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GOVERNMENT OF TAMIL NADU

# STANDARD SEVEN

## TERM - II

## VOLUME - 3

# SCIENCE
# SOCIAL SCIENCE

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Department of School Education

Untouchability is Inhuman and a Crime

VII Std Science Term-2 EM Introduction Pages.indd 1 27/06/2023 12:39:58

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VII Std Science Term-2 EM Introduction Pages.indd 2 6/3/2024 4:14:21 PM

## PREFACE

The Science textbook for standard Seven has been prepared following the guidelines given in the National Curriculum Framework 2005. The book enables the reader to read the text, comprehend and perform the learning experiences with the help of teacher. The Students explore the concepts through activities and by the teacher demonstration. Thus the book is learner centric with simple activities that can be performed by the students under the supervision of teachers.

## HOW TO USE THE BOOK?

- The Second term VII Science book has six units.
- Two units planned for every month including computer science chapter has been introduced.
- Each unit comprises of simple activities and experiments that can be done by the teacher through demonstration if necessary student's can perform them.
- Colorful info-graphics and info-bits enhance the visual learning.
- Glossary has been introduced to learn scientific terms.
- The "Do you know?" box can be used to enrich the knowledge of general science around the world.
- ICT Corner and QR code has been introduced in each unit for the first time to enhance digital science skills.

**Lets use the QR code in the text books ! How ?**

- Download the QR code scanner from the Google play store/ Apple App Store into your Smart phone.
- Open the QR code scanner application
- Once the scanner button in the application is clicked, camera opens and then bring it closer to the QR code in the text book.
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- Click the URL and go to the content page.



VII Std Science Term-2 EM Introduction Pages.indd 3 27/06/2023 12:39:58

# STANDARD SEVEN - TERM - II - SCIENCE



## Table of Contents


| Unit | Titles | Page No. | Month |
|---|---|---|---|
| 1. | Heat and Temperature | 1 | October |
| 2. | Electricity | 12 | November |
| 3. | Changes Around Us | 36 | November |
| 4 | Cell Biology | 57 | October |
| 5 | Basis of Classification | 70 | December |
| 6 | Digital Painting | 87 | December |


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Assessment



VII Std Science Term-2 EM Introduction Pages.indd 4 27/06/2023 12:39:58

# Unit 1

# Heat and Temperature



## Learning Objectives

- To understand the working principle of thermometer
- To measure temperature using thermometer
- To know about Thermometric Liquids
- To differentiate between Clinical and Laboratory Thermometer
- To know the various units of temperature
- To convert a temperature from a thermometer scale to others.

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VII Std Science Term-2 EM Unit 1.indd 1 11/11/2022 18:02:54

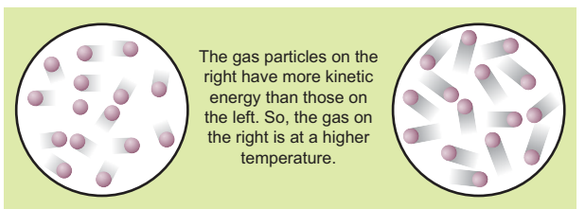
## Introduction



You shiver when it is cold outside and sweat when it is hot outside, but how can you measure those weather temperatures? Temperature is involved in many aspects of our daily lives, including our own bodies and health; the weather; and how hot the stove must be in order to cook food.

**The measurement of warmness or coldness of a substance is known as its temperature.**

It is a measure of the average kinetic energy of the particles in an object. Temperature is related to how fast the atoms within a substance are moving.




## 1.2 Temperature Units:

There are three units which are used to measure the temperature: Degree Celsius, Fahrenheit and Kelvin.

**Degree Celsius:** Celsius is written as°C and read as degree. For example 20°C; it is read as twenty degree Celsius. Celsius is called as Centigrade as well.

**Fahrenheit:** Fahrenheit is written as °F for example 25°F; it is read as twenty five degree Fahrenheit.

**Kelvin:** Kelvin is written as K. For example 100K; it is read as hundred Kelvin.

**The SI unit of temperature is kelvin (K).**

## 1.3 Measuring Temperature

The temperature of the object is well approximated with the kinetic energy of the substances. The high temperature means that the molecules within the object are moving at a faster rate.

But the question arises, how to measure it? Molecules in any substance are very small to analyze and calculate its movement (Kinetic energy) in order to measure its temperature. You must use an indirect method to measure the kinetic energy of the molecules of a substance.

We studied that solids expands when heat is supplied to it. Like solid substances, liquids are also affected by heat. To know this let us do the activity 1.

**In a thermometer, when liquid gets heat, it expands and when it is cooled down, it contracts. It is used to measure temperature.**

Like solid and liquid objects, the effect of heat is also observed on gaseous objects.

## 1.4 Thermometer:

**Thermometer is the most common instrument to measure temperature.**

There are various kinds of thermometers. Some of them are like glass tubes which look thin and are filled with some kind of liquid.

**Why Mercury or Alcohol is used in Thermometer?**

Mostly Alcohol and Mercury are used in thermometers as they remain in liquid form even with a change of temperature in them. A small change in the temperature causes change in volume of a liquid. We measure this temperature by measuring expansion of a liquid in thermometer.

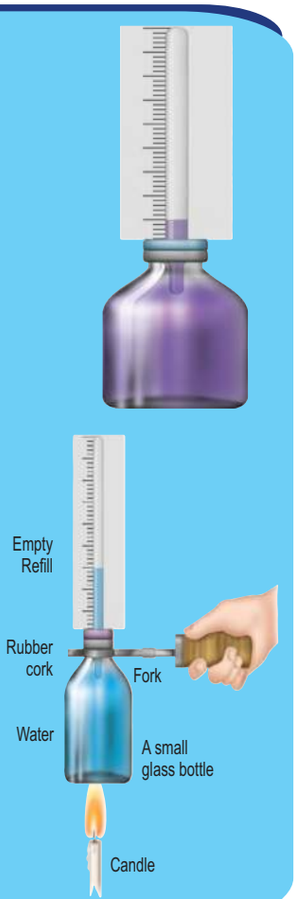
## ACTIVITY 1

**What is required?**

A small glass bottle, a rubber cork, an empty refill, water, colour, a candle, a fork, a paper.

**What to do?**

- Take a small glass bottle. Fill it with coloured water.
- Make hole at the centre of the rubber cork.
- Pass empty refill from the hole of the rubber cork.
- Make the bottle air tight and observe the water raised in the refill.
- Make a scale on paper, place it behind the refill and note down the position of the surface of water.
- Hold bottle with fork and supply heat to it with candle. Then observe.




**What is the change in the surface of water?**

---

- Stop the supply of heat. When water is cooled, observe the surface of water in the refill, **what change takes place? Why?**

---

**When, a liquid is heated, it expands and when it is cooled down, it contracts.**

### Properties of Mercury:-

- Its expansion is uniform. (For equal amounts of heat it expands by equal lengths.)
- It is opaque and shining.
- It does not stick to the sides of the glass tube.
- It is a good conductor of heat.
- It has a high boiling point (357°C) and a low freezing point (−39°C). Hence a wide range of temperatures can be measured using a mercury thermometer

### Properties of Alcohol

- The freezing point of alcohol is less than −100°C. So it can be used to measure very low temperatures.
- Its expansion per degree Celsius rise in temperature is very large.
- It can be coloured brightly and hence is easily visible.

## 1.4 Types of Thermometers

There are different types of thermometers for measuring the temperatures of different things like air, our bodies, food and many other things. Among these, the commonly used thermometers are clinical thermometers and laboratory thermometers.

### 1.4.1 Clinical Thermometer

These thermometers are used to measure the temperature of a human body, at home, clinics and hospitals. All clinical thermometers have a kink that prevents the mercury from

## ACTIVITY 2

**What is required?**

A big bottle, a balloon, threads, candle, water, fork

**What to do?**

- Take one big bottle, and fill some water in it.
- Attach one balloon on the mouth of bottle and fix it with thread.
- Hold bottle with a fork. Heat the bottle with a candle and take observation.
- What change occurs in the state of balloon after heating the bottle?

  ----------
- What change occurs in the state of balloon after heating the bottle?

**Why?** ----------

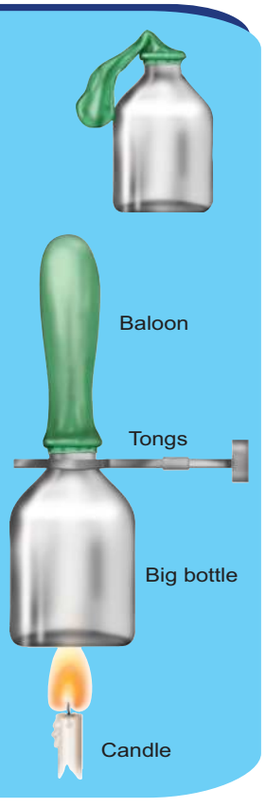
Now, let the bottle get cooled down.

**What change occurs in the state of balloon after bottle gets cool down?**

**Why?** ----------

**When gases substance gets heat, it expands; when it cools it contracts.**

Why does a tyre get burst in summer? ----------




flowing back into the bulb when the thermometer is taken out of the patient's mouth, so that the temperature can be noted conveniently. There are temperature scales on either side of the mercury thread, one in Celsius scale and the other in Fahrenheit scale. Since the Fahrenheit scale is more sensitive than the Celsius scale, body temperature is measured in F only. A clinical thermometer indicates temperatures from a minimum of 35°C or 94°F to a maximum of 42°C or 108°F.



**Precautions to be Followed While Using a Clinical Thermometer**

- The thermometer should be washed before and after use, preferably with an antiseptic solution.
- Jerk the thermometer a few times to bring the level of the mercury down.
- Before use, the mercury level should be below 35°C or 94°F.
- Do not hold the thermometer by its bulb.
- Keep the mercury level along your line of sight and then take the reading.
- Handle the thermometer with care. If it hits against some hard object, it may break.
- Do not place the thermometer in a hot flame or in the hot sun.

### 1.4.2 Laboratory Thermometers

Laboratory thermometers are used to measure the temperature in school and other laboratories for scientific research. They are also used in the industry as they can measure temperatures higher than what clinical thermometers can record. The stem and the bulb of a lab thermometer are longer when compared to that of a clinical thermometer and

there is no kink in the lab thermometer. A laboratory thermometer has only the Celsius scale ranging from −10°C to 110°C.



**Precautions to be Followed While Using a Laboratory Thermometer**

- Do not tilt the thermometer while measuring the temperature. Place it upright.
- Note the reading only when the bulb has been surrounded by the substance from all sides.




In humans, the average internal temperature is 37°C (98.6°F), though it varies among individuals. However, no person always has exactly the same temperature at every moment of the day. Temperatures cycle regularly up and down through the day according to activities and external factors.

## ACTIVITY 3

**Measure your body temperature**

Wash the thermometer preferably with an antiseptic solution. Hold it firmly by the end and give it a few jerks. These jerks will bring the level of Mercury down. Ensure that it falls below 35°C (95°F). Now place the thermometer under your tongue or arm pit. After one minute, take the thermometer out and note the reading. It tells you your body temperature. **What did you record as your body temperature?**_____

## ACTIVITY 4

**Use of Laboratory thermometer**

- Take some water in a beaker.
- Take a laboratory thermometer and immerse its bulb end in water; holding it vertically. Ensure to dip whole portion of bulb end. The bulb end should not touch the bottom or side of the beaker.
- Observe the movement of rise of mercury. When it becomes stable, take the reading of the thermometer.
- Repeat this with hot water and take the reading.

### Difference between clinical and laboratory thermometer

| Clinical Thermometer | Laboratory Thermometer |
|---|---|
| Clinical thermometer is scaled from 35°C to 42°C or from 94°F to 108°F. | Laboratory thermometer is generally scaled from –10°C to 110°C. |
| Mercury level does not fall on its own, as there is a kink near the bulb to prevent the fall of mercury level. | Mercury level falls on its own as no kink is present. |
| Temperature can be read after removing the thermometer from armpit or mouth. | Temperature is read while keeping the thermometer in the source of temperature, e.g. a liquid or any other thing. |
| To lower the mercury level jerks are given. | No need to give jerk to lower the mercury level. |
| It is used for taking the body temperature. | It is used to take temperature in laboratory. |



VII Std Science Term-2 EM Unit 1.indd 5 11/11/2022 18:02:56

### 1.4.3 Digital Thermometer

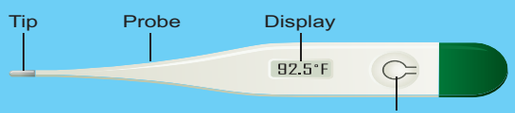
Here is a lot of concern over the use of mercury in thermometers. Mercury is a toxic substance and is very difficult to dispose of if a thermometer breaks. These days, digital thermometers are available which do not use mercury. Instead, it has a sensor which can measure the heat coming out from the body directly and from that can measure the temperature of the body.




Digital thermometers are mainly used to take the body temperature.

**ACTIVITY 5**

**Use of Digital thermometer**




1. Wash the tip with warm (not hot), soapy water.
2. Press the "ON" button.
3. Insert the tip of the thermometer into the mouth, bottom, or under the armpit.
4. Hold the thermometer in place until it beeps (about 30 seconds).
5. Read the display.
6. Turn off the thermometer, rinse under water, and put it away in a safe place.

### Caution

Alex wanted to measure the temperature of hot milk using a clinical thermometer. His teacher stopped him from doing so.

We are advised not to use a clinical thermometer for measuring the temperature of any object other than human body. Also we are advised to avoid keeping it in the sun or near a flame. Why?

A Clinical thermometer has small temperature range. The glass will crack/ burst due to excessive pressure created by expansion of mercury.




**Maximum-minimum thermometer**

The maximum and minimum temperatures of the previous day reported in weather reports are measured by a thermometer called the maximum - minimum thermometer.

## 1.5 Scales of thermometers

**Celsius scale**

Celsius is the common unit of measuring temperature, termed after Swedish astronomer, **Anders Celsius** in 1742, before that it was known as Centigrade as thermometers using this scale are calibrated from (Freezing point of water) 0°C to 100°C (boiling point of water). In Greek, '**Centium**' means 100 and '**Gradus**' means steps, both words make it **centigrade** and later **Celsius**.

**Fahrenheit Scale**

Fahrenheit is a Common unit to measure human body temperature. It is termed after the name of a German Physicist **Daniel Gabriel Fahrenheit**. Freezing point of water is taken as 32°F and boiling point 212°F. Thermometers with Fahrenheit scale are calibrated from 32°F to 212°F.

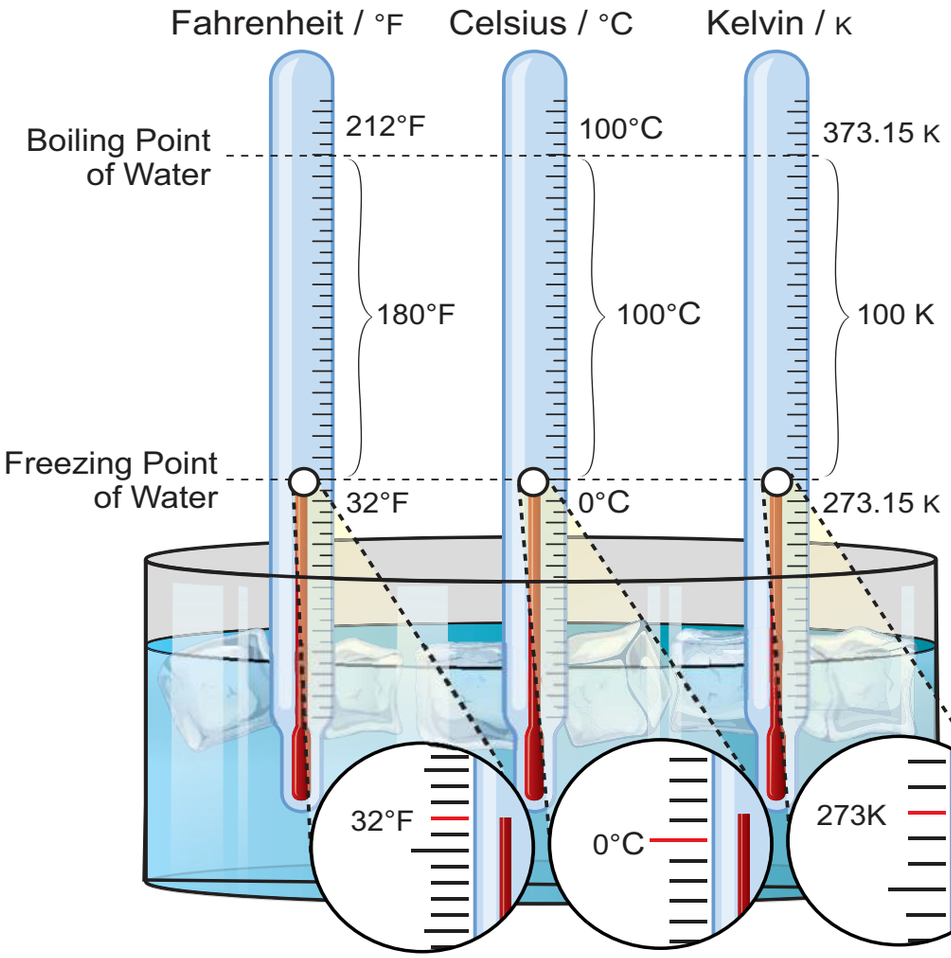
**Kelvin scale**

Kelvin scale is termed after **Lord Kelvin**. It is the SI unit of measuring temperature and written as K also known as absolute scale as it starts from absolute zero temperature.



VII Std Science Term-2 EM Unit 1.indd 6 11/11/2022 18:02:56

Temperature in Celsius scale can be easily converted to Fahrenheit and Kelvin scale as discussed ahead




Relation between Fahrenheit scale and Celsius scales is as under.

$$\frac{(F-32)}{9} = \frac{C}{5}, \quad K = 273.15 + C$$

The equivalence between principal temperature scales are given in Table for some temperatures.

| Temperature | Celsius scale (°C) | Farenheit scale (°F) | Kelvin scale (K) |
|---|---|---|---|
| Boiling point of water | 100 | 212 | 373.15 |
| Freezing point of water | 0 | 32 | 273.15 |
| Mean temperature of human body | 37 | 98.6 | 310.15 |

# HEAT AND TEMPERATURE

## KEY CONTRIBUTORS



Lord Kelvin



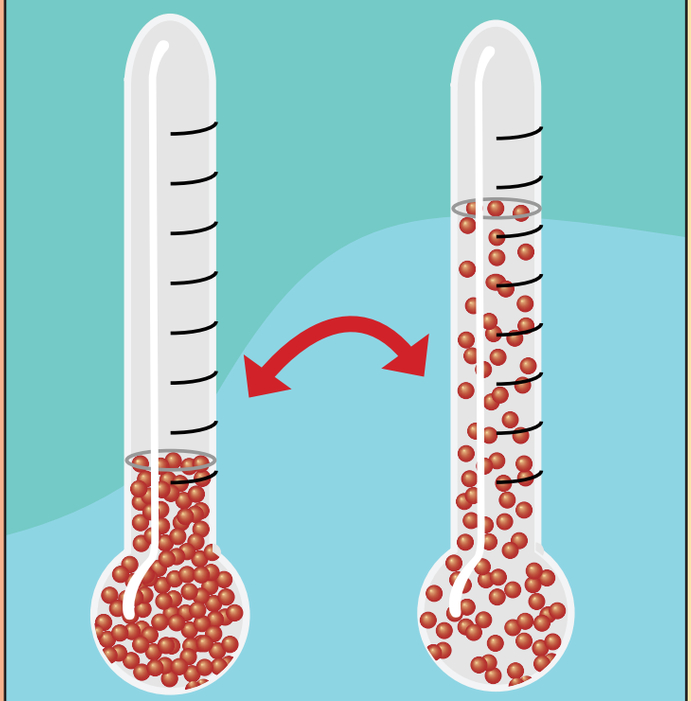
Anders Celsius



Gabriel Fahrenheit



Rankine




**Thermometer Liquid Expands when Heated**

**$10^{32}$ KELVIN**

Temperature of the Universe in the earliest moments after the Big Bang

**373.15 KELVIN**

Boiling point of water

100 °C, 212 °F

**329.85 KELVIN**

Hottest natural temperature ever recorded on Earth.

56.7 °C, 134.06 °F

**310.15 KELVIN**

Average human body temperature

37 °C, 98.6 °F

**273.15 KELVIN**

Freezing point of water

0 °C, 32 °F

**178.45 KELVIN**

Coldest natural temperature ever recorded on Earth

-94.7 °C, -138.46°F

**1 KELVIN**

The Boomerang Nebula maintains the coldest known natural temperature in the universe

-272.15 °C, -457.87 °F

**0 KELVIN**

**Absolute zero** Temperature

-273.15 °C, -459.67 °F




Most of the people in the world use the Celsius scale to measure temperature for day to day purpose. The Kelvin scale has been designed in such a way, it is not only an absolute temperature scale, but also 1°C change is equal to a 1K change. This makes the conversion from Celsius to absolute temperature scale (Kelvin scale) easy, just the addition or subtraction of a constant 273.15

But in United States they prefer to use the Fahrenheit scale. The problem is, converting Fahrenheit to absolute scale (Kelvin) is not easy.

To sort out this problem they use The Rankine scale. It named after the Glasgow University engineer and physicist **Rankine**, who proposed it in 1859. It is an absolute temperature scale, and has the property of having a 1°R change is equal to a 1°F change. Fahrenheit users who need to work with absolute temperature can be converted to Rankine by

R= F+ 459.67

## 1.6 Numerical Problems

**Solved examples**

**1. How much will the temperature of 68°F be in Celsius and Kelvin?**

**Given :**

Temperature in Fahrenheit = F = 68°F

Temperature in Celsius = C = ?

