaf c) Stem d) Flower
48. Germination cannot happen without _____. a) Air b) Toys c) Dust d) Stones
49. The first part to come out of a seed is the _____ a) Shoot b) Root c) Leaf d) Flower
50. Germination changes a seed into a _____. a) Rock b) New plant c) Flower d) Fruit

---

B. OPEN-ENDED QUESTIONS (Write your answers in the spaces provided)

1. What is germination?

   ……

2. Name any two things a seed needs to germinate.

   ……

3. Why does a seed need water?

   ……

4. Why does a seed need air?

   ……

5. Why does a seed need warmth?

   ……

6. Do seeds need sunlight in the first stages? Explain.

   ……

7. Write the two types of germination.

   ……

8. What happens in epigeal germination?

   ……

9. Name one example of a plant with epigeal germination.

   ……

10. What happens in hypogeal germination?

    ……

11. Give one example of a plant with hypogeal germination.

    ……

12. Write any four stages of germination.

    ……

13. Which part of the seed grows first?

    ……

14. What is the work of the root?

    ……

15. Name one plant whose root stores food.

    ……

16. What is the work of the stem?

……

17. Name one plant whose stem stores food.

……

18. What is the work of the leaf?

……

19. Name two plants whose leaves we eat.

……

20. What is the work of the flower?

……

21. Write one use of flowers at home.

……

22. Name one flower we can eat.

……

23. What comes from flowers?

……

24. What do fruits protect?

……

25. Give two examples of one-seeded fruits.

……

26. Give two examples of many-seeded fruits.

……

27. What are fruits rich in?

……

28. Write one use of fruits to humans.

……

29. What do plants grow from?

……

30. What is the first thing a seed does when it is planted?

……

31. What does the shoot grow into?

……

32. What does the leaf help the plant to make?

……

33. Name any two parts of a plant.

……

34. Which part of the plant supports branches?

……

35. Which part of the plant is underground?

……

36. What do roots absorb from the soil?

……

37. Which part of the plant is colorful?

……

38. Why are flowers important to plants?

……

39. Write one use of black pepper seeds.

……

40. What is a plant that stores food in its root?

……

41. What is a plant that stores food in its stem?

……

42. What is a plant that stores food in its leaf?

……

43. What do plants need to live and grow?

……

44. What does the shoot do during germination?

……

45. Write one difference between epigeal and hypogeal germination.

……

46. What happens after leaves appear?

……

47. Why are fruits important in our diet?

……

48. Write the formula for germination.

……

49. What is the main function of a leaf?

……

50. Why are plants important to people?

……

Introduction

Organs which help us to see, hear, smell, taste and feel are called sensory organs. The organs which help us to know the world around us are eyes, ears, nose, tongue and skin. These are our sensory organs.

10.1, Functional mechanism of all sensory organs

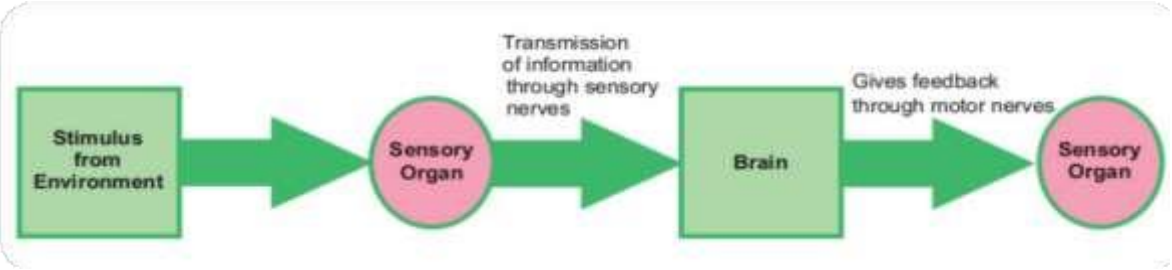
Human beings have special body parts called sensory organs. These organs help us to receive information from the world around us. They work together with the brain to help us understand what is happening.

The five main sensory organs are: eyes, ears, nose, tongue and skin.

Each sensory organ has a specific role/function. They sense things like light, sound, smell, taste, or touch. When they sense something, they send messages to the brain through nerves. The brain then helps us know what we are seeing, hearing, smelling, tasting, or feeling.

They work as follows:

1. A sensory organ receives information (like a smell, a sound, or light).
2. That information is changed into a signal.
3. The signal travels to the brain through nerves.
4. The brain understands the signal and helps us react.



Picture 10.1. Functional mechanism of all sensory organs

For example, if you touch something hot, your skin sends a message to the brain, and your brain tells your hand to move quickly

10.2, Function and maintenance of skin

a) Function of the skin

The skin is the outer covering of the body.

It is a sensory organ for touch and feel.

Picture 10.2. Human skin

It is the **largest organ** of the human body and has several important jobs:

- **Protects the body** from dirt, germs and injuries.
- **Keeps the body temperature balanced** (not too hot or too cold).
- **Helps us feel things** through the sense of touch (like hot, cold, soft, or sharp).
- **Removes waste** through sweat.
- **Covers and holds** everything inside the body together.

b) Hygiene of the skin

Keeping the skin clean is very important to stay healthy and avoid diseases. Good hygiene means keeping the skin free from germs and dirt.

- **Bathe every day** using clean water and soap.
- **Use lotion or oil** to keep the skin soft and avoid dryness.
- **Wear clean clothes** to stop germs and sweat buildup.
- **Wash hands regularly**, especially before eating and after using the toilet.
- **Keep fingernails trimmed and clean** to avoid carrying dirt and germs.

c) Maintenance of the skin

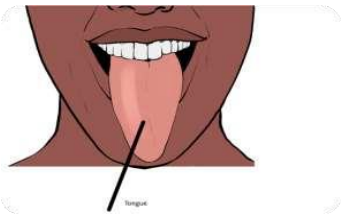
Taking care of the skin helps it stay healthy and strong.

- **Eat healthy food** like fruits and vegetables to keep the skin fresh.
- **Avoid playing in dirty places** to prevent skin infections.
- **Do not stay too long in the hot sun** to avoid sunburn.
- **Protect yourself from insect bites** by wearing proper clothes.
- **Treat any wounds or cuts quickly** to avoid infections.

10.3, Function and maintenance of tongue

a) Function of the tongue

The tongue is a **muscle inside the mouth**. Tongue is the sensory organ for taste.



Picture 10.4. Human tongue

It has many important roles in our daily life:

1. **Helps us taste food**: It has taste buds that help us know if something is sweet, sour, salty, or bitter.
2. **Helps us speak clearly**: The tongue moves in different ways to form words and sounds.
3. **Helps us chew and swallow**: It moves food around the mouth and pushes it down the throat.
4. **Keeps the mouth clean**: It helps remove small food particles after eating.

b) Hygiene of the tongue

Good hygiene of the tongue helps keep the mouth healthy and smelling fresh.