Temperature in Kelvin = K = ?

$$\frac{(F-32)}{9} = \frac{C}{5}$$

$$\frac{(68-32)}{9} = \frac{C}{5}$$

$$C = 5x\frac{36}{9} = 20°C$$

$$K = C + 273.15 = 20 + 273.15 = 293.15$$

Thus, the temperature in Celsius = 20ºC and in Kelvin = 293.15 K

**2. At what temperature will its value be same in Celsius and in Fahrenheit?**

**Given :** If the temperature in Celsius is C, then the temperature in Fahrenheit (F) will be same,

i.e. F = C. $\frac{(F-32)}{9} = \frac{C}{5}$

(or)

$$\frac{(C-32)}{9} = \frac{C}{5}$$

$$(C–32) \times 5 = C \times 9$$

$$5C – 160 = 9\,C$$

$$4\,C = – 160$$

$$C = F = – 40$$

The temperatures in Celsius and in Fahrenheit will be same at – 40

**3. Convert the given temperature :**

1) 45°C = ..... °F 2) 20°C = ..... °F

3) 68°F = ..... °C 4) 185°F = ..... °C

5) 0°C = ..... K 6) -20°C = ..... K

7) 100 K = ..... °C 8) 272.15 K = ..... °C

## POINTS TO REMEMBER

1. The measurement of warmness or coldness of a substance is known as its temperature.
2. There are three units which are used to measure the temperature: Degree Celsius, Fahrenheit and Kelvin.
3. The SI unit of temperature is Kelvin (K).
4. In a thermometer, when liquid gets heat, it expands and when it is cooled down, it contracts. It is used to measure temperature.

5. Relation between Fahrenheit scale and Celsius scales is

$$\frac{(F-32)}{9} = \frac{C}{5}$$

$$K = 273.15 + C$$



## EVALUATION




## I. Choose the correct answer

1. International unit of measuring temperature is _____

   a. Kelvin  b. Fahrenheit

   c. Celsius  d. Joule

2. In thermometer when bulb comes in contact with hot object, liquid inside it

   a. expands  b. contracts

   c. remains same  d. none of above

3. The body temperature of a healthy man is;

   a. 0°C  b. 37°C  c. 98°C  d. 100°C

4. Mercury is often used in laboratory thermometers because it _____

   a. is a harmless liquid

   b. is silvery in colour and is attractive in appearance

   c. Expands uniformly

   d. is a low cost liquid

5. Which of the following temperature conversions is incorrect

   K ( Kelvin) = °C ( Celsius) + 273.15

| | °C | K |
|---|---|---|
| a. | -273.15 | 0 |
| b. | -123. | +150.15 |
| c. | + 127. | + 400.15 |
| d. | + 450 | + 733.15 |

## II. Fill in the blanks

1. Doctor uses _____ thermometer to measure the human body temperature.

2. At room temperature Mercury is in _____ state.

3. Heat energy transfer from _____ to _____

4. – 7°C temperature is _____ than 0°C temperature.

5. The common laboratory thermometer is a _____ thermometer

## III. Match the following

| | |
|---|---|
| i) Clinical thermometer | A form of energy |
| ii) Normal temperature of human body | 100°C |
| iii) Heat | 37°C |
| iv) Boiling point of water | 0°C |
| v) Melting point of water | Kink |

## IV. Give very short answer

1. Temperature of Srinagar (J&K) is – 4°C and in Kodaikanal is 3°C which of them has greater temperature ? What is the difference between the temperatures of these two places?
2. Jyothi was prepared to measure the temperature of hot water with a clinical thermometer. Is it right or wrong? Why?
3. A clinical thermometer is not used to measure the temperature of air, why?
4. What is the use of kink in clinical thermometer?
5. Why do we jerk a clinical thermometer before we measure the body temperature?

## V. Give short Answer

1. Why do we use Mercury in thermometers? Can water be used instead of mercury? What are the problems in using it?
2. Swathi kept a laboratory thermometer in hot water for some time and took it out to read the temperature. Ramani said it was a wrong way of measuring temperature. Do you agree with Ramani? Explain your answer.
3. The body temperature of Srinath is 99°F. Is he suffering from fever? If so, why?

## VI. Give long answer

1. Draw the diagram of a clinical thermometer and label its parts.
2. State the similarities and differences between the laboratory thermometer and the clinical thermometer.

## VII. Higher Order Thinking questions

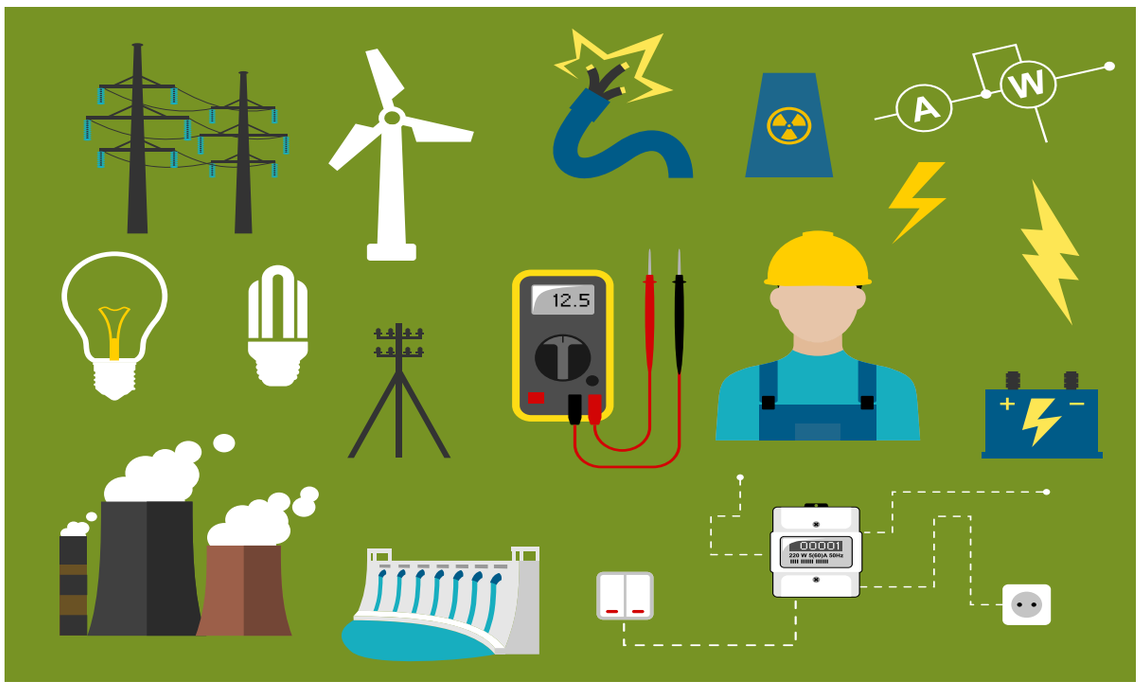
1. What must be the temperature in Fahrenheit, so that it will be twice its value in Celsius?
2. Go to a veterinary doctor (a doctor who treats animals). Discuss and find out the normal temperature of domestic animals and birds.



VII Std Science Term-2 EM Unit 1.indd 11 11/11/2022 18:02:58

# Unit 2

# ELECTRICITY




## Learning Objectives

- Understanding the flow of electric current and learning to draw the circuit diagram
- Understanding the difference between conventional current and electron flow.
- Understanding the different types of circuit based on flow of electricity and the connection of bulbs in a circuit
- Distinguishing a cell and a battery
- Understanding the effects of electric current and factors affecting the effect of electric current
- Applying their knowledge in identifying the components of electrical circuits.
- Understanding the discrimination between different type of circuits.
- Doing numerical problems and drawing the circuit diagram of their own.



VII Std Science Term-2 EM Unit 2.indd 12 7/15/2022 2:35:03 PM

## Introduction

In 1882, when it was sun set in the west that miracle happened in New york city. When Thomas Alva Edison gently pushed the switch on 14,000 bulbs in 9,000 houses suddenly got lighted up. It was the greatest invention to mankind. From then the world was under the light even in the night.

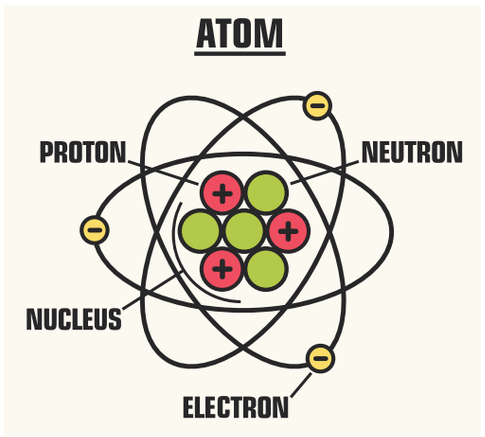
Many countries began using electricity for domestic purposes. Seventeen years after the New York, in 1899 electricity first came to India. The Calcutta Electric Supply Corporation Limited commissioned the first thermal power plant in India on 17 April 1899.

Around 1900s, a thermal power station was set up at Basin Bridge in Madras city and power was distributed to the government press, general hospital, electric tramways and certain residential areas in Madras. Today electricity is a common household commodity.



In your class 6, we learned about electricity and their sources. From operating factories, running medical equipments like ventilator, communications like mobile, radio and TV, drawing water to the agricultural field and light up homes electricity is important. What is electricity? We can see that. it is a form of energy, like heat and magnetism.

We have learnt that all materials are made up of small particles called atoms. The centre of the atom is called the nucleus. The nucleus consists of protons and neurtrons. Protons are positively charged. Neutrons have no charge. Negatively charged electrons revolve around the nucleus in circular orbits. Electricity is a form of energy that is associated with electric charges that exists inside the atom




### ACTIVITY 1

Comb your dry hair. Immediately after combing the dry hair, bring the comb closer to the bits of paper . what will you observe?



When you are getting up from the plastic chair , the nylon shirt seems to be stuck to the chair and make crackling sound. What is the reason for the creation of the sound?

A balloon sticks to wall without any adhesive after rubbing on your hand.

Do you know the reason for all?

In all the above activities, when a body is rubbed against some other body become charged.

Electric charge is measured in a unit called coulomb. One unit of coulomb is charge of approximately $6.242 \times 10^{18}$ protons or electrons.

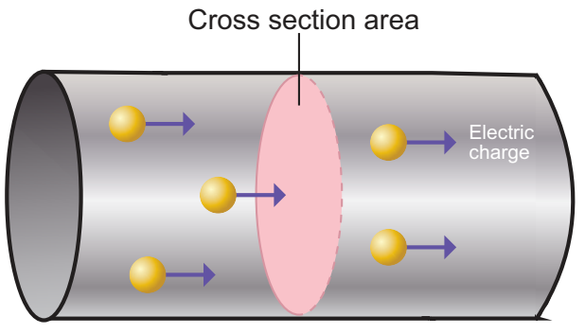
Electrical charges are generally denoted by the letter 'q'



VII Std Science Term-2 EM Unit 2.indd 13 7/15/2022 2:35:04 PM

## 2.1. Electric Current

The flow of electric charges constitute an electric current. For an electrical appliance to work, electric current must flow through it. An electric current is measured by the amount of electric charge moving per unit time at any point in the circuit. The conventional symbol for current is 'I'.




## Unit of Electric Current

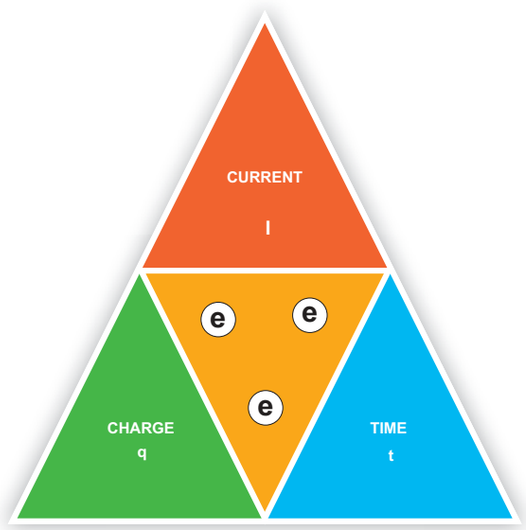
The SI unit for measuring an electric current is the **ampere**, which is the flow of electric charge across a surface at the rate of one coulomb per second.

$$I = \frac{q}{t}$$

Where I ⇒ current (in Ampere - A)

q ⇒ charge (in coulomb - c)

t ⇒ time taken (in seconds - s)




## Worked example 2.1

If 30 coulomb of electric charge flows through a wire in two minutes, calculate the current in the wire?

### Solution

**Given :**

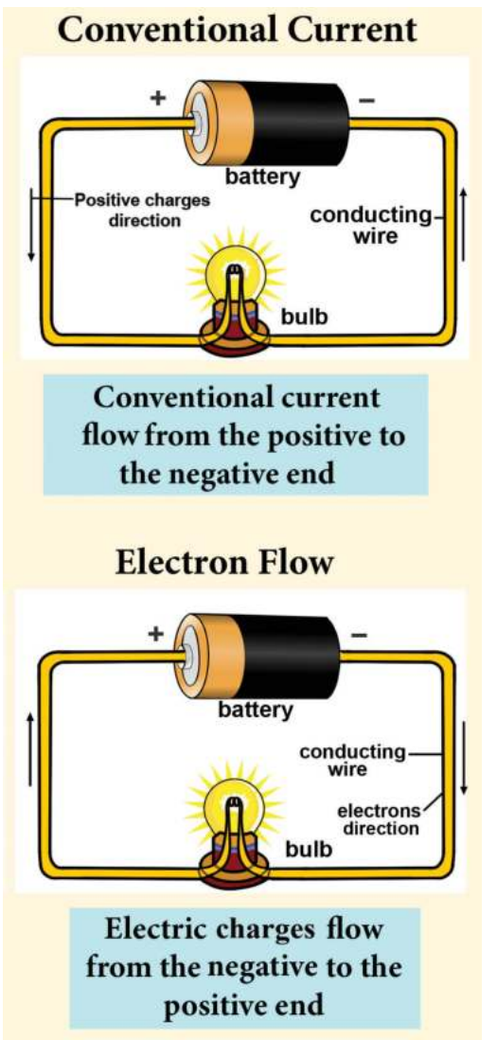
Charge (q) = 30 coulomb

Time (t) = 2 min x 60s

= 120 s

Current I = q/t = 30C/120s = 0.25 A

### 2.1.1. Conventional Current and Electron Flow



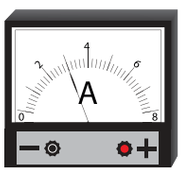

Before the discovery of electrons, scientists believed that an electric current consisted of moving positive charges.

This movement of positive charges is called **conventional current.**

After the electrons were discovered, it was known that electron flow actually takes place from the negative terminal to the positive terminal of the battery. This movement is known as **electron flow.**

Conventional current is in the direction opposite to electron flow.

### 2.1.2. Measurement of electric current




Electric current is measured using a device called ammeter. The terminals of an ammeter are marked with + and - sign. An ammeter must be connected in series in a circuit.

Instruments used to measure smaller currents, in the milli ampere or micro ampere range, are designated as milli ammeters or micro ammeters.

1 milliampere (mA) = $10^{-3}$ ampere.
= 1/1000 ampere
1 microampere (μA) = $10^{-6}$ ampere
= 1/1000000 ampere

## Worked Examples 2.2

If 0.002A current flows through a circuit, then convert the current in terms of micro ampere?

### Solution:

Given that the current flows through the circuit is 0.002A

We know that

$1\ A = 10^{6}\ \mu A$

$0.002A = 0.002 \times 10^{6}\ \mu A$

$= 2 \times 10^{-3} \times 10^{6}\ \mu A$

$= 2 \times 10^{3}\ \mu A$

$0.002A = 2000\ \mu A$

### 2.2. Potential difference (V)

Electrical charges need energy to push them along a circuit.

PS23F

Water always flows from higher to lower ground. Similarly an electric charge always flows from a point at higher potential to a point at lower potential.

An electric current can flow only when there is a potential difference (V) or P.D.

The potential difference between any two points in the circuit is the amount of energy needed to move one unit of electric charge from one point to the other.

### 2.2.1. Unit of potential difference

Did you ever notice the precautionary board while crossing the railway track and the electrical transformer? What does the word high voltage denotes?





VII Std Science Term-2 EM Unit 2.indd 15 7/15/2022 2:35:07 PM

The term metioned in the board volt is the measurement for the electric potential difference.

The SI unit of potential difference is volt (V). potential difference between two points is measured by using a device called voltmeter.

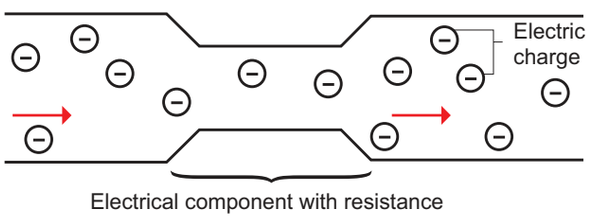
Water at the top of the waterfall has more potential energy



Water near the base of the waterfall has less potential energy

The electric current flow from the higher potential level to the lower potential level is just like the water flow.

## 2.2.2. Electrical conductivity and Resistivity




### Resistance (R)

An electrical component resists or hinders the flow of electric charges, when it is connected in a circuit. In a circuit component, the resistance to the flow of charge is similar to how a narrow channel resists the flow of water.

The higher the resistance in a component, the higher the potential difference needed to move electric charge through the component. We can express resistance as a ratio.

Resistance of a component is the ratio of the potential difference across it to the current flowing through it. $R = \frac{V}{I}$

The SI unit of resistance is ohm

Greater the ratio of V to I, the greater is the resistance

### Electrical conductivity (σ)

Electrical conductivity or specific conductance is the measure of a material's ability to conduct an electric current. It is commonly represented by the Greek letter σ (sigma) The SI Unit of electrical conductivity is Siemens/meter(S/m)

### Electrical resistivity (ρ)

Electrical resistivity (also known as specific electrical resistance, or volume resistivity) is a fundamental property of a material that quantifies how strongly that material opposes the flow of electric current. The SI unit of electrical resistivity is the ohm-metre (Ω.m).

| Material | Resistivity (ρ) (Ω m) at 20°C | Conductivity (σ) (S/m) at 20°C |
|---|---|---|
| Silver | $1.59 \times 10^{-8}$ | $6.30 \times 10^{7}$ |
| Copper | $1.68 \times 10^{-8}$ | $5.98 \times 10^{7}$ |
| Annealed Copper | $1.72 \times 10^{-8}$ | $5.80 \times 10^{7}$ |
| Aluminum | $2.82 \times 10^{-8}$ | $3.5 \times 10^{7}$ |

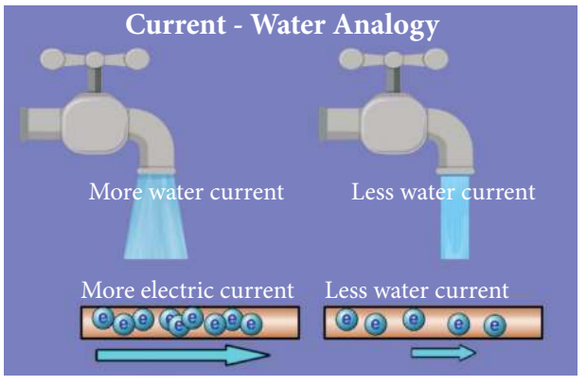
## 2.2.3. Analogy of Electric Current with Water Flow

An electric current is a flow of electrons through a conductor (like a copper wire). We can't see electrons, however, we can imagine the flow of electric current in a wire like the flow of water in a pipe.

Let us see the analogy of flow of electric current with the water flow.

Water flowing through pipes is pretty good mechanical system that is a lot like an electrical circuit. This mechanical system consists of a pump pushing water through a closed pipe. Imagine that the electrical current is similar to the water flowing through the pipe. The following parts of the two systems are related

- The pipe is like the wire in the electric circuit and the pump is like the battery.
- The pressure generated by the pump drives water through the pipe.
- The pressure is like the voltage generated by the battery which drives electrons through the electric circuit.
- Suppose, there are some dust and rust that plug up the pipe and slow the flow of water, creating a pressure difference from one end to the other end of the pipe. In similar way, the resistance in the electric circuit resists the flow of electrons and creates a voltage drop from one end to the other. Energy loss is shown in the form of heat across the resistor.




## 2.3. Sources of Electric current - Electro chemical cells or electric cells

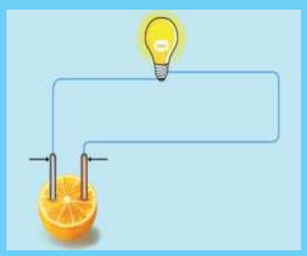
An electric cell is something that provides electricity to different devices that are not fed directly or easily by the supply of electricity.

### ACTIVITY 2

Shall we produce electricity at our home?

**Materials required:**

Zinc and copper electrodes, a light blub, connecting wires, and fruits such as lemons, orange, apples, grapes, and bananas.



**Procedure:**

1. Set up a circuit as shown in figure
2. Note the brightness of the blub when the circuit is connected to a lemon.
3. Repeat the experiment using the other fruits listed above. Do you notice the differences in the brightness of the bulb when it is connected to different fruits? Which fruit gives the greatest brightness? Why? (If you do not know please get the appropriate reason from your teacher)

**Inference:**

In the above activity what makes enabled the bulb to glow. Why there is a difference in the brightness of the bulb? The reason is that the fruits which you have connected to the bulb produces the electric energy at different levels

The sources which produce the small amount of electricity for shorter periods of time is called as electric cell or electro chemical cells. Electric cell converts chemical energy into electrical energy

In addition to electro chemical, we use electro thermal source for generating electricity for large scale use.

It has two terminals. When electric cells are used, a chemical reaction takes place inside the cells which produces charge in the cell.

| Primary Cell | Secondary Cell | | | |
|---|---|---|---|---|
| Dry cell | Lithium cylindrical cells | Button cells | Alkaline cells | Automobile battery |
|  |  |  |  |  |

## 2.3.1. Types of cell – primary cell and secondary cell

In our daily life we are using cells and batteries for the functioning of a remote, toys cars, clock, cellphone etc. Eventhough all the devices produces electrical energy, some of the cells are reusable and some of them are of single use. Do you know the reason why? Based on their type they are classified into two types namely – primary cell and secondary cell.