- **Brush your tongue gently** every day when brushing your teeth.
- **Rinse your mouth** after meals to remove food particles.
- **Drink clean water** to keep the mouth and tongue moist.
- **Avoid too many sugary foods** to prevent tongue and mouth problems.

C, Maintenance of the tongue

Taking care of the tongue helps it work well and prevents sickness:

- **Eat fruits and vegetables** for a healthy tongue.
- **Visit a health center or dentist** if the tongue has sores or pain.
- **Avoid putting dirty objects in the mouth**, like pens or fingers.
- **Do not eat or drink very hot things** that can burn your tongue.

10.4, Function and maintenance of the nose

a) Function of the nose

The nose is a sensory organ for smell. Smells flow in air. Our nose picks up the air when we breathe in. Brain instantly tells whether the smell is good or bad.

The nose is an important part of our body that helps us in many ways:

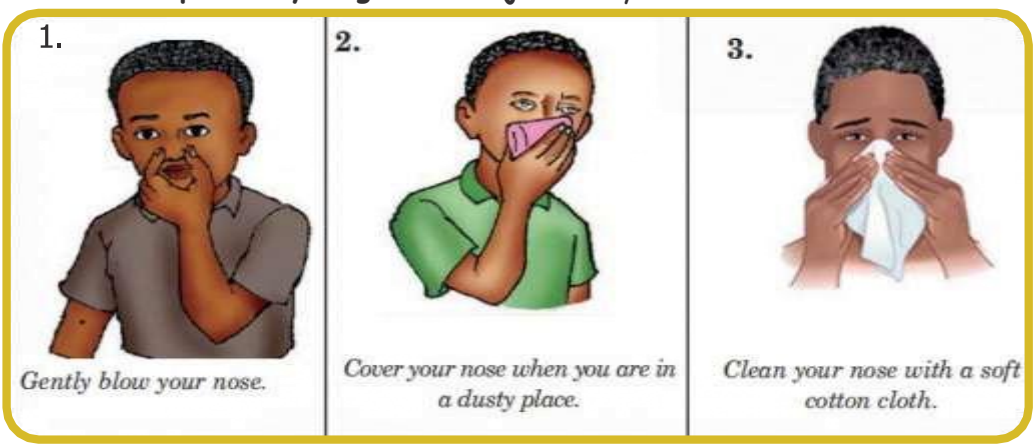
1. **Breathing**: The nose allows air to enter the body and filters out dust and germs.
2. **Smelling:** The nose helps us detect different smells, like flowers, food, or smoke.
3. **Warming and moistening air:** It warms and moistens the air before it goes to the lungs.
4. **Protecting the body:** Nose hairs and mucus trap dirt and bacteria to keep us healthy.

b) Hygiene of the Nose

Keeping your nose clean helps you breathe better and stay healthy:

- **Blow your nose gently** with a clean tissue to remove mucus
- **Wash your hands** after touching or blowing your nose to stop the spread of germs
- **Rinse your nose** with clean water if it feels blocked or dry (with adult help).

- **Don't put dirty fingers or objects** in your nose to avoid infections.



Picture 10.5. Hygiene of the Nose

c) Maintenance of the Nose

Taking good care of your nose helps it do its job well:

- **Breathe through your nose**, not your mouth, to filter air properly.
- **Drink enough water** to keep the nose moist and comfortable.
- **Avoid smoke, dust and strong smells** that can irritate your nose.
- **Visit a health worker** if you have nosebleeds, pain, or trouble breathing.

10.5, Function and maintenance of ear

a) Function of the ears

Ears are our sensory organs of hearing. We have a pair of ears on either side of our head. The ears are important body parts that help us in the following ways:

- **Hearing**: Ears help us listen to sounds, music, voices and warnings like sirens or alarms.
- **Balance:** The ears help us stay balanced, so we don't fall when we stand, walk, or run.
- **Communication**: By hearing words and sounds, we understand others and learn to speak.
- **Alertness**: Ears help us stay safe by hearing sounds around us.

b), Hygiene of the ears

Good ear hygiene helps keep your ears clean and working well:

Clean the outside of the ears with a soft cloth when bathing.

Do not put sharp or dirty objects like sticks, fingers, or pens into your ears.

Avoid using cotton buds deep inside the ear – they can push wax further in.

Wash your hands before touching your ears to prevent infections.

c), Maintenance of the ears

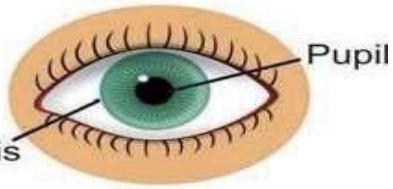
Taking care of your ears helps protect your hearing and overall health:

- **Avoid loud sounds** like loud music or shouting near your ears.
- **Cover your ears** in cold weather to protect them.
- **Keep ears dry**: dry them gently after bathing or swimming.
- **Visit a doctor**: if you have ear pain, discharge, or cannot hear well.

10.6, Function and maintenance of the eye

a) Function of the eyes

The eyes are organs of sight. We have a pair of eyes.



Picture .

The eyes are very important sense organs that help us in many ways:

- **Seeing**: Eyes help us to see people, places, objects, colors and movements.
- **Learning**: We use our eyes to read, write, watch and learn new things.
- **Safety**: Eyes help us avoid danger by seeing obstacles, traffic, or harmful things.
- **Communication**: We use eye contact and facial expressions to understand others.

b) Hygiene of the eyes

Keeping the eyes clean helps prevent infections and keeps our vision clear:

- **Wash your face and eyes** gently with clean water every day.
- **Do not rub your eyes** with dirty hands – it can spread germs.
- **Wash your hands** before touching your eyes.
- Avoid using someone else's eye drops or eye makeup.

c) Maintenance of the eyes

Taking good care of your eyes helps keep your vision sharp and your eyes healthy:

- **Protect your eyes from bright sunlight** by using a hat or sunglasses.
- **Avoid reading in dim light** or holding books too close to your eyes.
- **Limit screen time** and take breaks to rest your eyes.
- **Visit an eye doctor** if you have blurry vision, pain, or trouble seeing.