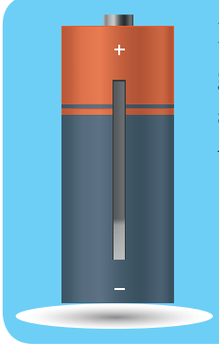
### Primary cell

The dry cell commonly used in torches is an example of a primary cell. It cannot be recharged after use.

### Secondary cells

Secondary cells are used in automobiles and generators. The chemical reaction in them can be reversed, hence they can be recharged. Lithium cylindrical cells, button cells and alkaline cells are the other types that are in use.

**ACTIVITY 3**



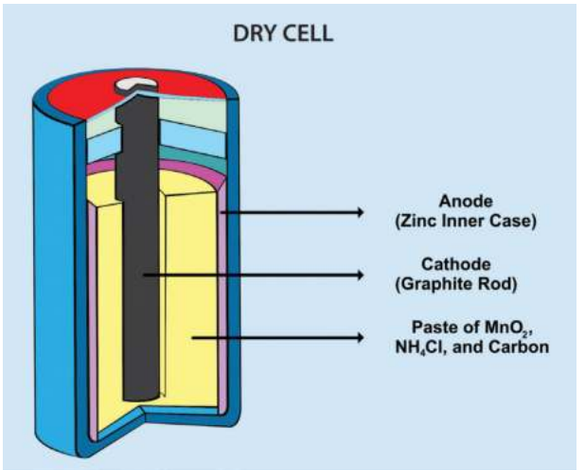
I am so exhausted. I am going to faint. What first aid will you give me to wake up?

## 2.3.2. Difference between primary cell and secondary cell

| PRIMARY CELL | SECONDARY CELL |
|---|---|
| 1. The chemical reaction inside the primary cell is irreversible | The chemical reaction inside the secondary cell is reversible |
| 2. It cannot be recharged. | It can be recharged |
| 3. Examples of secondary cells are lead accumulator, Edison accumulator and Nickel – Iron accumulator. | It is used to operate devices such as mobile phones, cameras, computers, and emergency lights. |
| 4. Examples- simple voltalic cell, Daniel cell, and lechlanche cell and dry cell | Examples of secondary cells are lead accumulator, Edison accumulator and Nickel – Iron accumulator. |

## 2.3.3. Primary cell – simply Dry cell

A dry cell is a type of chemical cell commonly used in the common form batteries for many electrical appliances. It is a convenient source of electricity available in portable and compact form. It was developed in 1887 by Yei Sakizo of Japan.




Dry cells are normaly used in small devices such as remote control for T.V, torch, camera and toys.

A dry cell is a portable form of a leclanche cell. It consists of zinc vessel which acts as a negative electrode or anode. The vessel contains a moist paste of saw dust saturated with a solution of ammonium chloride and zinc chloride.

The ammonium chloride acts as an electrolyte.

Electrolytes are substances that become ions in solution and acquire the capacity to conduct electricity.

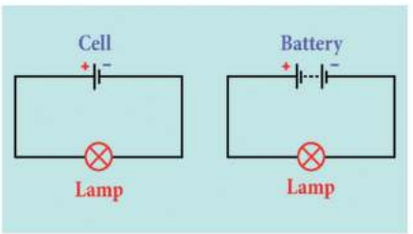
The purpose of zinc chloride is to maintain the moistness of the paste being highly hygroscopic. The carbon rod covered with a brass cap is placed in the middle of the vessel. It acts as positive electrode or cathode.

It is surrounded by a closely packed mixture of charcoal and manganese dioxide ($MnO_2$) in a muslin bag. Here $MnO_2$ acts as depolarizer. The zinc vessel is sealed at the top with pitch or shellac. A small hole is provided in it to allow the gases formed by the chemical action to escape. The chemical action inside the cell is the same as in leclanche cell.

The dry cell is not really dry in nature but the quantity of water in it is very small, as the electrolyte is in the from of a paste. In other cells, the electrolyte is usually a solution



## 2.3.4. Batteries




**Batteries are a collection of one or more cells** whose chemical reactions create a flow of electrons in a circuit. All batteries are made up of three basic components: an anode (the '+' side), a cathode (the '–' side), and some kind of electrolyte. Electrolyte is a substance that chemically reacts with the anode and cathode.

## 2.3.5. Invention of the Battery



One fateful day in 1780, Italian physicist, physician, biologist, and philosopher, Luigi Galvani, was dissecting a frog attached to a brass hook. As he touched the frog's leg with an iron scapel, the leg twitched.

Galvani theorized that the energy came from the leg itself, but his fellow scientist, Alessandro Volta, believed otherwise.



Volta hypothesized that the frog's leg impulses were actually caused by different metals soaked in a liquid.

He repeated the experiment using cloth soaked

in brine instead of a frog corpse, which resulted in a similar voltage. Volta published his findings in 1791 and later created the first battery, the voltaic pile, in 1800.



The invention of the modern battery is often attributed to Alessandro Volta. It actually started with a surprising accident involving the dissection of a frog.

## 2.4. ELECTRIC SWITCH

Our country faces a shortage of electricity. So wastage of electricity means you are depriving someone else of electricity. Your electricity bill goes up. So, we must use electricity very carefully and only when it is needed. We must use the electricity as long as we need it in our house hold activities.

Can you remember what you did last year to turn the current on or off?



This time, we shall use a switch to turn the current on or off. You may have used different kinds of switches to turn your household electric appliances on or off. Switches help us to start or stop the appliances safely and easily.

### ACTIVITY 4

**Make your own switch**




Let us make a switch of our circuits. Take 10 cm – long iron strip. Bend it twice as shown in figure. Now drive a nail into the bend of the wooden block. Nail one end of the strip to the other end of the wooden block so that its free end rests just above the first nail without touching it. Your switch is ready.

Would you like to test your switch? To do so, first set up the circuit as shown in the figure.

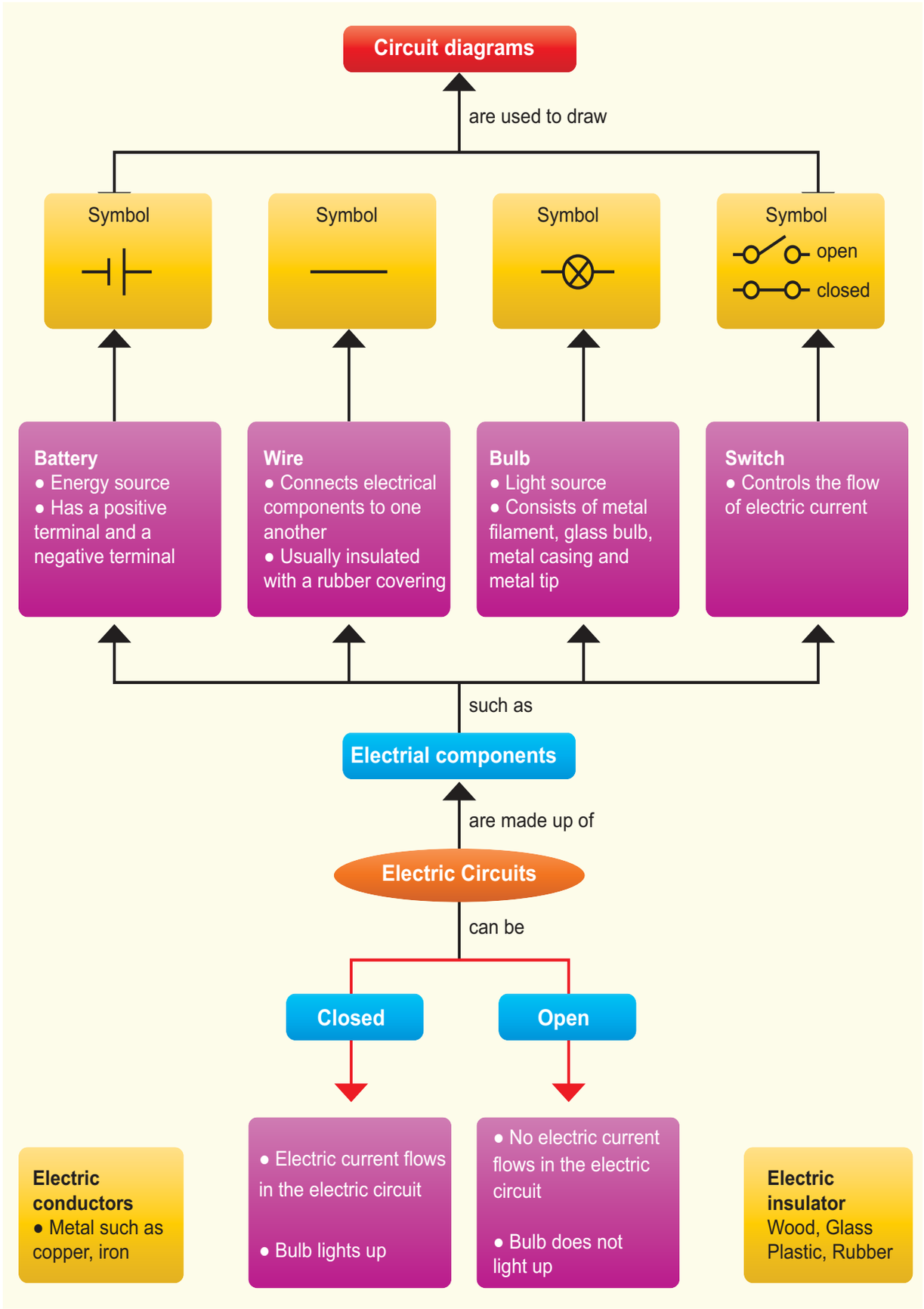
How would you use the switch to open or close the circuit.

If the bulb in your circuit glows when the metal strip of your switch is pressed on the nail and turns off when it is not, then your switch is working. The switch you made is a simple one. You may have seen many different types of switches on switchboards and appliances at your home and school. The switches are designed according to their usage, convenience and safety. But all of them work on the same principle. Switch is a mechanical component that consists of two or more terminals that are internally connected to a metal strip. Commonly used switches are listed below:

| | | | | | |
|---|---|---|---|---|---|
| **Tapping key** |  | **Toggle switch** |  | **Illuminated switch** |  |
| **Plug key** |  | **Rocker switch** |  | **Slide switch** |  |



VII Std Science Term-2 EM Unit 2.indd 20 7/15/2022 2:35:13 PM





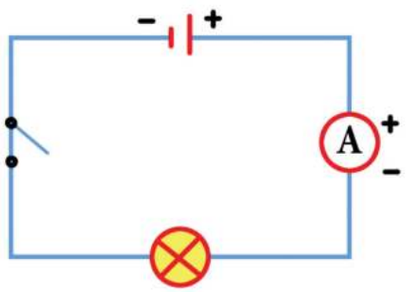

VII Std Science Term-2 EM Unit 2.indd 21 7/15/2022 2:35:13 PM

## 2.5. Electric circuit

It is difficult to draw a realistic diagram of this circuit. The electrical appliances you use at home have even more difficult circuits. Can you draw realistic diagrams of such circuits which contain many bulbs, cells, switches and other components? Do you think it is easy? It is not easy.

Scientists have tried to make the job easier. They have adopted simple symbols for different components in a circuit. We can draw circuit diagrams using these symbols.

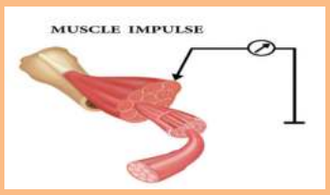
Symbols for bulbs, cells and switches are shown in figure.

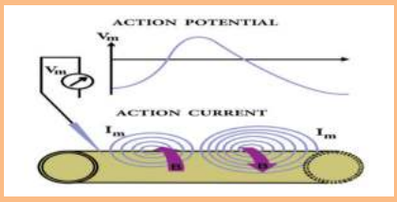



In a cell, the longer line denotes the positive (+) terminal and the short line denotes the negative (-) terminal. We shall use these symbols to show components in the circuits we draw. Such diagrams are called **circuit diagrams.**




All muscles of our bodies move in response to electrical impulses generated naturally in our bodies



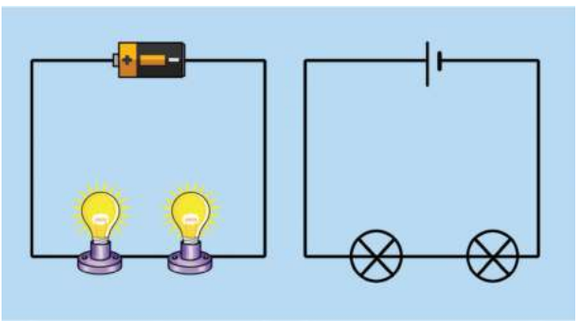

### 2.5.1. Types of electrical circuits

In the above experiment, we make a circuit with a bulb and a cell. We make only one kind of the circuit with a cell and a bulb. But we can make many types of circuits if we have more than one bulb or cells by connecting these components in different ways.

### 2.5.2. Series circuit

Two kinds of circuits can be made with two bulbs and a cell. In this experiment we shall make one of them and study it.

Look at the circuit with two bulbs, and a cell and a switch given here (Figure)



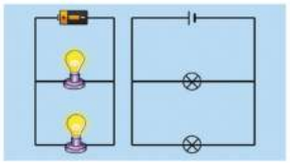
It is clear from the circuit diagram, that the two bulbs are connected one after the other. The circuit diagram shows the sequence of the bulbs and cell, not their real position. The way in which the bulbs have been connected in this circuit is called **series connection.**

Now make the circuit by joining the two bulbs and cell. Do both the bulbs light up? Do both glow equally bright? If one glows less bright, will it shine more brightly if we change its place in the sequence? Change the sequence of bulbs and notice.

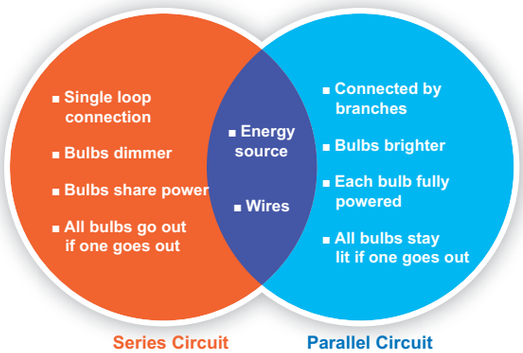
Sometimes bulbs appear to be similar can differ from each other. So, similar looking bulb do not always glow equally bright when connected in series. The circuit can be broken at several places. For example, between the cell and the bulb, between the two bulbs etc.

### 2.5.3 Parallel Circuit

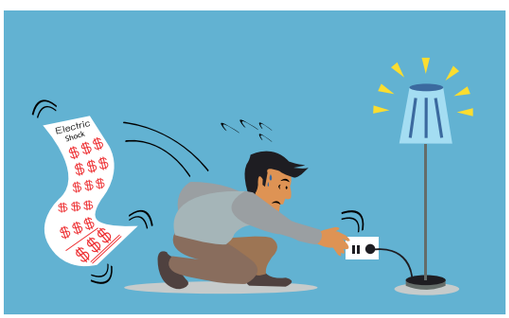
Figure - shows a circuit in which two bulbs are connected in different places. This is a second type of circuit. Two bulbs in this circuit are said to be connected in parallel and such circuits are called **parallel circuits.**



### 2.5.4. Similarity and Difference between Series and Parallel Circuit




### Science to mind pricking




If an electrician attending an electrical fault at your home gets current shock, will you touch him in order to get rid off him from current risk? Will you use the wet stick to beat him to avoid further effects of electric shock?

Why do the electric line man are wear rubber gloves in their hands while doing electrical works on a electrical pole?

We know that all materials are made up of the basic building block, the 'atom'. An atom, in turn, contains electrically charged particles. Many of these particles are fixed to the atoms but in conductors (such as all metals) there are lots of particles that are not held to any particular atom but are free to wander around randomly in the metal. These are called 'free charge'.

DO YOU KNOW?

#### Short circuit



You might have observed the spark in the electric pole located nearby your house. Do you know the cause of this electric spark? This is due to the short circuiting of electricity along its path.A short circuit is simply a low resistance connection between the two conductors supplying electrical power to any circuit.

Arc welding is a common example of the practical application of the heating due to a short circuit.

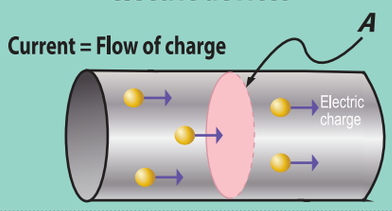
### 2.6. Conductors And Insulators

Based on the property of conductance of electricity, substances are classified into two types, namely, Conductors and Insulators (or) bad conductors of electricity

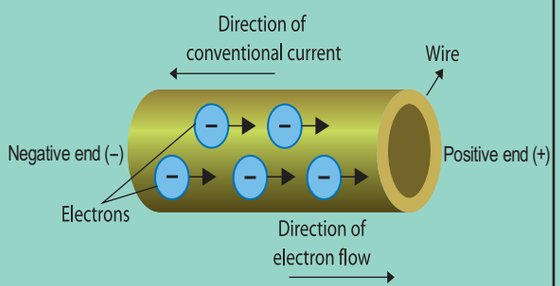
The electrons of different types of atoms have different degrees of freedom to move around. With some types of materials, such as metals, the outermost electrons in the atoms are loosely bound and they chaotically move in the space between the atoms of that material. Because these virtually unbound electrons are free to leave their respective atoms and float around in the space between adjacent atoms, they are often called as free electrons.

# Electricity

**Electric current is the flow of electric charges, typically through wires, conductors and electric devices**




## Conventional current and Electric current




**Conventional current**

**Conventional current flow is from positive (`+` ) to negative (`-`)**

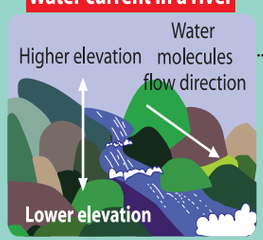
**Electric current**

**Electric current flow is from (`-`)negative to (`+` ) positive**

**Electric current I = Q/t**

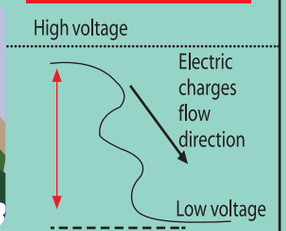
## Water current vs electric current - Analogy

**Water current in a river**



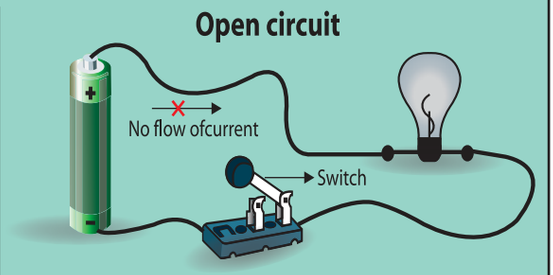

water molecules flow towards a point of lower elevation

**Electric current in a wire**



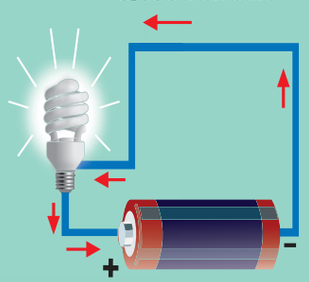

Electric charges flow towards a point of lower voltage

## Open circuit



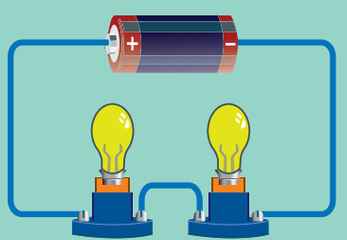

An incomplete electrical circuit in which no current flows

## Closed circuit



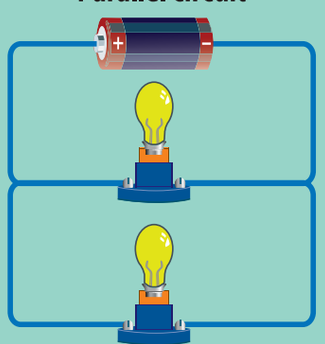
An electric circuit providing an uninterrupted endless path for the flow of current

## Series circuit



Circuit that has only one closed path through which the electric current flows

## Parallel circuit



Circuit that Offers more than one path for the flow of electric current



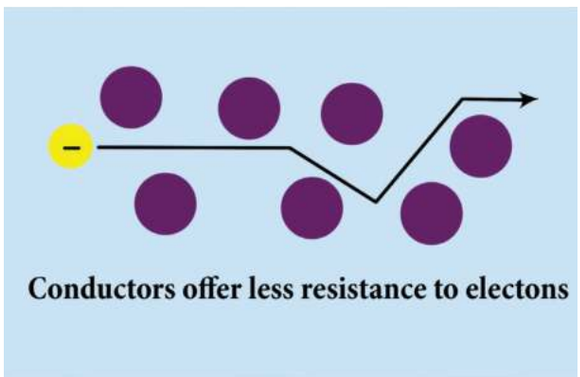
VII Std Science Term-2 EM Unit 2.indd 24 7/15/2022 2:35:15 PM

Let's imagine that we have a metal in the form of a wire. When a voltage is connected across the ends of the metal wire, the free electrons drift in one direction.

So, a really good conductor is one that has lots of free charges while those who don't have enough **'free charges'** would not be good at conducting electricity or we can say that they would be 'poor conductors' of electricity.

### 2.6.1. Conductors

Conductors are the materials whose atoms have electrons that are loosely bound and are free to move through the material. A material that is a good conductor gives very little resistance to the flow of charge (electron) on the application of external voltage. This flow of charge (electron) is what constitutes an electric current. A good conductor has high electrical conductivity in the above activity.

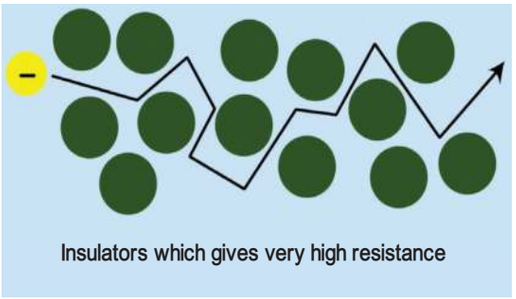



**Conductors offer less resistance to electons**

In general, more the free electrons, the better the material will conduct (for a certain applied voltage).