HAVE ENOUGH TIME AND SPACE TO ANSWER THESE QUESTIONS EFFECTIVELY

TOPIC: SENSORY ORGANS

Multiple Choice Questions (Choose the correct answer)

1. Sensory organs help us to _____.
   a) Eat food b) Know the world around us c) Sleep well d) Run fast
2. How many main sensory organs do humans have? a) Four b) Five c) Six d) Seven
3. The organ that helps us to see is the __a) Ear b) Eye c) Nose d) Tongue
4. The organ that helps us to hear is the ___a) Nose b) Ear c) Eye d) Skin
5. The organ that helps us to smell is the _a) Nose b) Ear c) Tongue d) Skin
6. The organ that helps us to taste is the ____a) Eye b) Tongue c) Nose d) Ear
7. The skin helps us to _____.a) Hear b) See c) Feel d) Taste
8. Which sense organ is the largest in the human body?
   a) Nose b) Skin c) Eye d) Ear
9. The main function of the tongue is to _____.
   a) Taste food b) See c) Smell d) Breathe
10. The brain receives messages from sensory organs through _____.
    a) Bones b) Muscles c) Nerves d) Veins
11. The skin protects the body from _____.
    a) Dirt and germs b) Music c) Smells d) Water
12. The skin removes waste through _____.
    a) Breathing b) Sweat c) Tears d) Urine
13. We should bathe _____ to keep the skin clean.
    a) Once a week b) Every day c) Once a month d) Never
14. Which of these helps keep the skin soft?
    a) Soap b) Lotion or oil c) Cold water d) Sand
15. The tongue helps us to know if food is _____.
    a) Hard or soft b) Hot or cold c) Sweet or bitter d) Big or small
16. Taste buds are found on the _____. a) Nose b) Tongue c) Ear d) Skin
17. The tongue helps us to _____. a) Speak b) Breathe c) Hear d) See
18. To keep the tongue clean, we should _____.
    a) Brush it b) Rub it with sand c) Ignore it d) Wash it with juice
19. The nose helps us to _____. a) See b) Smell c) Hear d) Taste
20. The hairs in the nose help to _____.
    a) Make sound b) Trap dirt c) See clearly d) Taste
21. Which of these helps the nose stay healthy?
    a) Inserting pens b) Blowing gently c) Not cleaning d) Using dirty fingers
22. The nose warms and moistens _____ before it goes to the lungs.
    a) Water b) Air c) Sweat d) Food
23. The ears help us to _____. a) Smell b) Taste c) Hear d) See
24. Which organ helps us keep our balance? a) Ears b) Eyes c) Tongue d) Nose
25. You should never put _____ in your ears.
    a) Water b) Sharp objects c) Cloth d) Lotion

26. The ears help us to hear _____ a) Smells b) Voices c) Lights d) Colors
27. To clean your ears, use _____.
    a) Cotton buds deep inside b) A soft cloth c) A stick d) A pen
28. Ears help in communication by _____.
    a) Speaking b) Listening c) Running d) Sleeping
29. The eyes are the organs of _____. a) Smell b) Sight c) Hearing d) Taste
30. Eyes help us to _____.
    a) Run b) See objects c) Breathe d) Hear
31. The eyes help us avoid _____ a) Food b) Dangers c) Games d) Dreams
32. To keep your eyes clean, you should _____.
    a) Rub them b) Wash your face c) Use dirty hands d) Share eye drops
33. Bright sunlight can harm your _____a) Tongue b) Eyes c) Nose d) Skin
34. You should visit an eye doctor when _____.
    a) You see clearly b) Your eyes hurt c) You eat d) You sleep
35. The skin helps us to feel _____. a) Taste b) Light c) Touch d) Smell
36. Ears help us to stay _____. a) Safe b) Hungry c) Tired d) Sleepy
37. The brain tells us what we are _____.
    a) Seeing, hearing, feeling b) Eating c) Writing d) Cleaning
38. To protect the skin, we should avoid _____.
    a) Playing in dirty places b) Eating fruit c) Washing hands d) Sleeping early
39. The tongue should be cleaned _____.
    a) Once a month b) Daily c) Weekly d) Never
40. The sense of smell helps us detect _____.
    a) Colors b) Odors c) Sound d) Heat
41. The ears should be kept _____. a) Dirty b) Clean c) Wet d) Blocked
42. We see colors and shapes using our _____a) Eyes b) Nose c) Tongue d) Ears
43. We should not eat very _____ food because it burns the tongue.
    a) Hot b) Cold c) Sweet d) Bitter
44. Washing hands helps protect the _____a) Skin b) Tongue c) Eyes d) Ears
45. Nose hairs and mucus trap _____.
    a) Air b) Dust and germs c) Light d) Sound
46. The eyes help us learn by allowing us to|a) Hear b) Read and write c) Taste d) Sleep
47. The ears help us know about _____.
    a) Colors b) Sounds c) Shapes d) Smells
48. The nose helps to filter _____.a) Light b) Air c) Sound d) Taste
49. The brain helps us to _____.a) React b) Sleep c) Run d) Smell
50. Skin, eyes, nose, ears and tongue are our _____.
    a) Organs of digestion b) Sensory organs c) Bones d) Muscles

---

Open-ended Questions

1. What are sensory organs?

---

2. Name the five sensory organs.

3. What is the function of the skin?

4. Mention two ways of keeping the skin clean.

5. Why is the skin called the largest organ?

6. Write two functions of the tongue.

7. What are taste buds?

8. Mention two ways of caring for the tongue.

9. What is the main function of the nose?

10. State two ways of keeping the nose clean.

11. Mention one function of nose hairs.

12. What should you avoid putting in your nose?

13. State two functions of the ear.

14. How do ears help us balance?

15. Why should we avoid loud music?

16. What should you do if you have ear pain?

17. Write three functions of the eyes.

18. Why should we protect our eyes from bright light?

19. Mention two ways of cleaning the eyes.

20. What should you do if your vision becomes blurry?

21. How do the eyes help in communication?

22. Write one way of maintaining the eyes.

23. State the function of the brain in relation to sense organs.

24. What happens when we touch a hot object?

25. How does the skin help in waste removal?

26. Why is it important to trim fingernails?

27. Write one way of maintaining the skin.

28. How does the tongue help us speak?

29. Name four tastes we can sense with the tongue.

30. Mention two functions of the nose apart from smelling.

31. Why is breathing through the nose better than the mouth?

32. What happens when we breathe in dirty air?

33. How do ears help in communication?

34. What should you never put in your ears?

35. How do we protect ears from cold weather?

36. What should you do after swimming to care for your ears?

37. Why are eyes important for learning?

38. Name one eye care practice.

39. What part of the body helps us to feel heat or cold?

40. State one danger of not washing your skin.

41. How does the brain help us to react to danger?

42. Which sense organ helps us to identify food by smell?

43. Write one way of keeping the tongue healthy.

44. Why should you visit a doctor when you have ear pain?

45. How does the skin protect the body?

46. How do sensory organs and the brain work together?

47. Mention one way to keep your eyes safe from the sun.

48. How does the ear help us stay safe?

49. What is the role of nerves in the sensory system?

50. Why is it important to care for all sensory organs?

UHIT 11

HUMAN SKELETON

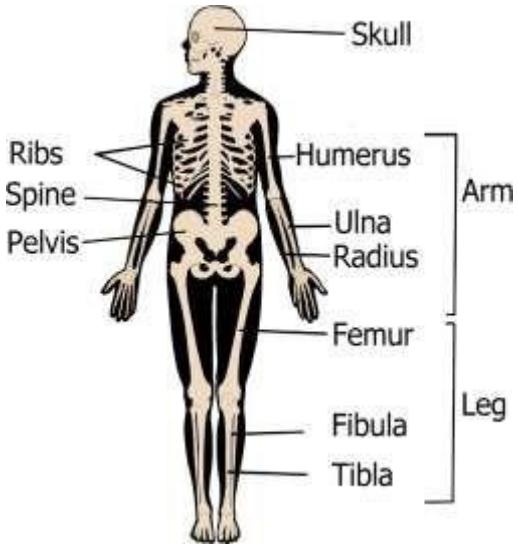
Introduction

The human skeleton is the part of our body made of bones. It helps us to stand, move and protects important parts inside the body. We will explore how the skeleton works, how to care for it and how to keep our bones healthy and strong.

11.1. Main parts and major bones of the skeleton

11.1.1 Main parts of the skeleton

The human skeleton gives shape and support to our body. A skeleton comprises skull, arms and legs. Each of the major parts consists of some small bones as shown in the diagram.



Picture 11.1. Main parts of human skeleton

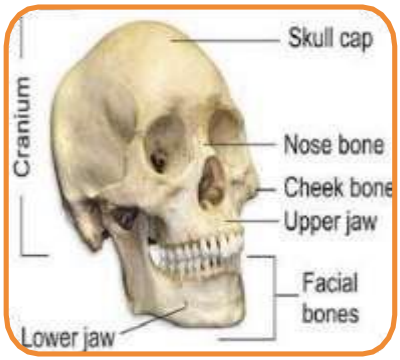
12.1.2, Major bones of the skeleton

i) Bones of the skull

Inside our head, there is a bony framework that encloses the brain. It is called **skull**. It is the hardest of all bones in the body. All the bones in the skull are fixed. The major bones of the skull are:

Cranium: It is the covering that protects and supports the brain. It consists of 8 bones.

Facial bones: There are 14 facial bones in the face and the jaws. The only movable bone in the jaw is the lower jaw.



Picture 11.2. Skull

ii) Bones of trunk

The part of the body to which the head and limbs are attached is called **trunk**. The major bones of the trunk are:

1. The backbone or spine

The backbone is made up of 33 ring-like bones called **vertebrae**. These 33 bones form a column called **spine**.

Spine encloses and protects the spinal cord. It also supports the head, neck and body for upright posture.

2: Ribs are curved bones. These are attached to the backbone at the back and breastbone at the front. All these ribs together form a cage-like structure called rib cage. Rib cage protects our heart and lungs. There are 12 pairs of ribs in this rib cage.

3: Pelvis

It is the lower part of the trunk. It supports the abdomen. It also protects the digestive organs. Legs and backbone are attached to the pelvis.

Picture 11.5. Pelvis

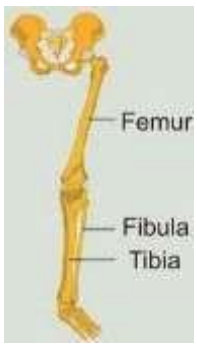
ii) Bones of legs and arms

1. Legs

The legs are called hind-limbs. Each leg has three long bones and several short bones. These bones make up the foot. Major bones of the leg are femur, tibia and fibula. The upper part of the leg has a long bone. It is called **femur**.

The lower part of a leg is made up of two bones—tibia and fibula. Tibia is larger than fibula.

Picture 11.6. Leg



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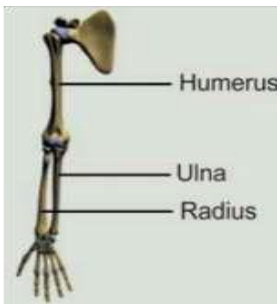
2. Arms

The arms are called forelimbs. Each arm has three long bones and several short bones. These bones form the fingers and the hands. Major bones of an arm are humerus, ulna and radius.

The upper part of an arm has a long bone. It is called **humerus**.

The lower part of an arm is made up of two bones— radius and ulna



Picture 11.7. Arm

11.2, Functions of the skeletal system

Without a skeletal system we would just have only the skin. The skeleton gives shape and support to our body. It also has other; functions which include :

- ✓ **Protects the brain**
- ✓ **Helps in talking and chewing food**
- ✓ **regulate the release of hormones.**
- ✓ **store minerals**
- ✓ **Helps us to move and walk**
- ✓ **Protects the spinal cord**

The skeleton together with muscles **help us to move.**

It protects all the delicate organs like brain and heart.

Some bones **produce blood cells** in the bone marrow.

Marrow is a soft tissue present inside the bone.

Bone tissues **store minerals** like calcium and phosphorus.

Bones **regulate the release of hormones.**

The facial bones form jaws which **help us in speaking and eating.**

The vertebral column or spine **protects the spinal cord.**

11.3, Main types of joints

Our body is made up of many bones. Where two bones meet, there is a joint.

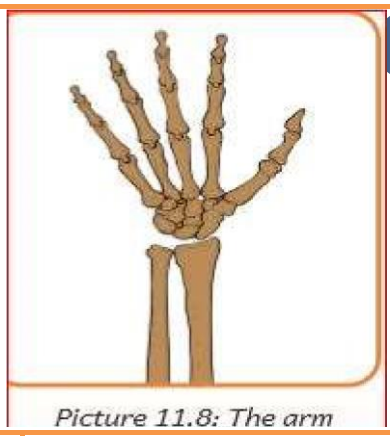
Joints help us bend, move and turn different parts of the body. There are two main types of joints:

1. **Movable Joints**

These joints allow movement.

They help us to walk, run, write and do many other things.

- **Examples of movable joints:**
- **Knee joint**: helps us bend our leg
- **Elbow joint**: helps us bend our arm
- **Shoulder joint**: helps us move our arm around
- **Neck joint**: helps us turn our head



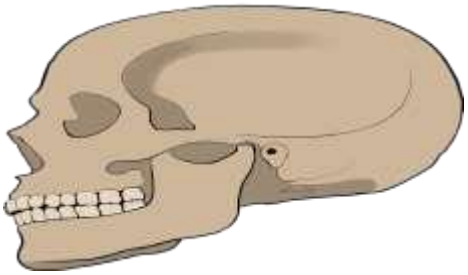
Picture 11.8: The arm

2. **Non-Movable Joints** These joints do not move.