### 2.6.2. Insulators

Those materials which don't have enough 'free electrons' are not good at conducting electricity or we can say that they would be 'poor conductors' of electricity and they are called insulators.




Insulators which gives very high resistance




This is the material used in SIM Cards, Computers, and ATM cards. Do you know by which material I am made up off?

The chip which are used in SIM Cards, Computers, and ATM cards are made up of semiconductors namely, silicon and germanium because of their electrical conductivity lies between a conductor and an insulator.



An insulator gives a lot of resistance to the flow of charge (electron). During the drift of the electrons in an object when an external voltage is applied, collisions occur between the free electrons and the atoms of the material also affect the movement of charges. These collisions mean that they get scattered. It is a combination of the number of free electrons and how much they are scattered that affects how well the metal conducts electricity. The rubber eraser does not allow electric current to pass through it. So rubber is a non-conductor of electricity. Rubber is an insulator



VII Std Science Term-2 EM Unit 2.indd 25 7/15/2022 2:35:15 PM

Most of the metals are good conductors of electricity while most of the non-metals are poor conductors of electricity.

DO YOU KNOW?

Wires made of copper, an electrical conductor, have very low resistance. Copper wires are used to carry current in households. These wires are in turn enclosed in electrical insulators, or materials of high electrical resistance. These materials are usually made of flexible plastic.



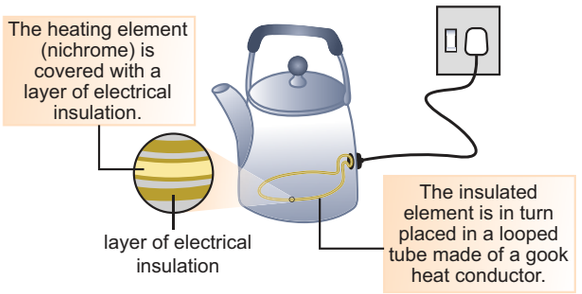
## 2.7.Effects of Electric Current

You performed many experiments with electricity in Class 6 and learned quite a few interesting facts. For example, you saw that a bulb can be made to light up by making electricity flow through it. The light of the bulb is thus one of the effects of electricity. There are several other important effects of electricity. We shall study some of these effects in this chapter. There are 3 main effects of electricity as,

- Heating effect
- Magnetic effect (Magnetism)
- Chemical effect

### 2.7.1.Heating effect

When an electric current passes through a wire, the electrical energy is converted to heat. In heating appliances, the heating element is made up of materials with high melting point. An example of such a material is nichrome (an alloy of nickel, iron and chromium).




The heating effect of electric current has many practical applications. The electric bulb, geyser, iron box, immersible water heater are based on this effect. These appliances have heating coils of high resistance.

Generation of heat due to electric current is known as the heating effect of electricity.

### Factors affecting Heating Effect of current

1. Electric Current
2. Resistance
3. Time for which current flows

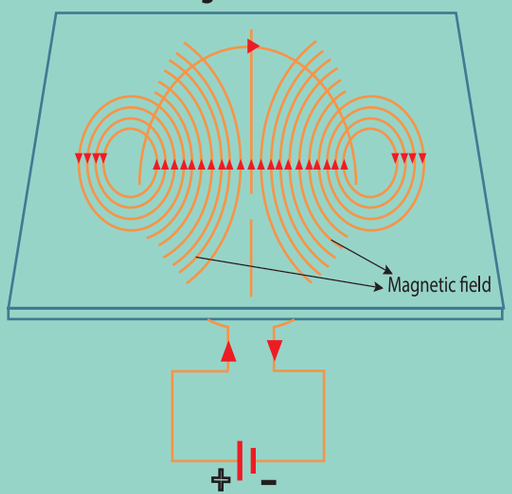
### Electric Fuse



Electric fuse is a safety device which is used in household wiring and in many appliances. Electric fuse has a body made of ceramic and two points for connecting the fuse wire. The fuse wire melts whenever there is overload of the current in the wire. This breaks the circuit and helps in preventing damage to costly appliances and to the wiring. In electrical devices, a glass fuse is often used. This is a small glass tube, in which lies the fuse wire.

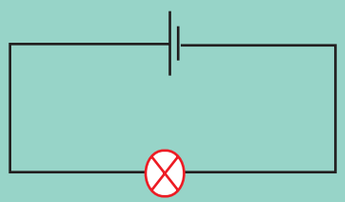
# Effects of Electric current

## Magnetic effect



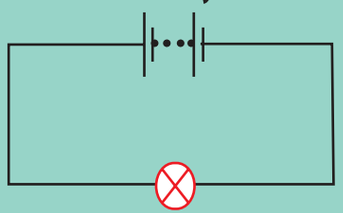

Production of magnetic field when the current flows through the coil of wire

## Cell



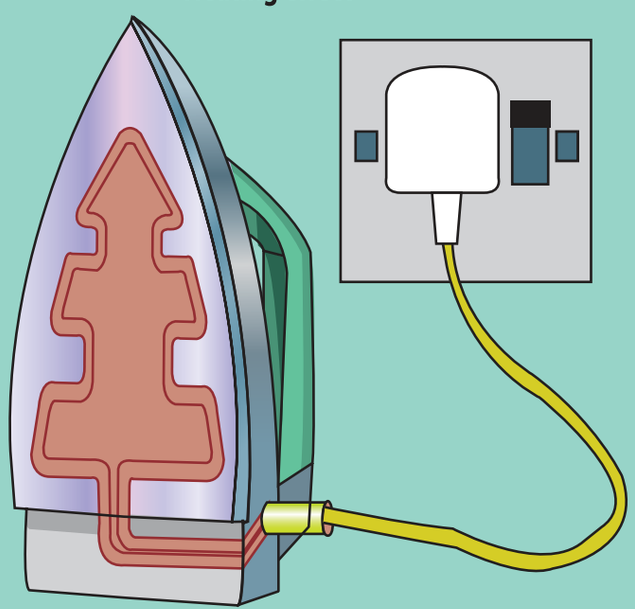
Cell is the basic electrochemical unit that converts chemical energy into electrical energy

## Battery



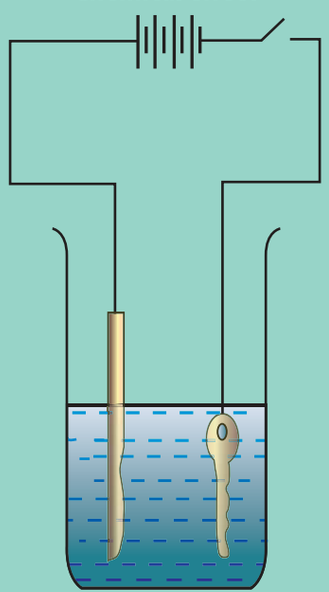
Baterry is a group of cells

## Heating effect



Prodction of heat by flow of electric current in a circuit

## Chemical effect



Chemical reaction happens when electricity passes through various conducting liquids



VII Std Science Term-2 EM Unit 2.indd 27 7/15/2022 2:35:16 PM

### MCBs (Miniature Circuit Breaker)



MCBs have been replacing electric fuse from wirings at most of the places. The electric fuse has a big practical problem. Whenever the wire fuses, one needs to replace the wire to resume electric supply. More often than not, this proves to be a cumbersome task. Miniature circuit breakers break the circuit automatically. One just needs to switch it on to resume the electric supply. Many models of MCBs have a built in mechanism by which the electric supply is automatically resumed.

## 2.8. Magnetic Effect of electricity

The next effect of electric current is Magnetism. In 1819, Hans Christian Oersted discovered the electricity that has a magnetic effect. The experiment in activity-5 will help you understand the magnetic effect of electric current.

### 2.8.1. Application of magnetic effect of electric current - Electromagnet

Magnetic effect of electric current has been used in making powerful electromagnets. Electromagnets are also used to remove splinters of steel or iron in hospitals dealing with eye injuries.

Electro magnets are used in many appliances that we use in our day to day life, namely, electric bell, cranes and telephone. Let us know how the magnetic effect of electric current is applied in telephones.

### ACTIVITY 5

**Materials required**

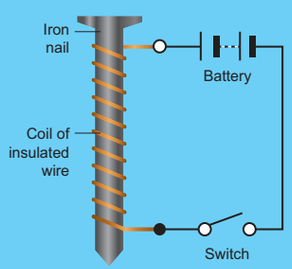
- Iron nail
- Battery & Switch
- Wire

Take around 75 cm long piece of insulated flexible wire and an iron nail say about 8 - 10 cm long. Wind the wire tightly around the nail in the form of a coil. Connect the free ends of the wire to the terminals of a cell as shown. Place some pins on or near the end of the nail. Now switch on and switch off the current, What happens?

When the switch is kept in on position the pins starts to cling to the end of the nail.

When the electric current is switched off the coil generally loses its magnetism. Such coils are called as electromagnets.

The polarities of both ends of the coil changes according to the direction of electric current passes.




### 2.8.2. Telephone

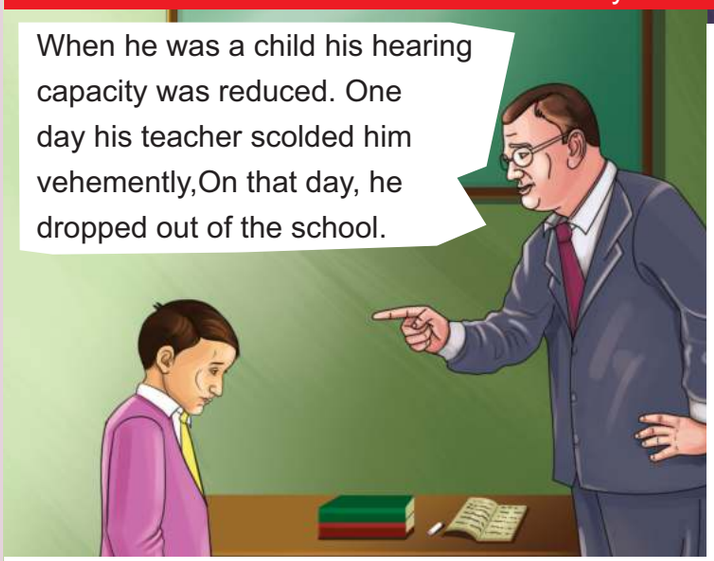
In telephones, a changing magnetic effect causes a thin sheet of metal (diaphragm) to vibrate. The diaphragm is made up a metal that can be attracted to magnets.

1. The diaphragm is attached to spring that is fixed to the earpiece.
2. When a current flows through the wires, the soft – iron bar becomes an electromagnet.

# The world comes to brightness

## Thomas Alva Edison (1847-1931)

Thomas Alva Edison was affected by scarlet fever and hence he joined the school at Fort Huron in America only at the age of eight.

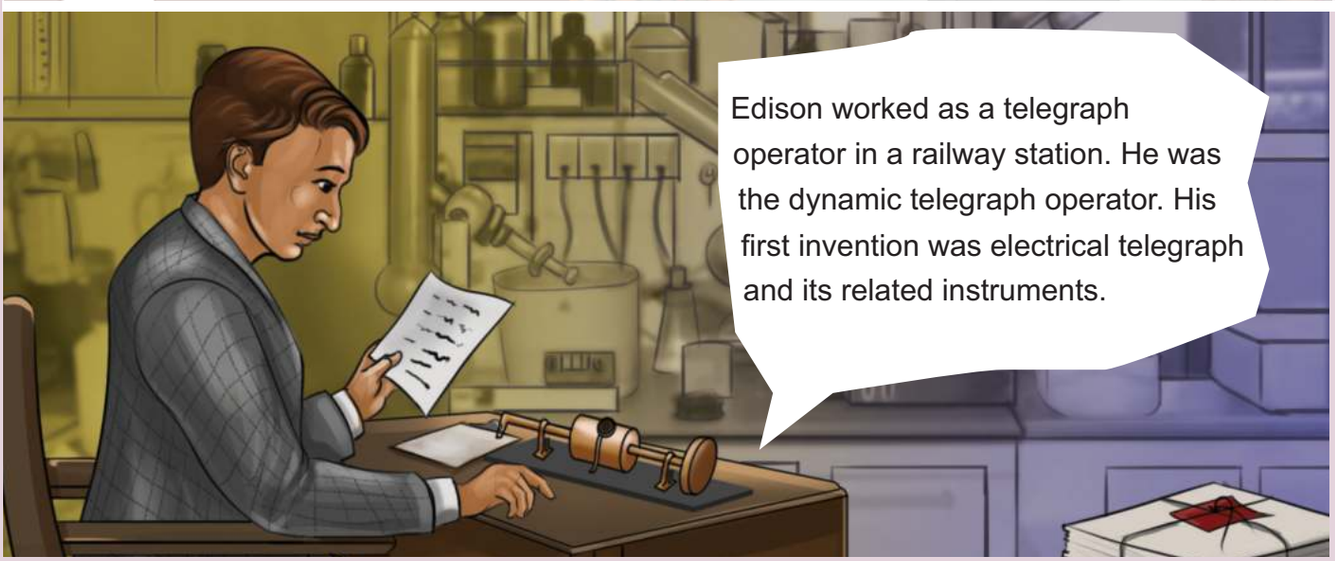




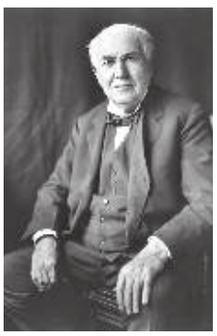

After leaving the school, his mother who was a teacher taught lessons at home for three years.

Since the age of seven, Edison was interested towards domestic electrical devices. At the age of 9, he read the book, “Natural and Experimental Philosophy” written by Richard Parker. At the age of 21, he read deeply Michal Faraday’s “Experimental Researches in Electricity”.

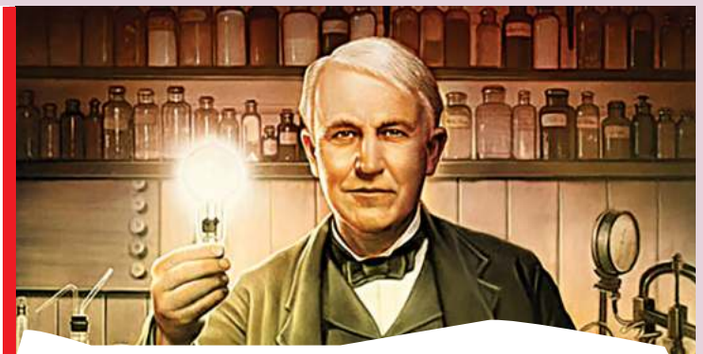








He invented an advanced instrument Gramophone in 1877.



He used a platinum wire coil in a vacuum glass and discovered the first electric bulb in 1879.

Thomas Alva Edison invented a commercially viable electric bulb. This was exhibited in 1897



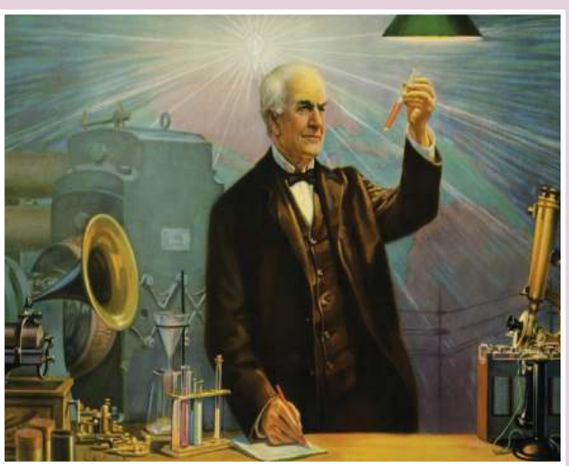
By using mechanical power in a battery, electric power was generated by providing the voltage. Edison proved that voltage is given in the ends of battery. The same was transferred into an electric motor which provided mechanical energy.



By extending Kinetoscope into 50 feet film strip, he made first talkie film by using electric motor and magnifying glass in 1891.

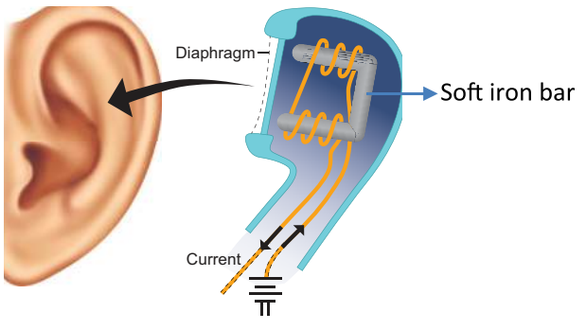
As a mark of respect to Edison on his death, the light of “Statue of Liberty” in New York was turned off. Except the road lights of Chicago and Broadway, all the lights in the city were turned off.





Edison was an American Scientist and Industrialist. He invented many instruments like Electric bulb, electric motor, gramophone and kinetoscope. He was known as for taking the world of darkness to brightness crossing all the obstacles in life.

3. The diaphragm becomes attracted to the electromagnet.
4. As the person on the other end of the line speaks, his voice cause the current in the circuit to change. This causes the diaphragm in the earpiece to vibrate, producing sound.




## 2.9. Chemical Effects of Electricity

Chemical reactions happens, when electricity passes through various conducting liquids. This is known as chemical effects of electricity. You will learn chemical effect of electricity in your higher classes.

## POINTS TO REMEMBER

- An electric current is a flow of electric charge or the amount of charge flowing through a given cross section of a material in unit time.
- Conventional current is in the direction opposite to electron flow.
- One ampere is defined as the flow of electric charge across a surface at the rate of one coulomb per second.
- An electric cell is something that provides electricity to different devices that are not fed directly or easily by the supply of electricity
- A dry cell is a portable form of a leclanche cell
- Batteries are a collection of one or more cells whose chemical reactions create a flow of electrons in a circuit
- The cell is the basic single electrochemical unit which converts chemical energy to electrical energy.
- Ammeter — An instrument for measuring the flow of electrical current in amperes. Ammeters are always connected in series with the circuit to be tested.
- Ampere (A) — A unit of measure for the intensity of an electric current flowing in a circuit. One ampere is equal to a current flow of one coulomb per second.
- Circuit — A closed path in which electrons from a voltage or current source flow. Circuits can be in series, parallel, or in any combination of the two.
- Current (I) — The flow of an electric charge through a conductor. An electric current can be compared to the flow of water in a pipe. Measured in ampere.
- Fuse — A circuit interrupting device consisting of a strip of wire that melts and breaks an electric circuit if the current exceeds a safe level.
- Conductor — Any material where electric current can flow freely. Conductive materials, such as metals, have a relatively low resistance. Copper and aluminum wire are the most common conductors
- Insulator — Any material where electric current does not flow freely. Insulation materials, such as glass, rubber, air, and many plastics have a relatively high resistance. Insulators protect equipment and life from electric shock.

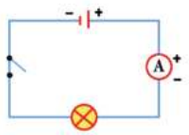
- ❖ Parallel Circuit — A circuit in which there are multiple paths for electricity to flow. Each load connected in a separate path receives the full circuit voltage, and the total circuit current is equal to the sum of the individual branch currents.
- ❖ Series Circuit — A circuit in which there is only one path for electricity to flow. All of the current in the circuit must flow through all of the loads.
- ❖ Short Circuit — When one part of an electric circuit comes in contact with another part of the same circuit, diverting the flow of current from its desired path.
- ❖ One unit of coulomb is charge of approximately $6.242 \times 10^{18}$ protons or electrons.
- ❖ The potential difference between any two points is the amount of energy needed to move one unit of electric charge from one point to the other.
- ❖ Electrical conductivity or specific conductance is the measures a material's ability to conduct an electric current
- ❖ Electrical resistivity is the property of a material that quantifies how strongly that material opposes the flow of electric current.
- ❖ The sources which produce the small amount of electricity for shorter periods of time is called as electric cell or electro chemical cells.
- ❖ Electrolytes : A substance that dissociates into ions in solution and acquires the capacity to conduct electricity. Sodium, potassium, chloride, calcium, and phosphate are examples of electrolytes.

## EVALUATION

### I. Choose the correct answers

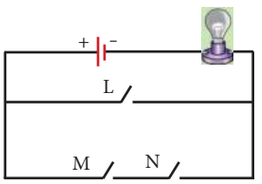
ETCL9

1. In the circuit diagram below, 10 units of electric charge move past point x every second .What is the current in the circuit?



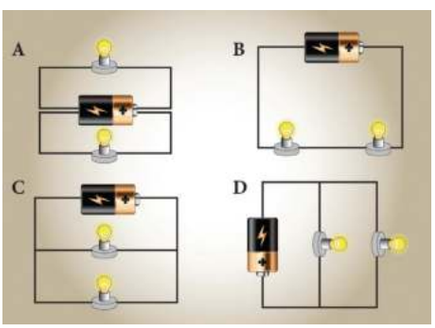

a) 10 A b) 1 A
c) 10 V d) 1 V

2. In the circuit shown, which switches (L,M or N) must be closed to light up the bulb?




a) switch L only
b) switch M only
c) Switch M and N only
d) either switch L or switches M and N

3. Small amounts of electrical current are measured in milliampere (mA). How many milliampere are there in 0.25 A ?
a) 2.5 mA b) 25 mA
c) 250 mA d) 2500 mA
4. In which of the following circuits are the bulb connected in series?




### II. Fill in the blanks.

1. The direction of conventional current is _____ to electron flow.

2. One unit of coulomb is charge of approximately _____ protons or electrons.
3. _____ is used to measure the electric current.
4. In conducting materials electrons are _____ bounded with atoms.
5. SI unit of Electrical conductivity of a conductor is _____

## III. True or False – If False give the correct answer

1. Electron flow is in the same direction to conventional current flow.
2. The fuse wire does not melts whenever there is overload in the wiring.
3. In a parallel circuit, the electric components are divided into branches.
4. The representation of the electric current is A.
5. The electrical conductivity of the semiconductor is in between a conductor and an insulator.