They hold bones together and protect parts of the body.

Example:

Skull joints – the bones in your head are joined but do not move.



11.4, Caring for the skeleton

The skeleton helps us to stand, move and protect our body. To keep our bones strong and healthy, we must take good care of them through food, exercise, water and safe habits.

The following can help us to care for and improve our bones' health:

1. **Eat healthy foods for strong bones**

Eat foods rich in calcium and Vitamin D.

2. **Do daily physical exercise**

Exercising helps bones grow stronger. One should avoid sitting or lying down all day.

3. **Drink clean water every day**

Water keeps joints like knees and elbows healthy and helps movement.

4. **Prevent bone accidents** by preventing falls and injuries

5. **Never play dangerous games**

6. **Be careful when playing or walking.**

Don't push or fight your friends during games.

Avoid climbing trees or jumping from high places.

7. **Get enough sunlight**

Sunlight helps the body make Vitamin D, which is good for strong bones.

Play or stay outside in the morning or afternoon sun (not too hot!).

This should last between 10 minutes and 30 minutes every day.

8. **Sit and stand with good posture**

Sit upright when in class or doing homework.

Do not bend your back or lean too much when writing or reading.

This helps your backbone stay in the right shape.

9. Get enough sleep and rest

Sleeping helps the body grow and repair bones.

Children need more sleep to grow strong and healthy.

10. Go for health check-ups

Visit the doctor or health center if you feel bone or joint pain. Regular check-ups help find problems early.

ASSESS YOURSELF

50 MULTIPLE CHOICE QUESTIONS (MCQs)

(Each question is followed by four options — circle or tick the correct answer)

1. The human skeleton is made up of: A) Muscles B) Bones C) Flesh D) Hair
2. The main function of the skeleton is to:
   A) Help breathing B) Help digestion C) Give shape and support D) Make food
3. The skeleton protects: A) Hair B) Skin C) Internal organs D) Hands
4. The human skeleton consists mainly of:
   A) Skull, arms, legs B) Heart, lungs, brain C) Hands, feet, ears D) Eyes, nose, mouth
5. The skull protects the: A) Heart B) Brain C) Lungs D) Liver
6. The skull is the: A) Softest bone B) Hardest bone C) Longest bone D) Smallest bone
7. The cranium protects and supports the: A) Eyes B) Brain C) Ears D) Heart
8. How many bones make up the cranium? A) 4 B) 8 C) 10 D) 12
9. Facial bones in the face and jaws are: A) 8 B) 12 C) 14 D) 20
10. The only movable bone in the skull is the:
    A) Nose bone B) Lower jaw C) Ear bone D) Cheek bone
11. The backbone is also called the: A) Rib cage B) Spine C) Pelvis D) Neck
12. The backbone is made up of: A) 30 bones B) 32 bones C) 33 bones D) 12 bones
13. The 33 small bones in the spine are called: A) Vertebrae B) Cartilage C) Joints D) Marrow
14. The spine protects the: A) Brain B) Heart C) Spinal cord D) Lungs
15. The rib cage protects the:
    A) Heart and lungs B) Legs and arms C) Brain D) Stomach only
16. The number of rib pairs in a human body is: A) 10 B) 12 C) 14 D) 18
17. The lower part of the trunk is called: A) Chest B) Pelvis C) Shoulder D) Neck
18. The pelvis supports the: A) Lungs B) Abdomen C) Heart D) Neck
19. The long bone in the upper leg is called: A) Tibia B) Femur C) Fibula D) Humerus
20. The two bones in the lower leg are:
    A) Femur and Tibia B) Tibia and Fibula C) Radius and Ulna D) Spine and Pelvis
21. The upper arm bone is called: A) Radius B) Ulna C) Humerus D) Femur
22. The two bones in the lower arm are:
    A) Radius and Ulna B) Tibia and Fibula C) Spine and Rib D) Femur and Pelvis

23. The skeleton works together with _____ to help us move.
A) Lungs B) Muscles C) Skin D) Hair
24. Bone marrow helps to produce: A) Sweat B) Blood cells C) Hair D) Skin cells
25. Bone tissue stores: A) Vitamins B) Minerals C) Water D) Fat
26. Which minerals are stored in bones?
A) Calcium and Phosphorus B) Iron and Zinc C) Sodium and Potassium D) Copper and Iodine
27. Joints are found where:
A) Two muscles meet B) Two bones meet C) Two veins meet D) Two nerves meet
28. Movable joints help us to: A) Sleep B) Bend and move C) Eat D) Digest food
29. Non-movable joints are found in the: A) Neck B) Skull C) Elbow D) Knee
30. The knee joint helps us to:
A) Bend the arm B) Bend the leg C) Turn the head D) Walk straight
31. The elbow joint helps us to:
A) Bend our leg B) Bend our arm C) Move our head D) Jump
32. The shoulder joint helps us to:
A) Sit B) Turn the head C) Move the arm around D) Stand
33. The neck joint helps us to:
A) Bend knees B) Turn our head C) Move our fingers D) Stretch arms
34. Which joint does not move? A) Elbow B) Skull C) Shoulder D) Neck
35. The skeleton also helps to:
A) Store sugar B) Make food C) Regulate hormones D) Pump blood
36. Eating foods rich in calcium helps to:
A) Strengthen bones B) Improve sight C) Heal wounds D) Grow hair
37. Vitamin D helps the body to:
A) Produce energy B) Absorb calcium C) Store water D) Digest food
38. Exercise helps bones to become: A) Weak B) Lazy C) Strong D) Small
39. Clean water keeps our _____ healthy. A) Joints B) Eyes C) Teeth D) Nails
40. The rib cage protects the:
A) Brain B) Spinal cord C) Heart and lungs D) Stomach
41. The facial bones help us to: A) Chew and speak B) See C) Hear D) Smell
42. Sitting upright helps to maintain a healthy:
A) Heart B) Backbone C) Brain D) Rib cage
43. We should avoid playing: A) Football B) Dangerous games C) Jump rope D) Running
44. Getting sunlight helps the body to produce:
A) Calcium B) Vitamin D C) Protein D) Water
45. The skeleton supports the: A) Heart B) Body C) Hands D) Hair
46. Children need more:
A) Sleep and rest B) Food only C) Water only D) Exercise only
47. Regular check-ups help to:
A) Damage bones B) Prevent bone problems C) Cause pain D) Break bones
48. Without a skeleton we would:
A) Run faster B) Stand straight C) Collapse D) Grow taller
49. The backbone helps to:
A) Support the head B) Help digestion C) Store fat D) Pump blood
50. The main source of calcium for bones is:
A) Milk and fish B) Rice and beans C) Sugar and oil D) Bread and jam

🦴 THE HUMAN SKELETON – OPEN-ENDED QUESTIONS

Name: _____ Class: _____ Date: _____

1. What is the skeleton made of?

.....

2. Write two main functions of the skeleton.

1. .....
2. .....

3. Mention the three main parts of the skeleton.

.....

4. What does the skull protect?

.....

5. How many bones form the cranium?

.....

6. Name two major bones found in the face.

1. .....
2. .....

7. What is the only movable bone in the skull?

.....

8. What protects the spinal cord?

.....

9. How many vertebrae make up the spine?

.....

10. State two functions of the rib cage.

1. .....
2. .....

11. How many pairs of ribs are found in the human body?

.....

12. What is the function of the pelvis?

.....

13. Name three main bones of the leg.

1. .....
2. .....
3. .....

14. Which bone is the longest in the human body?

.....

15. Mention two bones found in the lower leg.

1. .....
2. .....

16. Name the three major bones of the arm.

.....

17. What does the humerus connect?

.....

18. What are joints?

.....

19. Write two examples of movable joints.

1. .....
2. .....

20. Write one example of a non-movable joint.

.....

21. What is the function of joints in our body?

.....

22. What are two functions of the skeleton besides movement?

1. .....
2. .....

23. What is bone marrow?

.....

24. Where is bone marrow found?

.....

25. Mention two minerals stored in bones.

1. .....
2. .....

26. Write two ways the skeleton protects our organs.

1. .....
2. .....

27. How can you make your bones strong?

.....

28. Name two foods that help bones grow strong.
    1. .....
    2. .....

29. Why should we drink clean water every day?

.....

30. Why should we do daily physical exercise?

.....

31. How does sunlight help our bones?

.....

32. What is good posture?

.....

33. Why should we sit upright while studying?

.....

34. Why should we avoid dangerous games?

.....

35. What happens if you fall and break a bone?

.....

36. What should you do if you feel bone or joint pain?

.....

37. Why should children get enough sleep?

.....

38. What do facial bones help us to do?

.....

39. What part of the skeleton protects the brain?

.....

40. How does the skeleton help us to move?

.....

41. Why are ribs curved in shape?

.....

42. What connects the ribs at the front of the body?

.....

43. What is the role of the spine in our body?

.....

44. Why is the skull hard?

.....

45. Mention two examples of movable joints and where they are found.

1. .....
2. .....

46. What happens to a person who lacks Vitamin D?

.....

47. How does the skeleton help in blood production?

.....

48. Write two ways to prevent bone accidents.

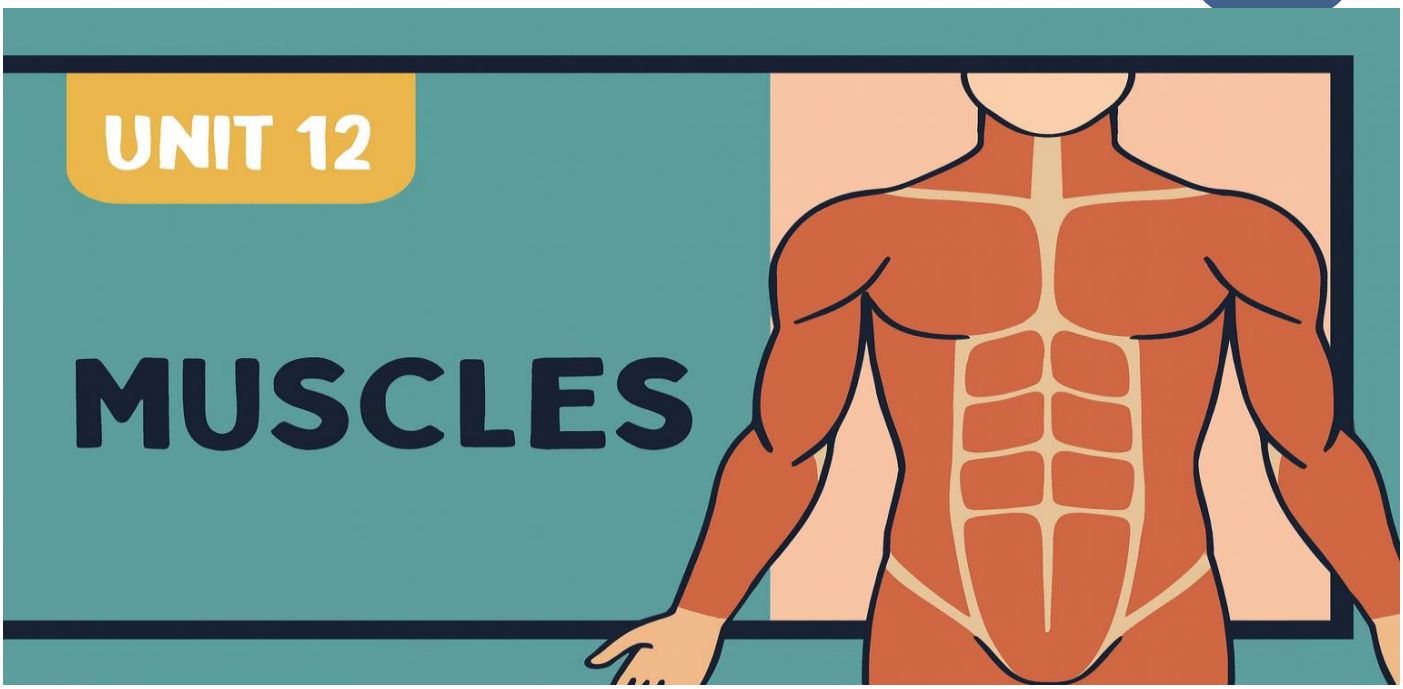
1. .....
2. .....

49. Mention two body parts attached to the pelvis.

1. .....
2. .....

50. What happens if the skeleton had no joints?

.....



Introduction

Muscles help us move, play, run and do many other activities. They work together with our bones to make our bodies strong and active. In this unit, we will learn about different kinds of muscles, how they help us move and how to keep them healthy and safe.

12.1, Definition and types of muscles

12.1.1, Definition of muscles

Muscles are soft tissues that cover bones and enable movement.

They work in coordination with bones to facilitate body movements.

Muscles are essential for activities like playing, dancing, walking and maintaining posture.