## IV. Match the following

| | | | |
|---|---|---|---|
| 1. | Cell | - | used to open or close a circuit |
| 2. | Switch | - | safety device used in electric circuit |
| 3. | Circuit | - | A complete path for the flow of an electric current |
| 4. | Miniature circuit Breaker | - | Reset by hand, circuit becomes complete once again |
| 5. | Fuse | - | A device which converts chemical energy into electrical energy |

## V. Analogy

1. Water : pipe :: Electric current :_____
2. Copper : conductor :: Wood : _____
3. Length : metre scale :: Current : _____
4. milli ampere: micro ampere :: $10^{-3}$A : _____

## VI. Assertion and Reason

1. Assertion (A) : Copper is used to make electric wires.
   Reason (R) : Copper has very low electrical resistance.
   Option:
   A. Both A and R are true and R is the correct explanation of A.
   B. Both A and R are true but R is NOT the correct explanation of A.
   C. A is true but R is false.
   D. A is false but R is true.
   E. Both A and R are false
2. Assertion (A): Insulators do not allow the flow of current through themselves.
   Reason (R) : They have no free charge carriers.
   A. If both A and R are true and the R is correct explanation of A.
   B. If both A and R are true but R is not a correct explanation of A.
   C. If A is true and R is false.
   D. If both A and R are false.

## VII. Very short answer

1. What is the speed of electric current?
2. What is the SI unit of electrical conductivity?
3. Name the device used to generate electricity.
4. Define fuse.
5. Name some devices that run using heat effect of electric current
6. Name few insulators.
7. What is a battery?



VII Std Science Term-2 EM Unit 2.indd 33 7/15/2022 2:35:19 PM

## VIII. Short Answer

1. Define an electric current.
2. Differentiate parallel and serial circuits.
3. Define electrical conductivity.

## IX. Long Answer

1. Explain the construction and working of an Telephone.
2. Explain the heating effect of electric current.
3. Explain the construction and working of a dry cell.

## X. Higher Order Question

A student made a circuit by using an electric cell, a switch, a torch bulb (fitted in the bulb holder) and copper connecting wires. When he turned on the switch, the torch bulb did not glow at all. The student checked the circuit and found that all the wire connections were tight.

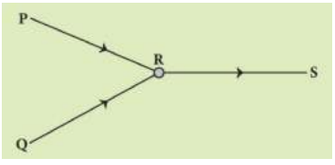
- ❖ What could be the possible reason for the torch bulb not glowing even when the circuit appears to be complete?

## XI Picture based Questions

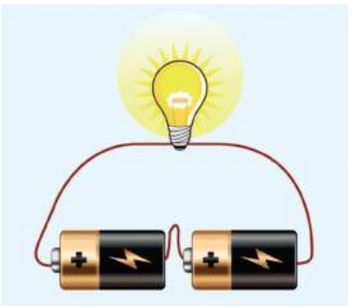
1. Three conductors are joined as shown in the diagram

The current in conductor RS is 10 A. The current in conductor QR is 6 A. What will be the current in conductor PR

a) 4 A
b) 6 A
c) 10 A
d) 16 A

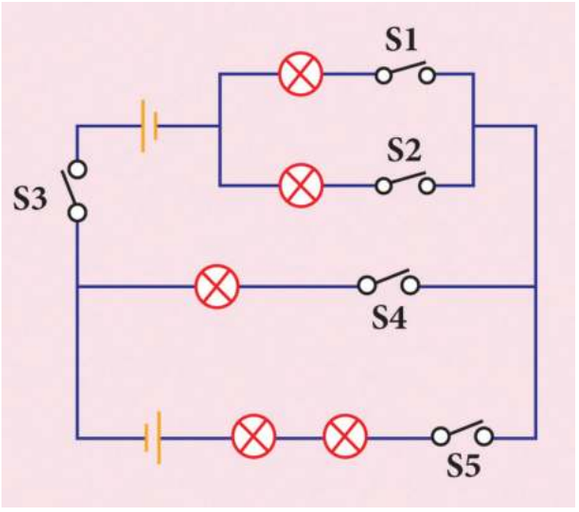



2. Draw the circuit diagram for the following series connection



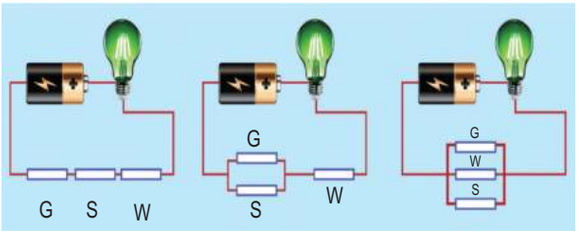
3. Study the electric circuit below. Which of the following switches should be closed so that only two bulbs will light up

a) S1,S2 and S4 only
b) S1, S3 and S5 only
c) S2, S3 and S4 ony
d) S2, S3 and S5 only




4. Study the three electric circuits below. Each of them has a glass rod (G), a steel rod (S), and a wooden rod (W).
In which of the electric circuits would the bulb not light up .

a) A only
b) C only
c) A and B only
d) A , B and C

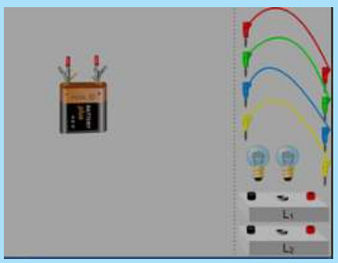



**(A)** **(B)** **(C)**

## ICT CORNER

# ELECTRICITY

**This activity helps the students to understand about the Parrellel and series circuit**



**PROCEDURE :**

**Step 1:** Type the URL link given below in the browser or scan the QR code. A page opens with a battery , some cables, two sets for circuit and two bulbs.

**Step 2:** Ask the students to fix the wires to the battery and the circuit

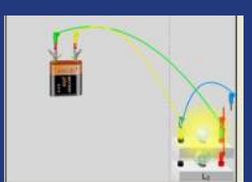
**Step 3:** Let the students do it and understand the concept with different combinations



**Step 1**



**Step 2**



**Step 3**

**Electricity URL:**

http://www.physics-chemistry-interactive-flash-animation.com/electricity_electromagnetism_interactive/components_circuits_association-series_parallel.htm

*Pictures are indicative only

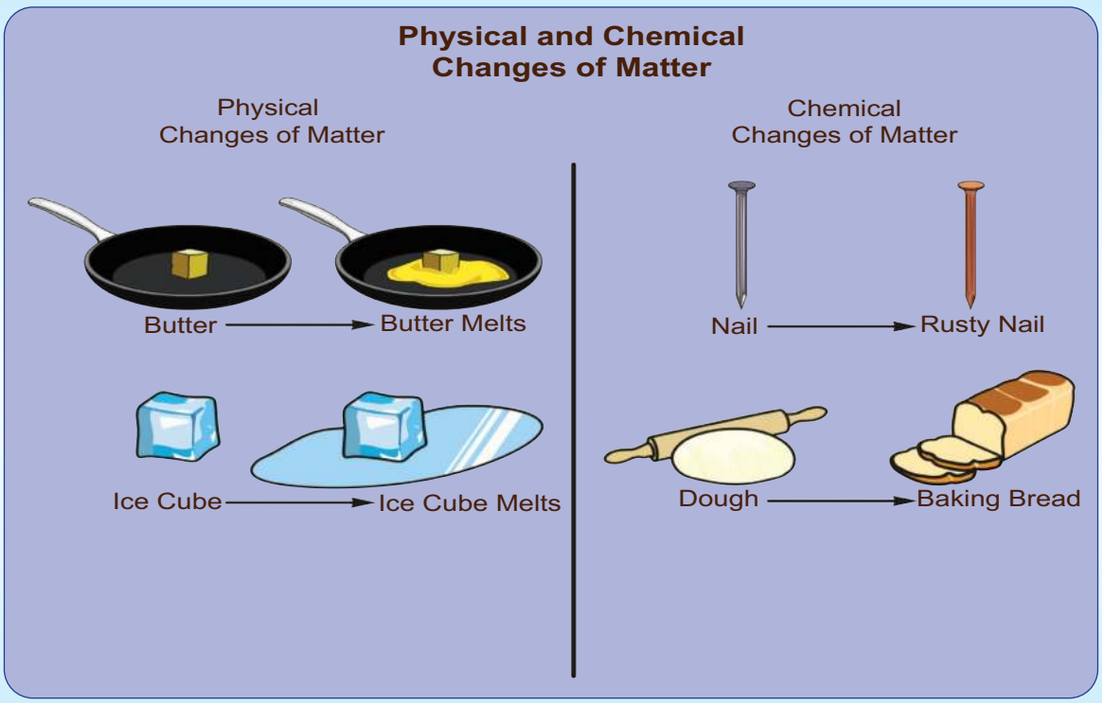
*If browser requires, allow Flash Player or Java Script to load the page.



VII Std Science Term-2 EM Unit 2.indd 35 7/15/2022 2:35:20 PM

# Unit 3

# Changes Around Us




## Learning Objectives

- To state the effect of heat on solid, liquid and gas and the associated changes in the arrangement of particles upon heating
- To differentiate physical change and chemical change on the basis of particle theory
- To involve in experiments crystallizing copper sulphate, melting ice, freezing water, sublimating camphor.
- To identify the process as a physical change or chemical change based on its characteristics
- To clarify the process of rusting, burning of paper, curdling of milk, reaction of baking soda with lemon juice
- To distinguish periodic and non-periodic changes
- To experience the endothermic and exothermic changes through simple activities



VII Std Science Term-2 EM Unit 3.indd 36 27/06/2023 13:00:25

## Introduction

Changes take place around us all the time. A change refers to an alteration in physical properties or alteration in the composition of matter. For example, ice melts on heating, that is, it changes from a solid to liquid. On further heating, water starts evaporating; it changes from a liquid to gas. Here, there is a change in the physical state of the substance. Let us look at another change, that is, when objects made of iron are exposed to moist conditions, a reddish-brown new substance called rust forms on the surface of these objects. In this instance of rusting, there is change in the composition of the substance. Thus, the change involves an alteration in the properties such as colour, texture and the state of the substance since there is formation of a new substance.

Let us go for another set of example. Heat a cup of water and a paper. The water upon heating become just hotter and hotter and at some point will become water vapour. It remains water at all times; that is, water remains the same, only its volume changes and hence it is called as physical change. Whereas in case of burning of paper, changes to carbon dioxide and other substances. Now we cannot get back the paper after burning. As there is a change in the chemical nature, it is called as chemical change.

When you mix sugar in water, is it a chemical change or physical change?

Look at the following list. Identify the physical and chemical changes and fill in the given table.

(rusting of iron, digestion of food, boiling egg, rotting banana, mixing sand and water, chopping wood, crushing a can, mixtures of different coloured buttons, burning of wood)













VII Std Science Term-2 EM Unit 3.indd 37 27/06/2023 13:00:28

| Physical Changes | Chemical Changes |
|---|---|
| | |
| | |
| | |
| | |
| | |

In class six, we read that matter is classified as solid, liquid and gas based on the physical state. We know that matter is made up of tiny particles, atoms and molecules; particles are in constant and random movement. Let us have a look at the summary of the characteristics of solid, liquid and gas.

When the arrangement of the particles in a substance change for any reason (applying pressure, altering temperature and other different reasons) the physical state of the substance gets changed.

Let us see what happens when we apply heat to the substances.

## 3.1 Effect of heat on solid, liquid and gases

Q17DZ

Upon heating, particle arrangement within the state of matter gets disturbed. The disturbance is seen either as expansion or contraction. When heated or cooled, the object may expand or contract, but the mass remains the same. That is, the number of particles that was inside the object does not undergo any change, only the arrangement of the particle changes. When a glass of water is heated, its volume increases and if a glass of water is cooled its volume decreases.




In which particles are very close together.

Particles are arranged in a fixed regular pattern.

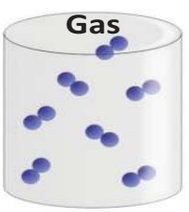
Particles can vibrate about their fixed positions.




In which particles are close together.

Particles are not arranged in a fixed regular pattern.

Particles are able to slide past one another.

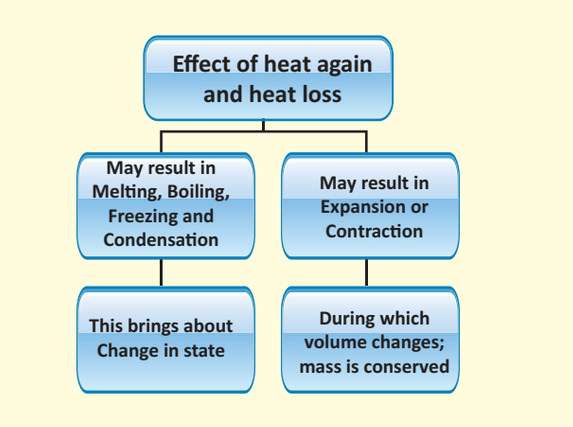



Particles are far apart from each other.

Particles are not arranged in a fixed regular pattern.

Particles move freely over long distances.

Such changes where there is change in volume but mass remaining the same are called physical changes and they can be pictorially depicted as follows:




There are other possibilities that can occur upon heating the solids, liquids and gases. The possible changes are due to melting, boiling, freezing and condensation during which there is change in the physical state of the particles of the matter. Let us discuss about them in detail in a short while.

Let us now see some physical changes and the underlying reasons as why they are simply physical changes.

## 3.2 Physical changes



Physical changes are the changes in which only physical properties of a substance undergo a change and there is no change in its chemical composition. There is no new substance formed in a physical change. Physical properties include lustre, malleability (flexibility), and ductility (ability to be drawn into a thin wire), density, viscosity, solubility, mass, volume and so on. Any change in these physical properties is referred to as a physical change. For example, when a rubber band is stretched, it elongates. However, when then stretching is stopped, the rubber band comes back to its original state and shape. In this example, there is no new substance formed but the rubber band remains the same before and after elongation.

### 3.2.1 Characteristics of a physical change

A physical change has following characteristics:

- During a physical change, no new substances are formed. In a physical change, the chemical properties of a substance do not change. For example, when ice cube melts, water is formed. In this change, there is no new substance, but water is same both in ice and in water.
- A physical change is usually temporary and reversible in nature. For example, when water is heated, water vapours are formed, once water vapours are cooled, water can be obtained again.
- In a physical change, the chemical properties of a substance do not change. For example, when a piece of gold is melted, its chemical composition remains the same in the solid form and also in the liquid form.
- In a physical change, the physical properties such as colour, shape and size of a substance may undergo a change . For example, cutting of vegetables and inflating a balloon are some examples of physical changes in which size and shape of a substance undergoes a change. we know it is not





## 3.3 Change of state

Change of state of a substance is one of the major physical changes we encounter in daily lives. We have read about simple changes of physical state such as melting of ice in our previous classes.

The following are some of the changes of state:

from Solid → to Liquid is Melting

from Liquid → to Gas is Vaporization

from Liquid → to Solid is Freezing

from Gas → to Liquid is Condensation

from Solid → to Gas is Sublimation

Melting, vaporization, and sublimation occur when heated and hence it is called as endothermic process. In an endothermic process, the speed of the molecules is increased hence they move faster.

In contrast, such as in freezing and condensation, heat is removed, resulting in the decreasing the speed of the molecules causing them move slower. Such processes are called as exothermic process.

In the next section we will look at each of these physical changes.

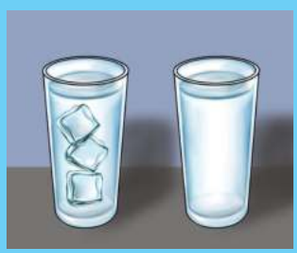
### 3.3.1 Melting

You have seen a puddle of water getting pooled around the glass of ice-cream or a glass of ice cubes when it is kept in room temperature. The ice cubes / ice-cream melt. Right! Can you give reason for that? The ice kept in the beaker receives heat from the surrounding air, to melt and form water.

**ACTIVITY 1**

**Melting of ice and freezing of water**

Though ice and water look different, they are both made of water molecules. This means that no new substance is formed during the melting of ice, only a change of state from solid to liquid takes place during the melting of ice. So, the melting of ice to form water is a physical change.



The change which occurs during the melting of ice to form water can be reversed easily by freezing the water to form ice again by keeping a beaker of water in the freezer zone of a refrigerator.

Thus we can find that

$$\text{Solid} \xrightarrow{\text{heating}} \text{Liquid}$$

$$\text{Liquid} \xrightarrow{\text{cooling}} \text{Solid}$$

Melting is the changing of a solid into its liquid state and it happens by heating, whereas Freezing is the changing of a liquid into its solid state and it happens by cooling.

### 3.3.2 Vapourization

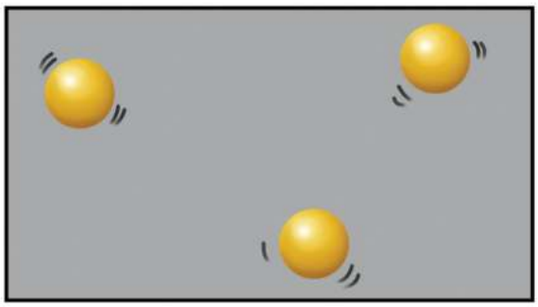
Look at a kettle kept on the fire. The bubbles form and the liquid water becomes

water vapour, if you heat it sufficiently.

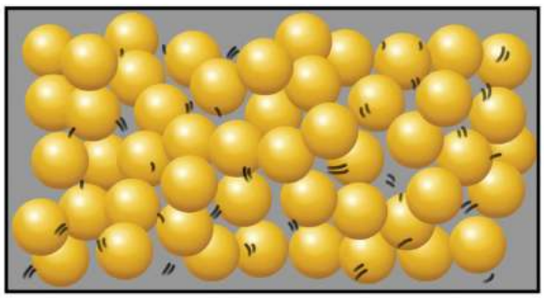
However, when you put a wet cloth to dry, the water evaporates into air, leaving the clothes dry.

That is there are two types of vaporization: boiling and evaporation, the first one is by heating and the second type of vapourization is natural.

Boiling is the process of conversion of a liquid into vapours on heating. In gaseous state, only the arrangement of molecules changes, there is no change in their chemical composition. So, boiling is a physical change.

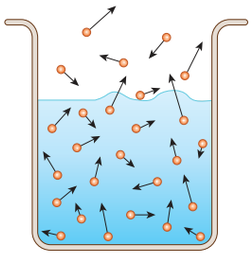


**Particles of a gas**



**Particles of a liquid**

Upon heating a liquid, the particles gain energy and vibrate more vigorously. When the particles possess enough energy, they overcome the strong forces of attraction between one another. The particles break free from one another and move randomly. For example, when liquid water is heated to 100°C, it boils to become steam. Boiling occurs when the boiling point is reached. The liquid changes to its gaseous state.

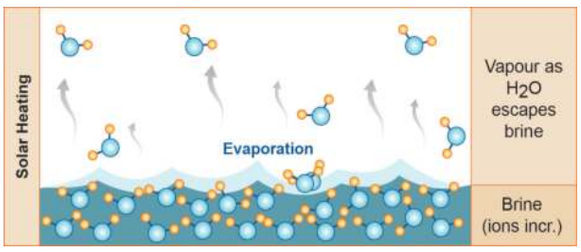


## Evaporation

Take a glass of water. All the water molecules are moving here and there at different velocities (shown as arrows of different lengths). Some of the molecules, especially at the surface, could be moving in a direction away from the liquid, and have adequate energy to overcome the attractive force (surface tension) of the liquid, then that molecule will escape into the air. Thus slowly and steadily the water molecules escape, or said to evaporate, and the water level in the glass decreases as the time passes. Note that the temperature of the water did not rise to the level of boiling point of water. Nor were there any bubbles formed like boiling.

Evaporation is the technique used to separate dissolved solids from a solid-liquid mixture. This is the technique used to extract salt from sea water in salt pans. Shallow level of sea water is impounded. Slowly the water evaporates due to action of Sun. Ultimately salt deposits over the ground we can understand. Evaporation makes use of the fact that the solvent in a solution can vapourise at any temperature, leaving behind a residue of the solid that was dissolved in the liquid.

From drying clothes to drying fish, evaporation is used.




**Factors affecting the rate of evaporation**

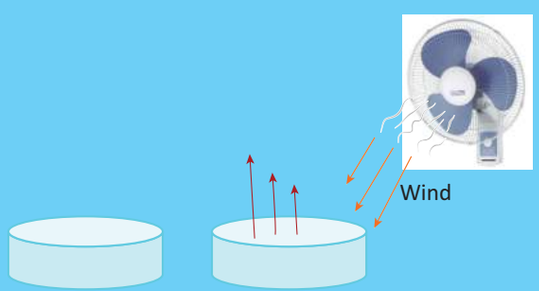
## ACTIVITY

### Activity 2

You must be remembering an activity done in Class six, in which we have taken two same shaped glasses and fill them with equal amount of water from same tap. We kept one under the hot sun and other under the shadow. After three to four hours, we saw that there is difference in water levels. The one kept in the hot place witness more evaporation compared to the one in shade. From this we can conclude that higher the temperature, the rate of evaporation will be more. As the temperature increases, more molecules are able to break free from the surface. Thus the rate of evaporation increases with rising temperature.

### Activity 3

Take two pans, one wide and another narrow. Fill hot water in both to the same depth. Keep them in open. Observe after one to two hours. The pan that is wide has cooled more than the narrow one. That is more the surface area; the rate of evaporation is more.




From this, can you guess why we unfurl the clothes while putting them to dry, rather than just drape them over the cloth line?

Greater the surface of conversion of a liquid, more molecules are available for evaporation.

### Activity 4

Take sugar solution in a shallow, broad bowl. Place the bowl in hot sun for a few hours. See that the bowl does not get any disturbance for the whole day. You can see that the solvent in the sugar solution evaporates leaving the sugar crystals in the bowl.

Evaporation is a slow process and occurs only at the surface of the liquid.

### 3.3.3 Freezing

Water in the freezer compartment of a refrigerator gets cooled and solidifies to form ice. In this case, the liquid water changes into solid water called ice.

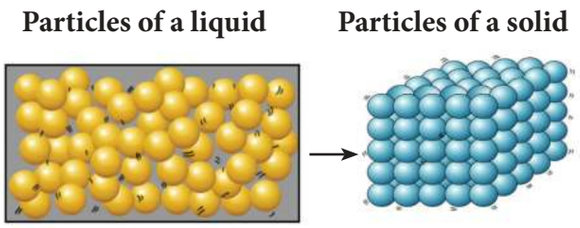
Only a change in state (from liquid to solid) takes place during the freezing of water to form ice, but no new substance is formed. So, the freezing of water is a physical change.

Upon cooling a liquid, the particles loose energy and vibrate less vigorously. When the particles possess less energy, they can experience strong forces of attraction between one another. The particles move closer to each other and movement of particles is also restricted. For example, when liquid water is cooled to 0° C, it freezes to become ice. Freezing occurs when the freezing point is reached. The liquid changes to its solid state.



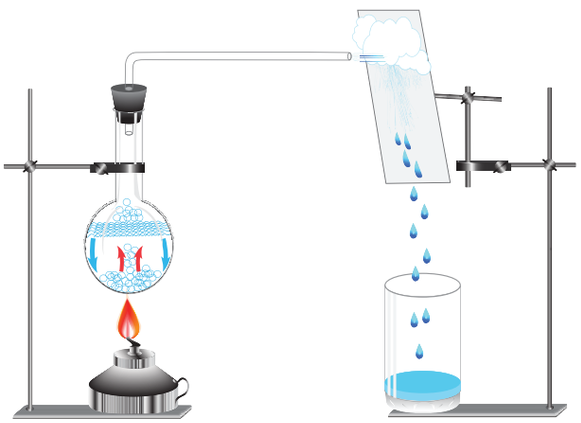
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The arrangement of particles in liquid and solid are diagrammatically represented as follows:




### 3.3.4 Condensation

We would have observed that the plate that covers the cooked food items have water droplets inside. Why?



The water vapour emerges from the hot food and goes up. The plate covering the food item is in relative less temperature than the hot food. Thus the more energetic molecules loose energy once they touch the cooler plate. As the molecules lose heat, they lose energy and slow down. They move closer to other gas molecules. Finally these molecules collect together to form a liquid. Condensation happens when molecules in a gas cool down.

In class six, you learnt about water cycle in which you already know how the clouds are formed from water vapour. Water vapour condenses to form clouds.

Condensation is the conversion of gas into its liquid state. The liquid obtained after condensation can be converted back into gas on heating. So, condensation is also a physical process. During this process, only the arrangement of molecules changes from the gaseous state to liquid state. So, condensation is a physical change.

$$\text{Gas} \xrightarrow{\text{cooling}} \text{Liquid}$$

$$\text{Liquid} \xrightarrow{\text{heating}} \text{Gas}$$

**Condensation** is the changing of a gas into its liquid state and it happens by cooling, whereas **Evaporation** is the changing of a liquid into its gas state and it happens by heating.

### 3.3.5 Sublimation

We have seen camphor being burnt at home, kept in rooms to prevent entry of mosquitoes. Have you ever noticed camphor becoming liquid at any point of time? ..... It will not.

There are certain solid substances like camphor, naphthalene that get converted into gas directly upon heating without becoming liquid. **This process in which a solid is converted directly into gas is called sublimation**.

In each of the above said processes, there is a change of state due to change in temperature. But there is no change in chemical composition. By changing the temperature all these changes can be reversed. We know that change of a physical state is only a physical change. So,



VII Std Science Term-2 EM Unit 3.indd 43 27/06/2023 13:00:32

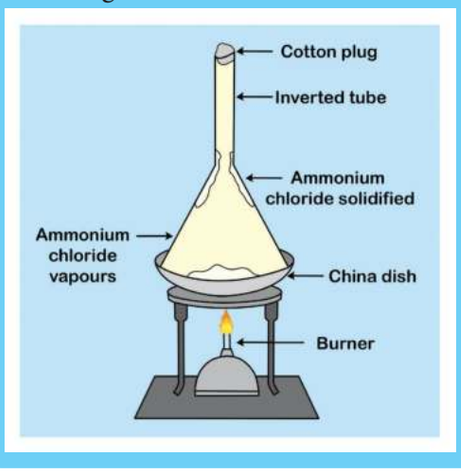
evaporation, boiling, condensation, melting and freezing are all physical processes

## ACTIVITY 5

### Sublimation

Take some camphor in a porcelain dish and cover it with a clean glass funnel. Close the mouth of the funnel with small amount of cotton wool. Heat the contents in the dish. can you see that camphor changes into vapour state without becoming liquid.

Ammonium chloride is another substance that undergoes sublimation.




## 3.3.6 Crystallization

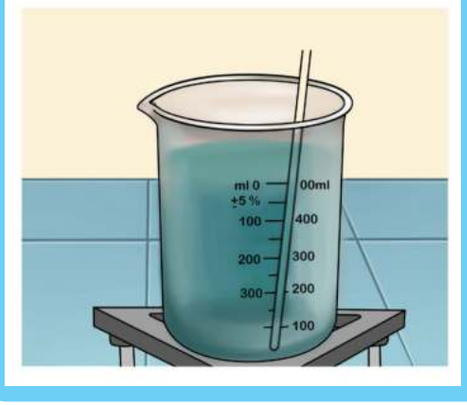
Though not mentioned earlier, crystallization is also a special form of physical change. The soluble impurities get removed from certain solids by crystallization. The process of cooling a hot, concentrated solution of a substance to obtain crystals is called crystallization.

We also know that sea-water contains salts dissolved in it and the salt can be separated from sea-water by the process of evaporation. The process of evaporation is not a good technique because the soluble impurities do not get removed in the process of evaporation.

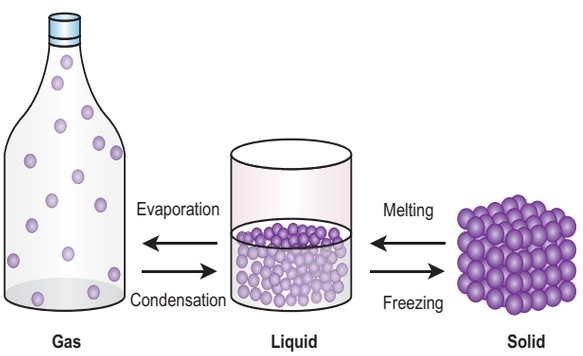
## ACTIVITY 6

### Crystallizing copper sulphate

Take about 100ml of water in a beaker. Heat the water over a burner till it boils. Add impure copper sulphate to the hot water with constant stirring. Continue to add copper sulphate till the solution takes up the added copper sulphate, that is, the added copper sulphate will not dissolve anymore. Filter the contents on a glass plate and allow it to cool. You could see crystals of copper sulphate in a few hours.



Further the crystals of salts obtained by the process of evaporation are small. The shape of crystals cannot be seen clearly. So the solid substances are usually purified by the process of crystallization. Large crystals of pure substances can be obtained from their solutions by the process of crystallization. **Crystallization is a method of separation as well as a method of purification.**



## 3.4 Chemical changes

Changes that occur with the formation of new substance with different chemical composition or transformation of a substance into another substance with the evolution or absorption of heat or light energy are termed as chemical changes. Rusting of iron, burning, curdling of milk, reaction of baking soda with lemon juice, fermentation are some examples of chemical changes.

Chemical changes are very important in our lives. All the new substances which we use in various fields of our life are produced as a result of chemical reactions. Some of the examples of the importance of chemical changes are given below:

i. Metals are extracted from their naturally occurring compounds called 'ores' by a series of chemical changes.
ii. Medicines are prepared by carrying out a chain of chemical changes.
iii. The materials such as plastics, soaps, detergents, perfumes, acids, bases, salts etc are all made by carrying out various types of chemical changes.
iv. Every new material is discovered by studying different types of chemical changes.

In addition to new products, the following may also accompany a chemical change:

- Heat, light or any other radiation may be given off or absorbed.
- Sound may be produced
- A change in smell may take place (or) a new smell may be given off.
- A colour change may take place.
- A gas may be formed.

Explosion of a firework is a chemical change. We know that such an explosion produces heat, light, sound and unpleasant gases that pollute the atmosphere. That is why we are advised not to play with fireworks.

When food gets spoiled, it produces a foul smell. Shall we call this change as a chemical change? ..... Discuss in the class. Give your reflections.

You must have noticed that a slice of an apple acquires a brown colour if it is not consumed immediately. Colour of the potato remains the same when stored in water but there is change in colour with the piece kept in air. Look at the cut brinjal kept in air. The change of colour in these cases is due to the formation of some new substances which you will learn in higher classes. Are these not chemical changes?

**Try yourself**

Cut a fresh slice of potato and brinjal and keep it away for sometime.



**Discuss and give your answer**
You know that plant produce their food by a process called photosynthesis.
Can we call photosynthesis a chemical change?

### 3.4.1 Rusting of iron

In class six, we have already studied that rusting is an example of a chemical change. Now, shall we read why the process of rusting is called a chemical change.

DO YOU KNOW?

**The Iron Pillar at Delhi**

Amazingly there is an iron that did not rust!



There is an iron pillar at the Qutub Minar in Delhi which is more than 1600 years age. Even after such a long period, the iron pillar kept in open spaces has not rusted at all. This shows that Indian scientists made great advances in metal making technology even at 16th century which enabled them to make this iron pillar having the quality of great rust resistance.

Rusting is one change that affects iron articles and slowly destroys them. Since iron is used in making bridges, ships, cars, truck bodies and many other articles, the monetary loss due to rusting is huge. The process of forming rust is represented as follows:

iron + oxygen + water→rust

$2Fe + 2O_2$ from air + $2H_2O \longrightarrow 2Fe_2O_3 . H_2O$

For rusting to take place both oxygen and water (or even water vapour) is essential. In fact, if the content of moisture in air is high, the air is said to be more humid and eventually rusting is faster.

How can we prevent rusting?

Iron articles can be prevented from making contact with oxygen, water/water vapour. A simple way is to apply a coat of paint or grease. These coats should be applied regularly to prevent rusting.

DO YOU KNOW?

Another way of preventing rusting is to deposit a layer of a metal like chromium or zinc on iron. This is called galvanization and you will learn about this detail in higher classes.

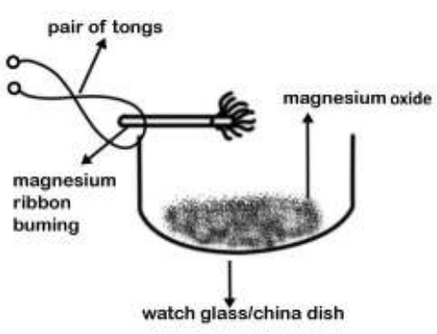


### 3.4.2 Burning

we have already studied that burning of paper is a fast change. Burning a piece of paper gives entirely new substances such as carbon-di-oxide, water, water vapour, smoke and ash. Heat and light are also given out during the burning of

**ACTIVITY 7**

Take a small piece of magnesium ribbon and clean it by rubbing its surface with a sand paper. Hold the magnesium ribbon at one end with a pair of tongs and bring its other end over the flame of a burner.



paper. We cannot combine the products of burning of paper to form the original paper again. So, it is a permanent change. Now, shall we perform an activity of burning a piece of magnesium ribbon and find what type of change is it?

What do you observe?

You can see that the magnesium ribbon starts burning with a dazzling white light. Hold the burning magnesium ribbon over a watch glass so that the powdery ash being formed by the burning of magnesium collects in the watch glass.

When magnesium ribbon burns in air, then the magnesium metal combines with the oxygen of air to form a new substance called magnesium oxide.

Magnesium + Oxygen ⟶ Magnesium oxide

$2Mg + O_2 \longrightarrow 2MgO$

Magnesium oxide compound appears as a white powdery ash.

The burning of magnesium ribbon is a chemical change, because a new substance, magnesium oxide, is formed during this change.

### 3.4.3 Curdling of milk

We know that curdling of milk is an example of irreversible change since we cannot get back the milk after curdling occurs. It is also called as a chemical change. Shall we clarify the process of curdling?

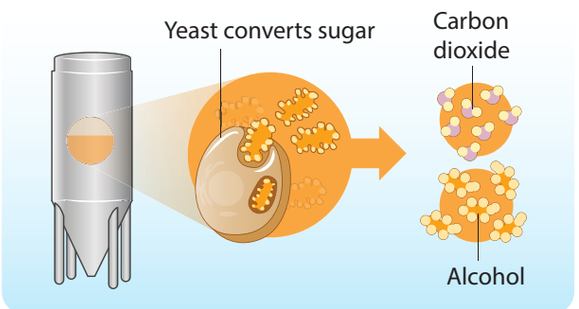
Curdling is a process in which liquid gradually turns into solid, forming clumps along the way. Take hot milk in a pan and add few drops of curd, in few minutes milk curdles forming lumpy solid masses. We can even add lemon extract to the hot milk to effect curdling immediately, but the taste and texture of the curd will not be the same as that of the curdling occurring in a few hours. You can try to taste the curd formed by immediate curdling and gradual curdling.

### 3.4.4 Fermentation

In class six, we saw an example that preparation of batter to produce idly is an example for irreversible change.

Fermentation is the process in which microorganisms such as yeast and certain bacteria break down sugar solution into alcohol and carbon-di-oxide.

It is an irreversible process as the alcohol formed cannot be turned back into sugar. Thus, fermentation is a chemical change.









Louis Pasteur (1822-1895), a French chemist and microbiologist was the first person to describe the process of fermentation.

He described that fermentation occurs in the absence of air and in the presence of micro organisms such as yeast. He discovered the cure for rabies.

### 3.4.5 Chemical reaction of baking soda with lemon

Baking soda is sodium hydrogen carbonate and lemon juice contains citric acid. So, when these two substances are mixed together, then a chemical change takes place between sodium hydrogen carbonate and citric acid to form three new substances: sodium citrate, carbon-di-oxide and water. The chemical change can be written in the form of a word equation as follows:-

Sodium hydrogen carbonate + citric acid → sodium citrate + carbon dioxide + water

**ACTIVITY 8**

When baking soda and lemon juice are mixed together, then bubbles of carbon-di-oxide are formed along with the formation of some salt and water. Take 10 ml of lemon juice and add pinch by pinch of baking soda to it. Actually when we mix baking soda with lemon juice, we will hear a hissing sound when bubbles of carbon-di-oxide coming out and rising in the reaction vessel.

## 3.5 Conditions needed for a chemical change

We know that firing of crackers is a chemical change. Some crackers explode only when thrown against a wall or struck with a hard substance. Thus, we could see that c**hange in pressure** may also bring about a chemical change.

When lemon juice is mixed with soda water, they produce brisk effervescence which is otherwise not possible when they are separate. So we can say that many chemical changes occur only when the **substances are made to physically contact with each other.**

We have tasted raw rice and cooked rice, Have not we? They are different in their taste. Cooking is a process that is involved in the stated example, wherein rice is boiled with sufficient water. It is the heat and the water that had brought the change in texture and taste of the rice before and after cooking. Thus we can say that **heating** is a condition needed for a chemical change to occur.

We know the use of vanaspathi in cooking vanaspathi is obtained from vegetable oils by addition of hydrogen to the oils. nickel, platinum or palladium are used as catalyst during the process of hydrogenation of oils.




Catalysts are substances that speed up the process of a chemical change and it will not undergo any change during the course of the reaction. For example, yeast acts as the catalyst in the fermentation of sugar. You will learn more about catalyst in your higher classes.

Water is a chemical compound that remains as water when undisturbed. But if a few drops of an acid is added to water and subjected to electrolysis by passing electric current, it decomposes into hydrogen and oxygen. So, we can understand that **electric current** is also a condition that is needed for effecting a chemical change.

Thus we can conclude that physical contact of the substances, heat, light, electricity, applying pressure are some of the different conditions needed for chemical changes to occur.



VII Std Science Term-2 EM Unit 3.indd 48 27/06/2023 13:00:35

## 3.6 Indicators of a chemical change

Take some broken pieces of egg shell in a test tube and add lemon juice to it. You could see bubbles of carbon-di-oxide evolving in the test tube. This is because of the chemical change between the two. Hence, we can say that evolution of bubbles serve as an indicator that of a chemical change.

When water is added to quicklime (calcium oxide) there will be evolution of lot of heat along with the formation of slaked lime (calcium hydroxide). This is a chemical change and it is indicated by the evolution of heat when the reaction sets in between quicklime and water.

Every day we cook food stuffs and clean the empty cooking utensils. Suppose when we leave the cooked utensils with some cooked food and leave them without washing for a day, we could sense a foul-smell coming from the vessels the next day. This is because the food stuff had become rotten and produces a foul-smell. Here spoilage of food is a chemical change and it is indicated by the foul smell. So, change of odour is also an indicator of a chemical change.

When an iron nail is kept in water for a few days and taken out, the nail will become reddish brown in colour indicating that it has rusted. We know that rusting is a chemical change and it is indicated by a change in colour of the iron nail.

We know that hot milk curdles to form white lumps of curd when mixed with lemon juice. A lump of curd is the precipitate that is obtained by the chemical reaction between hot milk and lemon juice. So, formation of precipitate is also an indication of a chemical change.

To conclude, there can be evolution of bubbles, evolution of heat, change of odour, change in colour or formation of a precipitate that serve as indicators for us to understand that a chemical change had taken place.

## 3.7 Exothermic and Endothermic chemical changes

U6FR4

Just as the physical change, Chemical reaction will be either endothermic or exothermic.

### ACTIVITY 9

Ask a student to stretch both hands, put a pinch of soap powder in one hand and a pinch of glucose in the other hand. Add a few drops of water to soap powder and ask how the student feels upon adding water. Now add a few drops of water to the glucose at the other hand. Now ask the student how he /she feels on adding water, What is the feeling when water is added to glucose?

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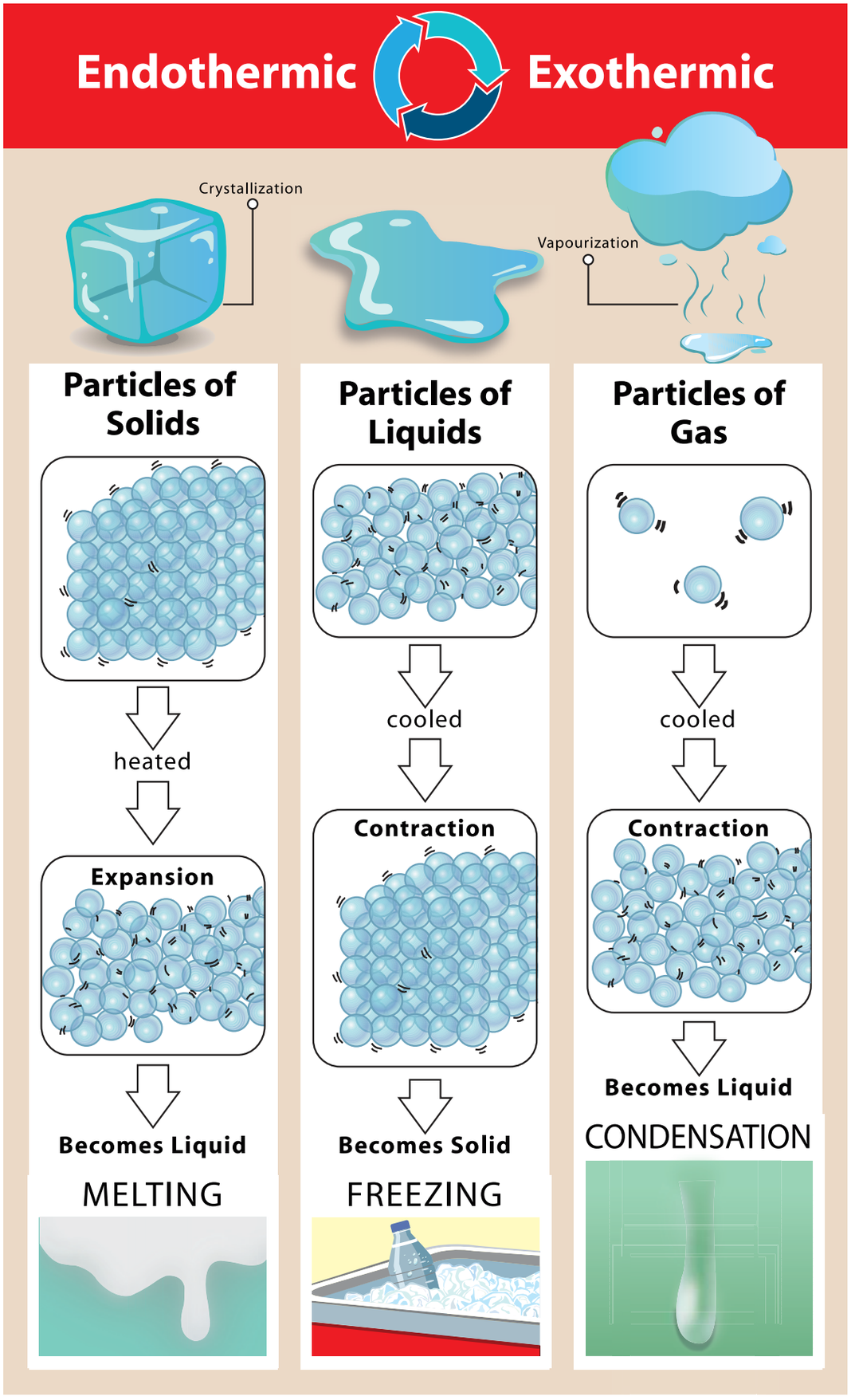
What is the difference when water is added to soap powder and when water is added to glucose?

.....

In this activity, the student reported that he / she felt the warmness in the palm when water is added to soap powder. Right! We saw that the burning of magnesium ribbon gives out heat and light. Similarly, burning of wood also releases heat and light. Such changes in which heat is released are known as exothermic changes.