12.1.2. Types of muscles

Muscles help our bodies move, stay alive and do different jobs. There are two main types of muscles in our bodies:

1. **Voluntary muscles (Skeletal muscles)**

- These muscles are attached to your bones.
- You control them. That means you use them when you want to move.
- You use skeletal muscles when you walk, run, write and smile.
- They are called voluntary muscles because you choose to use them.

***Example**: The muscles in your arms and legs.*

Involuntary muscles (smooth muscles)

- These muscles are found inside your body, in places like stomach, heart, intestines bladder

- You do not control them.
- They help your body do things like digest food or push urine out.

Example: *The muscles that squeeze your food in your tummy.*

12.2. Major muscle groups

Our bodies have many muscles, but they can be put into a few main groups based on where they are and what they do. Here are the main muscle groups you should know:

1. Arm muscles

These muscles help you lift, carry, wave, or throw things.

Found in the upper arm and forearm. Examples: Biceps (front of upper arm), Triceps (back of upper arm)

When you bend your arm, your biceps are working!

Picture 12.2. Major muscles of an arm

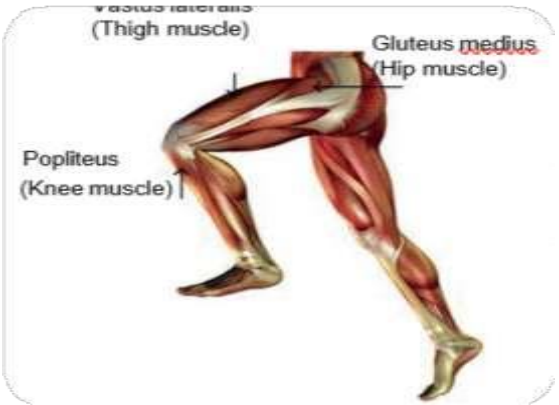
2. Leg muscles

These muscles help you walk, run, jump and kick.

Found in the thighs, calves and hips.

Your leg muscles are some of the strongest in your body!

Picture 12.3. Major muscles of the legs Muscles



3. Back muscles

- These muscles help you stand up straight and lift things.
- They also help you twist and turn.
- Found all along your upper and lower back.
- Your back muscles help support your spine.

4. **Chest muscles**

- Help you move your arms forward and across your body.
- Also help with breathing.

Example: Pectoral muscles

5. **Stomach (abdominal) muscles**

- Help you sit up, bend, twist and keep your balance.
- Found in your tummy area.

These muscles protect the organs inside your belly.

6. **Face and neck muscles**

- Help you smile, chew, blink and talk.
- Also help you turn your head and hold it up.

12.3, Functions of voluntary muscles

Major functions of voluntary muscles are:

1. **Help us to move:** Voluntary muscles make it possible for us to walk, run, jump and play.

Example: Leg and arm muscles help you play football or climb stairs.

2. **Help us do everyday tasks:** They help us write, eat, carry things and open doors.

Example: Your hand and arm muscles help you hold a pencil or a spoon.

3. **Help us stay balanced and stand upright:** Muscles in your tummy (abdominals), legs and back help you keep your balance and stand or sit properly.
4. **Help us make facial expressions:** Voluntary muscles in your face let you **smile, frown and talk**.

Example: You use facial muscles when you laugh or blow out candles.

5. **Protect bones and organs:** Some voluntary muscles also help protect your bones and soft organs, like the muscles in your chest and belly.

12.4. Muscle accidents (cramps) and first aid

Muscle accidents happen when muscles are hurt or injured during activities like sports, playing, lifting, or falling. One common type of muscle accident is muscle cramps.

A muscle cramp **is when a muscle suddenly tightens and causes pain**.

It may last a few seconds or minutes and usually happen in the legs, arms, or stomach muscles.

Causes of muscle cramps

Muscle cramps can happen when:

- You exercise for too long without resting
- You do not drink enough water
- You do not warm up before doing sports or
- exercise
- You sleep or sit in the same position for too long

Signs of a muscle cramp

- Sudden pain in a muscle
- The muscle feels tight or hard
- It's difficult to move the affected part

First aid for muscles cramps

If someone has a muscle cramp, follow these steps:

1. **Stop the activity:** Let the person rest immediately.
2. **Stretch the muscle gently:** Stretch the part slowly. For example, straighten a cramped leg.
3. **Massage the muscle:** Rub the muscle gently to help it relax.
4. **Give water:** Let the person drink water, especially if they are sweating.
5. **Use warm cloth:** If the pain continues, put a warm towel on the muscle to soothe it.

12.5, Caring for muscles

Our muscles help us move, play and do many things every day. To stay healthy and strong, muscles need proper care. The following are ways in which we can take good care of our muscles.

1. Take good food and pure air.
2. Avoid dangerous games.
3. Sit, walk and stand in a correct posture.
4. Do physical exercise regularly.

Maintaining tone of a muscle

Muscle tone is the natural tightness or tension in your muscles, even when you are not moving.

This helps them be ready when we need to move.

To keep muscle tone, we need to practice the following:

- Eat healthy food like fruits, vegetables and whole grains.
- Drink enough clean water.
- Do simple strength exercises like jumping, stretching, or carrying light objects.

Prevention of muscle accidents

During physical exercises, follow these tips to prevent accidents:

1. Take five to ten minutes to warm up and cool down properly.
2. Plan to start slowly and boost your activity level gradually.
3. Do not exercise when you are sick.
4. Choose clothes and shoes designed for your type of exercise.
5. Avoid exercise in humidity and overheating conditions.

TAKE YOUR TIME AND SPACE TO ANSWER EFFECTIVELY THESE QUESTIONS

UNIT 12: MUSCLES – 50 MCQs

Instructions: Choose the correct answer for each question.

1. Muscles help us to: a) Sleep b) Move c) Watch TV d) None
2. Muscles work together with: a) Bones b) Hair c) Teeth d) Nails
3. Voluntary muscles are also called: a) Smooth muscles b) Skeletal muscles c) Heart muscles d) Brain muscles
4. Voluntary muscles can be: a) Controlled b) Uncontrolled c) Dead d) None
5. Involuntary muscles are found in: a) Arms b) Legs c) Stomach d) Hands
6. Muscles that squeeze food in the tummy are: a) Voluntary b) Involuntary c) Leg muscles d) Arm muscles
7. Biceps are found in the: a) Leg b) Arm c) Stomach d) Back
8. Triceps are found in the: a) Back b) Arm c) Chest d) Leg
9. Leg muscles help us: a) Speak b) Walk c) Blink d) Hear
10. Chest muscles help in: a) Moving arms forward b) Digestion c) Writing d) Listening
11. Abdominal muscles are in the: a) Chest b) Back c) Stomach d) Arm
12. Face muscles help us to: a) Walk b) Smile c) Run d) Lift things
13. Neck muscles help us to: a) Speak b) Turn head c) Digest food d) Hear
14. Muscles protect: a) Skin b) Bones and organs c) Hair d) Eyes
15. Voluntary muscles help in: a) Seeing b) Moving c) Breathing d) Digesting
16. Muscle cramps cause: a) Laughter b) Pain c) Sleep d) Smell

17. Muscle cramps usually happen in: a) Stomach b) Legs c) Arms d) All
18. Causes of cramps include: a) Drinking water b) Exercising too long c) Sleeping well d) Eating fruits
19. Stretching a cramped muscle: a) Helps it relax b) Hurts it c) Breaks it d) Freezes it
20. Massaging a cramped muscle: a) Helps it relax b) Breaks it c) Makes pain worse d) Stops heart
21. Drinking water during cramps: a) Helps b) Hurts c) Nothing d) Breaks bone
22. Using warm cloth on muscle: a) Helps soothe b) Breaks it c) Cools body d) Cuts skin
23. Caring for muscles includes: a) Junk food b) Exercise c) Sleeping less d) Sitting all day
24. Correct posture helps: a) Muscles b) Hair c) Teeth d) Eyes
25. Muscle tone means: a) Muscles are soft b) Natural tension in muscles c) Muscles broken d) Muscles dead
26. Warm up before exercise: a) Prevents cramps b) Causes cramps c) Wastes energy d) Hurts bones
27. Cooling down after exercise: a) Prevents cramps b) Breaks muscles c) Stops heart d) Hurts legs
28. Muscle exercises: a) Jumping b) Stretching c) Lifting light objects d) All
29. Involuntary muscles help: a) Walk b) Digest food c) Run d) Smile
30. Voluntary muscles help: a) Speak b) Lift things c) Play d) All
31. Leg muscles are: a) Weakest b) Strongest c) Softest d) Dead
32. Arm muscles help to: a) Throw things b) Blink c) Digest food d) Hear
33. Back muscles help: a) Stand upright b) Sleep c) Digest d) Blink
34. Face muscles help: a) Smile b) Walk c) Jump d) Kick
35. Neck muscles help: a) Turn head b) Write c) Run d) Jump
36. Muscle tone keeps muscles: a) Ready to move b) Weak c) Dead d) Soft
37. Foods for strong muscles include: a) Fruits and vegetables b) Candy c) Chips d) Soda
38. Drinking enough water keeps muscles: a) Strong b) Weak c) Dead d) Dry
39. Avoiding dangerous games: a) Protects muscles b) Weakens muscles c) Breaks bones d) Hurts eyes
40. Exercising slowly: a) Prevents accidents b) Causes accidents c) Breaks muscles d) Weakens bones
41. Sitting correctly helps: a) Spine and muscles b) Hair c) Teeth d) Eyes
42. Overheating while exercising: a) Can cause cramps b) Prevents cramps c) Makes muscles stronger d) Helps posture
43. Muscle cramps can be caused by: a) Not resting b) Too much water c) Too much sleep d) Eating fruits
44. Muscles work with: a) Bones b) Teeth c) Skin d) Hair

45. Arm muscles are located in: a) Legs b) Arms c) Chest d) Back
46. Leg muscles help in: a) Jumping b) Smiling c) Blinking d) Chewing
47. Chest muscles are called: a) Pectorals b) Biceps c) Triceps d) Abdominals
48. Abdominal muscles help: a) Sit up b) Blink c) Hear d) Lift arms
49. Face muscles allow: a) Expression b) Walking c) Digestion d) Lifting
50. Muscle accidents can happen during: a) Sports b) Sitting c) Sleeping d) Eating

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50 Open-Ended Questions – Muscles (Grade 4)

Instructions: Write your answers in the space provided.

1. What are muscles?

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2. Name two types of muscles.

   .....

3. Where are voluntary muscles found?

   .....

4. Give one example of voluntary muscles.

   .....

5. Where are involuntary muscles found?

   .....

6. Give one example of involuntary muscles.

   .....

7. What do arm muscles help us do?

   .....

8. Name two arm muscles.

   .....

9. What do leg muscles help us do?

   .....

10. Name three places leg muscles are found.

    .....

11. What is the function of back muscles?

    .....

12. What do chest muscles help us do?

    .....

13. Give one example of chest muscles.

    .....

14. What do abdominal muscles help with?

    .....

15. Why are face muscles important?

    .....

16. Name two functions of neck muscles.

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17. How do voluntary muscles help us move?

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18. How do voluntary muscles help us with daily tasks?

.....

19. Why are voluntary muscles important for balance?

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20. Give an example of how face muscles are used.

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21. How do muscles protect bones and organs?

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22. What is a muscle cramp?

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23. Name two causes of muscle cramps.

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24. What is the first step in giving first aid for a cramp?

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25. How should you stretch a cramped muscle?

.....

26. Why do we massage a cramped muscle?

.....

27. Why should a person drink water during cramps?

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28. How does a warm cloth help a cramped muscle?

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29. Name one way to take care of muscles.

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30. Why is eating healthy food important for muscles?

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31. How does correct posture help muscles?

.....

32. Why should we exercise regularly?

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33. What is muscle tone?

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34. How can we maintain muscle tone?

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35. Why should we warm up before exercise?

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36. Why should we cool down after exercise?

.....

37. How do arm muscles help us play sports?

.....

38. How do leg muscles help us run and jump?

.....

39. Why is water important for muscles?

.....

40. How do face muscles help us communicate?

.....

41. Give an example of an involuntary muscle function.

.....

42. Give an example of a voluntary muscle function.

.....

43. Name one sign of a muscle cramp.

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44. What should you avoid to prevent muscle accidents?

.....

45. Why is avoiding dangerous games important for muscles?

.....

46. How does fresh air help muscles?

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47. How do you keep your muscles strong?

.....

48. Name one exercise that helps muscles.

.....

49. What happens if muscles are not cared for?

.....

50. Write one way to prevent muscle cramps.

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- **For a focus on questioning:** "The important thing is not to stop questioning." —Albert Einstein
- **For creativity and exploration:** "Science is the art of turning imagination into reality." — Unknown
- **For the role of the scientist:** "The scientist is not the person who gives the right answers, they are the ones who ask the right questions." —Claude Levi-Strauss
- **For understanding the world:** "Nothing in life is to be feared. It is only to be understood." — Marie Curie
- **For the joy of discovery:** "Somewhere, something incredible is waiting to be known." —Carl Sagan