VII Std Science Term-2 EM Unit 3.indd 49 27/06/2023 13:00:35






VII Std Science Term-2 EM Unit 3.indd 50 27/06/2023 13:00:40



PERIODIC CHANGE

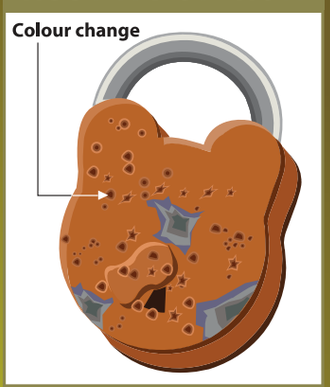
NON-PERIODIC CHANGE



## MIXING EGG SHELL OR BAKING SODA WITH LEMON JUICE

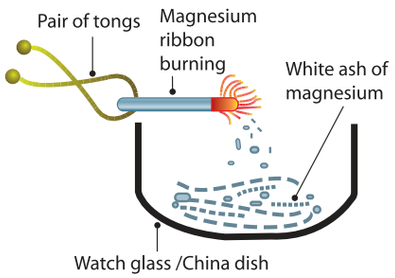



## RUSTING OF IRON

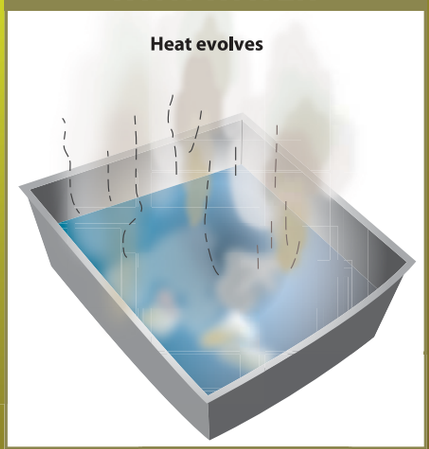



## BURNING OF MAGNESIUM RIBBON

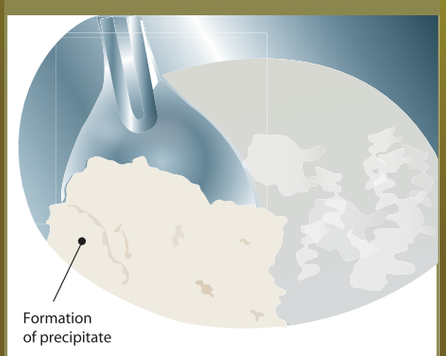
**Formation of new product:**
**Magnesium oxide**




## MIXING QUICK LIME WITH WATER




## CURDLING OF MILK




## THUNDERSTORM





VII Std Science Term-2 EM Unit 3.indd 51 27/06/2023 13:00:53

There are some changes in which heat is absorbed. For example, water absorbs heat when it evaporates to form water vapours. Similarly ice absorbs heat when it melts to form water. Such changes in which heat is absorbed are known as endothermic changes. Dissolution of glucose in water is also an endothermic change.

## 3.8 Periodic and non-periodic change

Depending on whether or not a change repeats itself after a definite period of time, it can be classified as periodic change or a non-periodic change.

### Periodic changes



Changes that repeat themselves after a definite interval of time are called **periodic changes.**

Rotation and Revolution of earth, beating of the heart, clock striking every hour, motion of the seconds-hand / minute-hand / hour-hand of a clock are some examples of periodic changes.

Every year we observe that seasons changes. We go from rains to winter and winter to summer and so on.

- What types of clothes are worn in winter?

  ---

- What are the clothes that we wear in summer? ---

If the winter season changes into summer, we observe change in the texture type of clothes we wear. We wear woolen clothes in winter and cotton clothes in summer. Similarly, we observe that the winter season is cool and summer season is hot. In winter, duration of night is longer than in summer. We take cold drinks in summer but prefer hot tea, coffee or milk in winter. These changes that we observe show the change of seasons.

The seasons and changes in weather occur because earth rotates on its fixed axis. Changing seasons are almost periodic in nature.

### Non-periodic changes

Changes that do not repeat themselves after a definite interval of time and occur randomly are called **non-periodic changes**. Eruption of a volcano, occurrence of an earthquake, a streak of lighting flash across the sky during a thunderstorm, running of a batsman between the wickets, movement of legs while dancing are a few examples of non-periodic changes.



### POINTS TO REMEMBER

- Particle arrangement within the state of matter gets disturbed upon heating. The disturbance is seen either as expansion or contraction.
- A process in which liquid changes into vapour on heating is called evaporation.
- A process in which solid changes into liquid on heating is called melting or fusion.
- A process in which gas changes into a liquid is called condensation.
- A process in which liquid changes into solid is called freezing.
- Physical changes are the changes in which only physical properties of a substance undergo a change and there is no change in its chemical composition.
- Solid substances are usually purified by the process of crystallization.
- Evaporation is the technique used to separate dissolved solids from a solid-liquid mixture.
- Certain solid substances like camphor, naphthalene get converted into gas directly without becoming liquid upon heating by sublimation.



VII Std Science Term-2 EM Unit 3.indd 52 27/06/2023 13:00:56

- ❖ Changes that occur with the formation of new substance with different chemical composition or transformation of a substance into another substance with the evolution or absorption of heat or light energy are termed as chemical changes.
- ❖ Changes that repeat themselves after a definite interval of time are called periodic changes.
- ❖ Changes that do not repeat themselves after a definite interval of time and occur randomly are called non-periodic changes.
- ❖ Changes in which heat is absorbed are known as endothermic changes.
- ❖ Changes in which heat is released are known as exothermic changes.



## Evaluation

7YENW

### I. Choose the best answer

1. When a woolen yarn is knitted to get a sweater, the change can be classified as _____ .
   a. physical change  b. chemical change
   c.endothermic change
   d. exothermic change
2. _____ of the following are endothermic changes.
   a. Condensation and melting
   b. Condensation and freezing
   c. Evaporation and melting
   d. Evaporation and freezing
3. The chemical change is _____ .
   a. water to clouds
   b. growth of a tree
   c. cow dung to bio-gas.
   d. ice-cream to molten ice-cream.
4. _____is an example of a periodic change.
   a. Earthquake.
   b. Formation of rainbow in sky
   c. Occurrence of tides in seas.
   d. Showering of rain
5. _____ is not a chemical change.
   a. Dissolution of ammonia in water
   b. Dissolution of carbon-di-oxide in water
   c. Dissolution of oxygen in water
   d. Melting of polar ice caps

### II. Fill in the blanks

1. Filling up a balloon with hot air is a _____ change.
2. Stretching gold coin into a ring is a _____ change.
3. Opening a gas cylinder knob converts _____ fuel into _____ fuel. This is an example of _____ change.
4. Spoiling of food is a _____ change.
5. Respiration is a _____ change.

### III. True or False. If false, give the correct answer.

1. Cutting of cloth is an example of a periodic change.
2. Taking a glass of water and freezing it by placing it in the freezer is a chemical change.
3. A bean plant collecting sunlight and turning it into bean seeds is an example of physical and non-periodic change.
4. If the chemical properties of a substance remain unchanged and the appearance or shape of a substance changes it is called a periodic change.
5. Tarnishing of silver is an example of endothermic change.



VII Std Science Term-2 EM Unit 3.indd 53 27/06/2023 13:00:56

### IV. Match the following

| A | B | C |
|---|---|---|
| 1. Melting | Change of state from liquid to solid | Ticking of clock |
| 2. Condensation | Change of state from liquid to gas | Formation of ice cube |
| 3. Evaporation | Change of state from solid to liquid | Collecting flowers |
| 4. Freezing | Change of state from gas to liquid | Ice cube to water |
| 5. Periodic change | Occurs at irregular time intervals | Water to steam |
| 6. Non-periodic change | Occurs at regular time intervals | Steam to water drops |

## V. Classify the following changes as physical and chemical changes

A rough piece of wood is sanded and polished resulting in change in texture, Rusting of a iron nail, Painting the grill, Bending a paper clip, Pounding silver into thin plate, Rolling the chappathi dough into thin wire, Occurrence of day and night, eruption of volcano, burning of matchstick, dosa from the batter, blinking of eyelids, occurrence of a thunderstorm, rotation of the earth, formation of eclipses.

| Physical changes | Chemical changes |
|---|---|
| | |
| | |
| | |
| | |
| | |

## VI. Analogy

1. Physical Change: Boiling::Chemical Change: _____.
2. Wood to saw dust:_____ :: Wood to Ash: Chemical change
3. Forest fire: _____ change::Change in period in a school: periodic change

## VII. Very short answer type question

1. State two examples of periodic changes.
2. Mention any two exothermic reactions.
3. Cold milk is heated and it becomes hot. Which type of change it is?
4. What type of change is artificial ripening of fruit?
5. What type of change is colouring of a paper?
6. Growing of nails is a periodic change. Why?
7. What type of energy changes is associated when ice melts?

## VIII. Short answer type question

1. Distinguish physical and chemical changes.
2. How can a change occur in a substance?
3. Can you suggest a method to collect water from sea water?
4. Is solar eclipse a periodic change? Give your reason.
5. What is the difference between dissolution of sugar and burning of sugar?

## IX. Long answer type question

1. Explain the following statement: Digestion is a chemical change.
2. How the iron blade is fixed into a wooden handle in tools used to dig the soil?

## X. Higher order Thinking questions

1. Peeled and unpeeled banana does not look the same. Does that mean peeling banana is a chemical change?
2. A very hot glass on putting in cold water cracks. What does this change indicate?
3. Boiling of water is a physical change; but boiling of egg is a chemical change. Why?

## XI. Assertion – Reason type question

1. Assertion: The explosion of fire cracker is a physical change.



VII Std Science Term-2 EM Unit 3.indd 54 27/06/2023 13:00:56

Reason: A physical change is a reversible change.

a. Both A and R are true and R is the correct explanation of A.
b. Both A and R are true but R is not the correct explanation of A.
c. A is true but R is false.
d. A is false but R is true.

2. Assertion: The process of conversion of liquid water to its vapours by heating the liquid is called boiling.
Reason: The process of conversion of water vapours to liquid by cooling the vapours is called condensation.

a. Both A and R are true and R is the correct explanation of A.
b. Both A and R are true but R is not the correct explanation of A.
c. A is true but R is false.
d. A is false but R is true.

3. Assertion: Burning of wood log to charcoal is a physical change.
Reason: The products formed of burning a piece of wood can be easily converted back to wood log.

a. Both A and R are true and R is the correct explanation of A.
b. Both A and R are true but R is not the correct explanation of A.
c. A is true but R is false.
d. A is false but R is true.

4. Assertion: The formation of iron oxide from iron is a chemical change.
Reason: For the rust to form from iron, it must be exposed to air and water.

a. Both A and R are true and R is the correct explanation of A.
b. Both A and R are true but R is not the correct explanation of A.
c. A is true but R is false.
d. A is false but R is true.

5. Assertion: A drop of petrol when touched with finger gives a chill feeling.
Reason: The above phenomenon is an endothermic one.

a. Both A and R are true and R is the correct explanation of A.
b. Both A and R are true but R is not the correct explanation of A.
c.A is true but R is false.
d. A is false but R is true.

## XII. Picture based question

1. Observe the picture and list down the changes that are accompanied in the picture.



a) ……..
b) …….
c) ……..

2. Observe the picture containing a kettle and note that it has salt water in it and answer the following questions:

a) What is name of the process that is done to the kettle?
b) What will happen to the content of the kettle?



c) What kind of change is occurring on the cold surface of the metal plate?
d) What can you say about the quality of water that is obtained in the beaker?

ICT CORNER

# CHANGES AROUND US

**This activity helps the students to understand the effect of heat on matters**




**PROCEDURE :**

**Step 1:** Type the URL link given below in the browser or scan the QR code. A page opens with a glass full of ice with a play button near to it.

**Step 2:** Press Play button. It opens into another page with the set up of temperature and change of phases.

**Step 3:** Set the temperature and phases. Press the play button below.

**Step 4:** Do it with different options. Then a next page button will come

**Step 5:** Go there you will end with a small quiz.




**Step 1**




**Step 2**




**Step 3**




**Step 4**

**Changes Around Us URL:**

https://interactives.ck12.org/simulations/chemistry/phases-of-matter/app/index.htmlm

*Pictures are indicative only

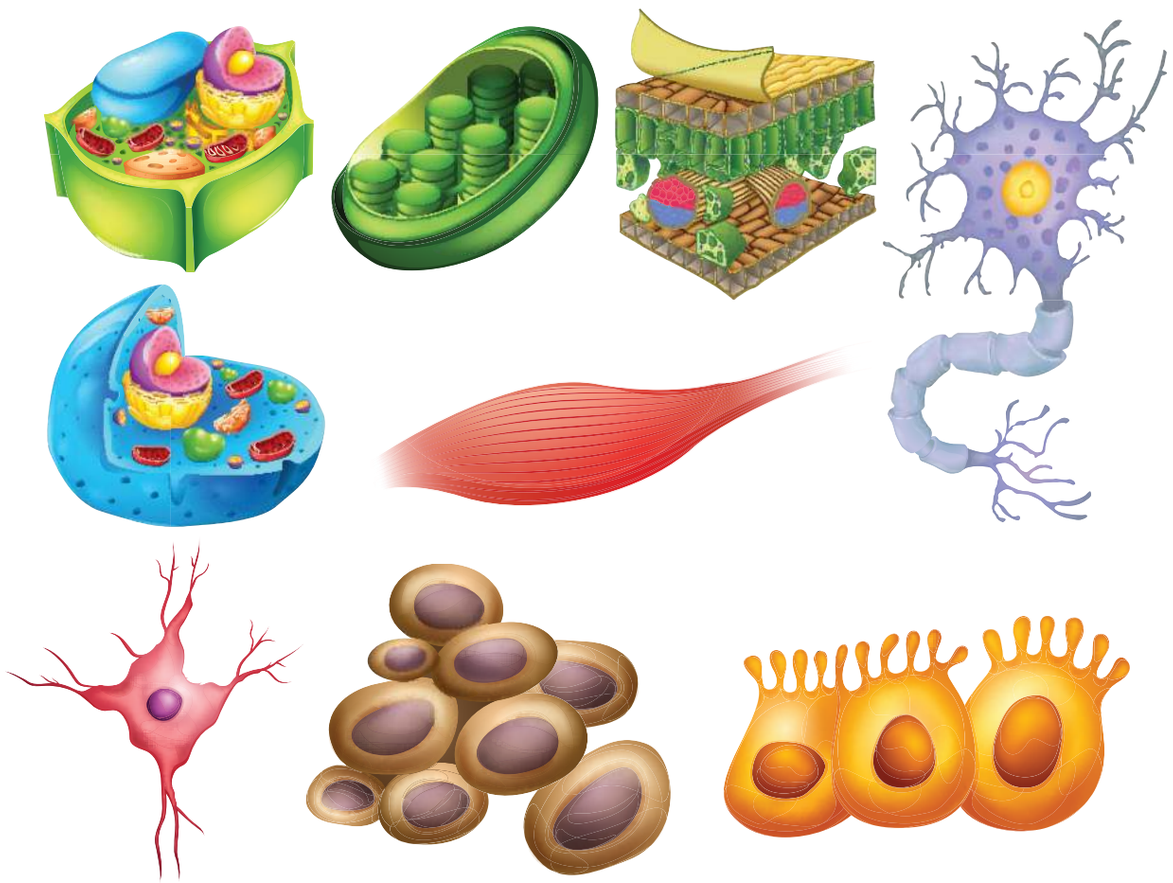
*If browser requires, allow Flash Player or Java Script to load the page.



VII Std Science Term-2 EM Unit 3.indd 56 27/06/2023 13:00:57

# Unit 4

# Cell Biology



## Learning Objectives

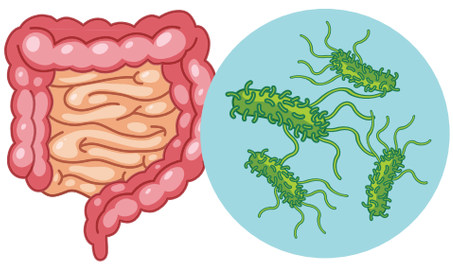
- To compare the plant cell with the animal cell and understand their similarities and dissimilarities
- To understand the cell as a fundamental unit of life
- To know and understand the different types of Human cells and their related functions
- To know the functions of different cell organelles
- To compare different cell organelles, their functions and know their similarities and specialties

LR069

## Introduction

Sona had a dinner, some hour later, she experienced a stomach pain and went to a clinic. After examination, the Doctor told Sona that she had eaten food contaminated with a type of bacteria which might have caused food poisoning. Bacteria are micro-organisms that can be seen only under microscope and not seen through nacked eyes. Salmonella species is a bacteria that can cause food-borne infection.

**Salmonella bacteria**



Our earth is a beautiful place where in different types of organisms happily coexist. From minute mosses to huge conifers, invisible bacteria to huge blue whale, all have a basic unit called Cell. Let us study about the cell.

**ACTIVITY 1**

Do you remember the lesson studied in previous class, how will you find whether on object is living or non – living? Write it down. An object is living or non – living?

1. Form a team and work together to write down some of the functions of living things, which you can remember.

_____

2. Do you think that an individual cell is living? Explain your answer

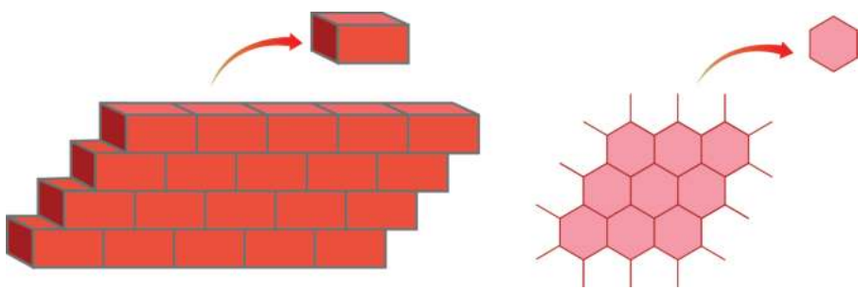
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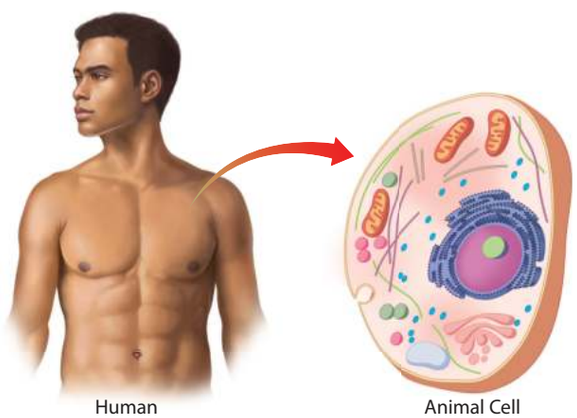
3. Write about various organelles of a cell which you know.

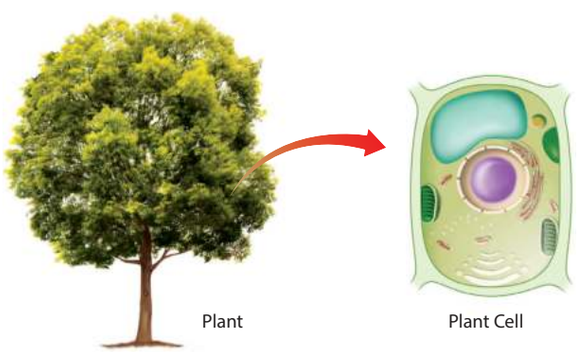
_____

## 4.1 Cell as a fundamental unit of life:

The building wall is made up of numerous bricks. In the similar manner, a bee hive is composed of numerous hexagonal units. Some of the organisms are represented by a single cell. Therefore, they show a simple organization. The basic functional unit of an organism is called, a cell. Structure of a cell represent the arrangement





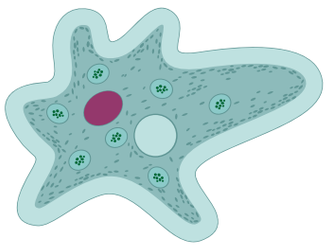



of parts or organells in a cell. Function is the activity of each part or organell in a cell. Cells are the basic building blocks of an organism. You learnt that atoms are the basic building blocks of matter in chapter three. Likewise, human body is made up of animal cells and plant is made up of plant cells.

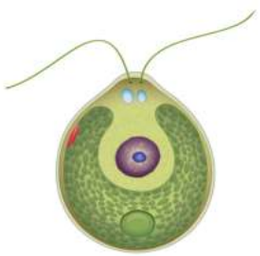
## Unicellular organisms

Some simple organisms, are made up of only one cell. They are called unicellular organisms, which can be seen with the help of a microscope. There are many single – celled microscopic organisms.

Have a look at the image. *Chlamydomonas* and an *Amoeba*, a single cell organisms which carryout entire functions. The body of all organisms are made up of tiny building blocks called, cells. Bacteria are also one celled unicellular organisms.



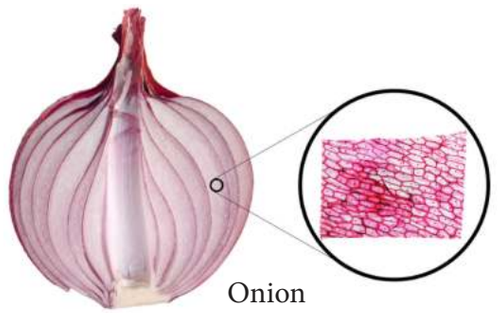
Amoeba



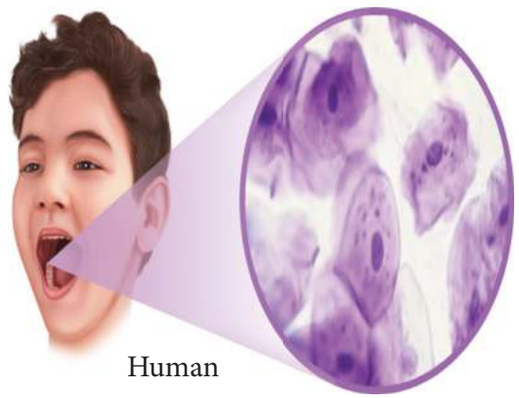
Chlamydomonas

## Multicellular Organism

The cells are organized into tissues, organs and organ systems in a multicellular organism. Macroscopic organisms are visible and consists of many cells. The body of macroscopic organisms involves various functions. You can see cells of onion and human through a microscope. Onion and man are examples for multicellular organism.



Onion



Human

## Cell to organism

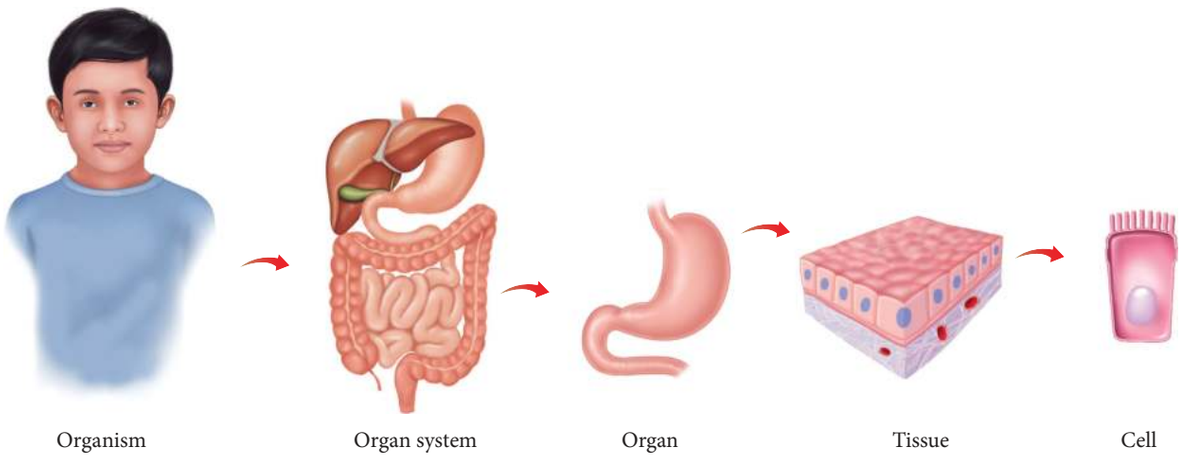
Many cells function together to form tissues, different tissues combined together to form an organ and different organs to form an organ system, which leads to form an organism.

## Organisms.

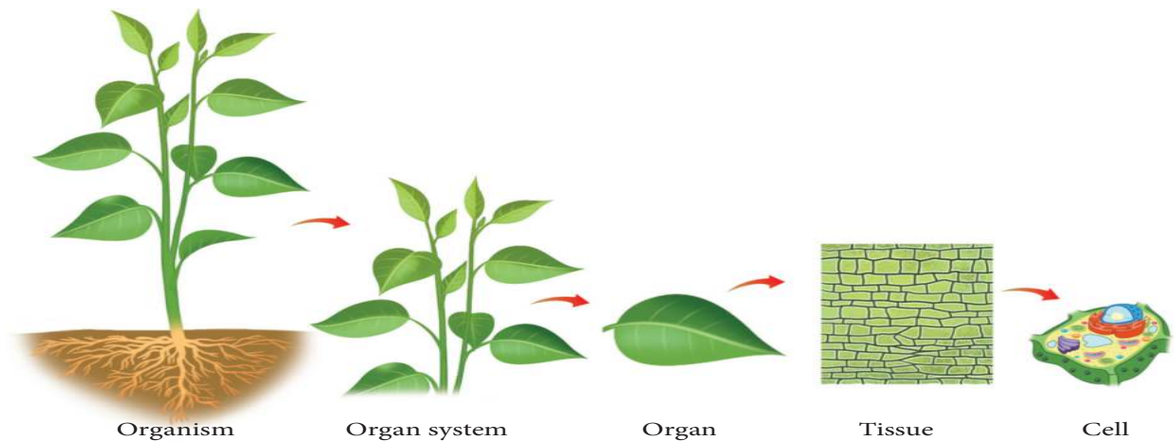
Many types of organ systems function together in a body, e.g. respiratory system, digestive system, excretory system circulatory system etc.

## Organ System

Many organs together form an organ system, which is concerned with a specific function. For example, Respiratory system, which has organs like nostrils, nasal chamber, wind pipe and lungs that helps in the process of respiration. In a plant, the root system consists of primary root, secondary root and tertiary root, which does the function of conduction of




**Human body**




**Plant body**

water, mineral and also fixation.

## Organ

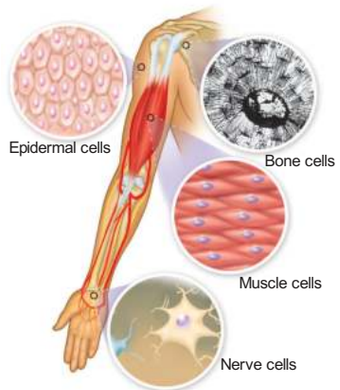
A collection of different tissues worked together to perform a specific function or functions is called an organ. Human body has different organs like stomach, eye, heart, lungs etc., are made up of different type of tissues. Plant have organs such as leaves, stems, and roots.

## Tissue

Tissue is a group of cells, organized for a specific function. Tissues have following features like same shaped cells or different shaped cells to perform a common function. Human and other animals are made up of nervous, epithelial, connective and muscle tissues. Plants have transport, protective and ground tissues.

## Cell

The cell is a basic structural and functional unit of life. Cell is the building unit of living organisms. You can see in a hand, how many types of cells are there to work together to perform its functions. So, cell is known as the basic unit of life.



**ACTIVITY 2**

Find out major organs that are part of the circulatory system of a human body and listout their functions

## 4.2 Plant and Animal cell comparison

Why do plant cells differ from animal cells? They differ from each other because they have to perform different functions.

Now you know that there are many main similarities between plant and animal cells. Let us see how they differ from one another as given in the picture (Activity 3).

## 4.3 Human cells related to functions

### Different types of cells

Our body is made up of many different kinds of cells. Each type of cell is specialized to perform a specific function. Depending on the function, cell has specific shape, size and may have some components which other type of cells do not have. Have a look at the differences between nerve cells and red blood cells in the images. Even though there are many different types of cells, there are some components common to all type of cells. Let us take a look at this in the next section.

### What's inside a cell?

Inside a cell, there are many tiny structures called cell organelles. These organelles are responsible for providing needs of the cell. They work to bring in food supplies, get rid of waste, protection and repair of the cell, and help it to grow and reproduce. Each one has a specific function to do for the cell. And, if any one organelle stops its function, then the cell is programmed to die.

### Cell Structure

As we have mentioned before, all cells have some common structure.

These are

1. Cell membrane
2. Cytoplasm, and
3. Nucleus (In most eukaryotic cells).

The structure of a typical plant and animal cell shows following peculiarities:

### Cell membrane

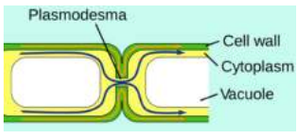
The boundary of an animal cell is the plasma membrane, which is also called as cell membrane

### Cell wall - "Supporter and Protector"

All animal and plant cells are enclosed or surrounded by a cell membrane as you learned before. However, as you might have noticed previously that, animal cells often have an irregular shape, whereas plant cells have a much more regular and rigid shape.

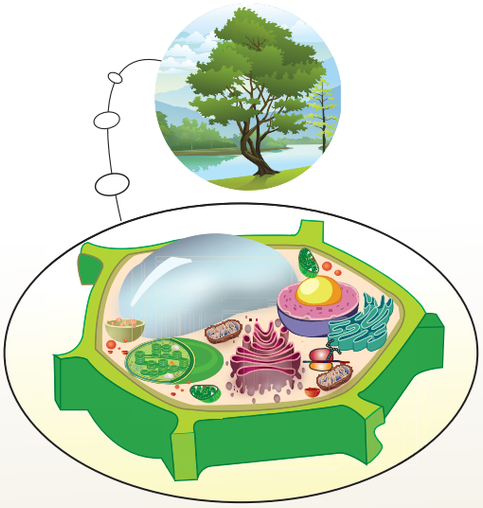
Plant cells have an additional layer on the outer side of the cell membrane. This is called as the cell wall, that provides a frame work for support and stability.

The cell wall is formed from various compounds, the main one being cellulose. Cellulose helps to maintain the shape of the plant cell. This allows the plant to remain rigid and upright even if it grows to great heights. Each cell is interconnected with its neighboring cells through openings called Plasmodesmata.




Cell wall

# PLANT CELL

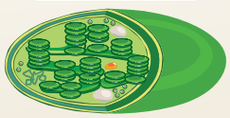


## Cell Wall



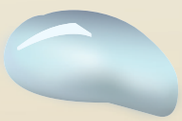
The outer most covering of the plant cell. It maintain the shape and protect the cell.

## Chloroplast



Chloroplast is a organelle, characterized by its two membranes and a high concentration of chlorophyll and carry out the photosynthesis.

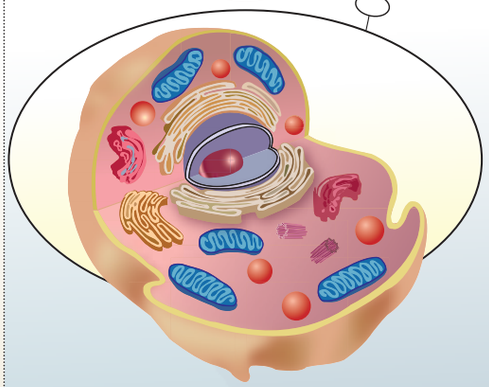
## Large vacuole



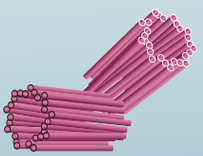
filled with both inorganic and organic molecules, along with water to support the organelle

# ANIMAL CELL





## Centriole



Centriole is a pair of minute cylindrical, involved in the development of spindle fibres in cell division.

## Small vacuole

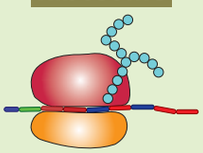
filled with both inorganic and organic molecules, along with water to support the organelle

## Nucleus



The nucleus is the control centre of the cell. It is the largest Organelle.

## Ribosome



Ribosome is a minute particle consisting of RNA. They synthesize polypeptides and proteins.

## Cytoplasm



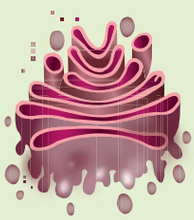
The cytoplasm includes all living parts of cell with in the cell membrane but excluding the nucleus.

## Endoplasmic reticulum



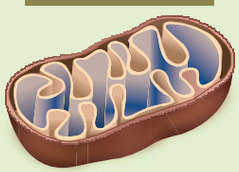
Endoplasmic reticulum a network of membranous tubules and is involved in protein and lipid synthesis.

## Golgi body



Golgi body is a complex of vesicles and folded membranes, involved in secretion and intracellular transport.

## Mitochondria



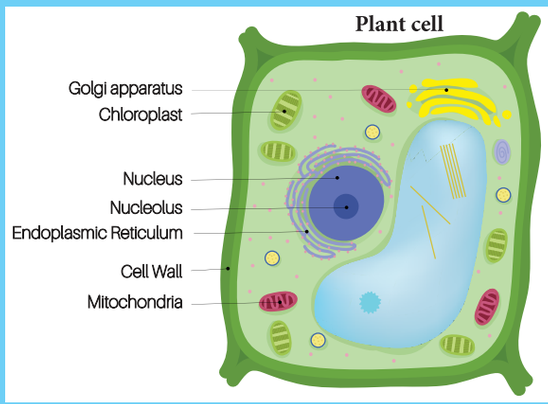
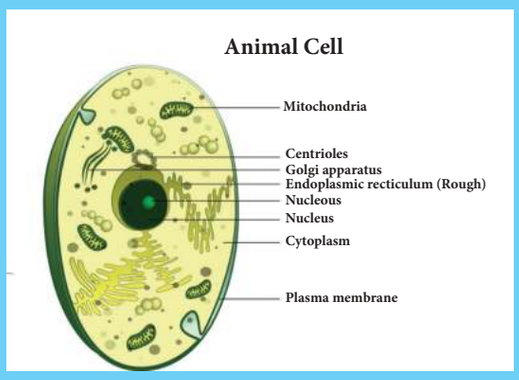
Mitochondria are organelles, They make most of the cell's supply of adenosine triphosphate (ATP), a molecule that cells use as a source of energy. Their main job is to convert energy.

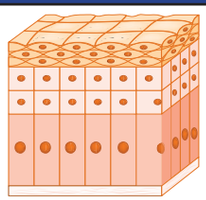
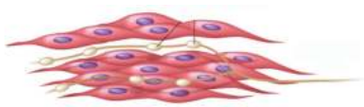


VII Std Science Term-2 EM Unit 4.indd 62 08/07/2022 17:17:29

## ACTIVITY 3

Study the pictures given and write the differences between cells that you observe in the given table

| Plant cell | Animal Cell |
|---|---|
|   |   |
| 1.<br>2.<br>3.<br>4.<br>5. | |

| Specialised cell | Structure | Function |
|---|---|---|
| Epithelial cells – they are mostly flat and columnar in shape |  | They cover the surface of the body for protection |
| Muscle cells – they are long and spindle shaped |  | They can contract and relax allowing the cell for movement. |
| Nerve cells – the body of nervous cell is branched with an elongated nerve fiber. |  | Nerve cells are specialized to carry and conduct messages that coordinate the functions of the body. |
| Red blood cells – Round, biconcave and disc shaped |  | Red blood cells carry oxygen and collect carbon dioxide from various part of the body. |

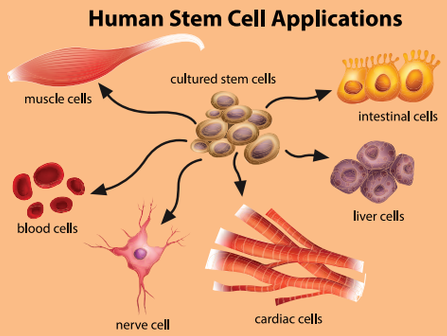


VII Std Science Term-2 EM Unit 4.indd 63 08/07/2022 17:17:33

DO YOU KNOW?

### Stem Cells

Stem cells are quite amazing as they can divide and multiply while at the same time with their ability to develop into any other type of cell. Embryonic stem cells are very special as they can become absolutely any type of cell in the body, for example, blood cell, nerve cell, muscle cell or gland cell. So they are utilized by the Scientist and Medicos, to cure and prevent some diseases like Spinal cord injury.




## Cytoplasm - I am the "Area of Movement".

When you look at the temporary mounts of an onion peel, you can see a large region of each cell an enclosed by the cell membrane. This region takes up very little stain. It is called the **cytoplasm**.

The cytoplasm includes all living parts of the cell with in the cell membrane, excluding the nucleus. The cytoplasm is made up of the cytosol and cell organelles. The cytosol is a watery, jelly-like medium made up of 70% - 90% water and usually colourless.

Cell organelles and structures present in a cell are endoplasmic reticulum, vacuole, ribosome, golgi body, lysosome, mitochondria, centriole, chloroplast, surrounded by plasma membrane and cell wall.

## Protoplasm vs. Cytoplasm

In particular, the material inside and outside the nuclear membrane is known as Protoplasm. The fluid inside the nucleus is known as the nuclear fluid or nucleoplasm and outside the nucleus is called as cytoplasm.

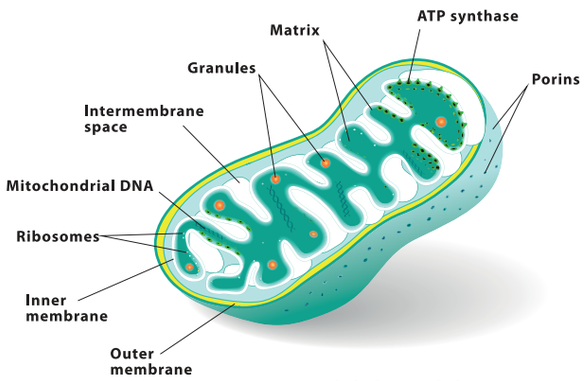
## Inside the cytoplasm

## Mitochondria - "Power house of the Cell".

Do you remember learning about the food as the energy source for the body? Just as wood is burnt to release the stored potential energy to make a fire to heat some water. The food that you ate to be broken down in order to release the energy which can be used by your body to function. Mitochondria are responsible to do this function.

Very active cells have more mitochondria than cells that are less active. Which type of cell, do you think, will have more mitochondria, a muscle cells or a bone cell?

Mitochondrian is an oval or rod shaped double membrane bounded organelle. Aerobic respiratory reactions take place with in the mitochondrion to release energy. So it is known as "the Power House" of the cell. The energy produced within the mitochondrion is used for all the metabolic activities of the cell

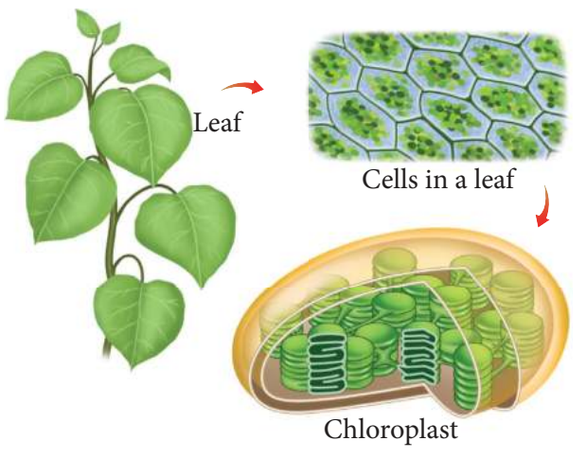



**Mitichondrion**

## Chloroplast- "Food Producers".

Do you notice the green organelles present in plant cells and absent in animal cells. Chloroplasts are the only cell organelles that can produce food from the sun energy. Only plants with chloroplast are able to do photosynthesis because they contain the very important green pigment, chlorophyll. Chlorophyll can absorb radiant energy from the Sun and convert it to the chemical energy which can be used by the plants and animals. Animal cells lack chloroplasts and are unable to do photosynthesis.

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### Observing chloroplast in algae

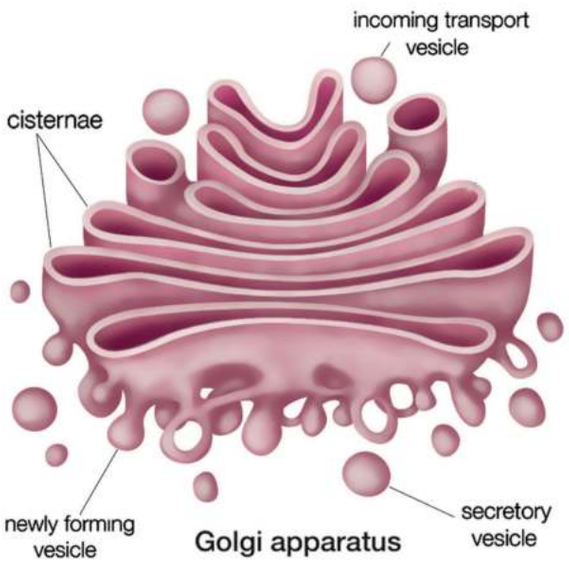
Collect some algae from pond and separate out thin filaments of them. Place a few filaments on a slide. Observe it under the microscope. Take the help of given figure and draw the picture of chloroplast that you have observed under the microscope. Chloroplast is a type of plastid. which are present only in plant cells. Plastids are mainly of two types - chromoplasts (coloured) and leucoplasts (colourless).

DO YOU KNOW?

Various range of these plastids impart different colours to various parts of plant. Chromoplast impart colour to flower and fruits. As fruits ripen, chloroplasts change to chromoplasts. Starch is converted to sugar.

## Golgi Complex- I need a break

Membrane bounded sacs are stacked on top of the other with associated secretory vesicles are collectively known as golgi complex. Functions of golgi complex are the production of secretory substances, packaging and secretion. This is the secret behind the change in the colour and taste of fruits



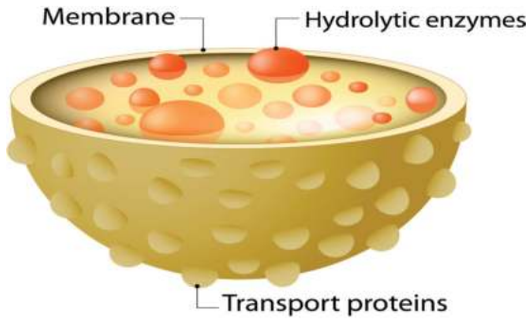

## Lysosome- "Suicidal Bag".

**Everything I touch, I destroy**

You will find organelles called as lysosomes, which are very small to view using a light microscope. They are the main digestive compartments of the cell. They lyse a cell, hence they are called "suicidal bag".



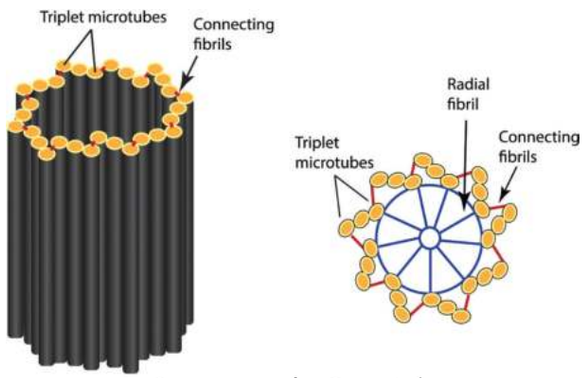
VII Std Science Term-2 EM Unit 4.indd 65 08/07/2022 17:17:36



Lysome

## Centrioles

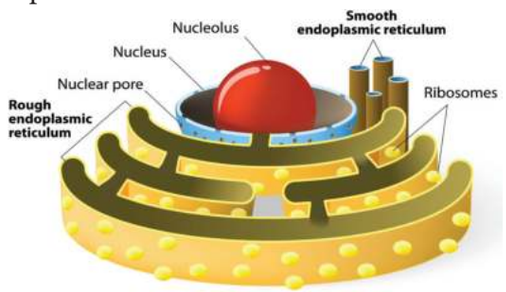
They are generally found close to the nucleus and are made up of tube-like structures. Centrioles or centrosomes are present only in animal cells and absent in plant cells. It helps in the separation of chromosomes during cell division.



Structure of a Centriole

## Endoplasmic reticulum - You guys, be quiet, I have so much work to do

It is an inter membranous network made up of flat or tubular sacs within the cytoplasm. Endoplasmic reticulum is of two types. They are rough endoplasmic reticulum and smooth endoplasmic reticulum.



Endoplasmic reticulum

**Rough endoplasmic reticulum** are rough due to the ribosomes attached to the membrane. which helps in the synthesis of protein.

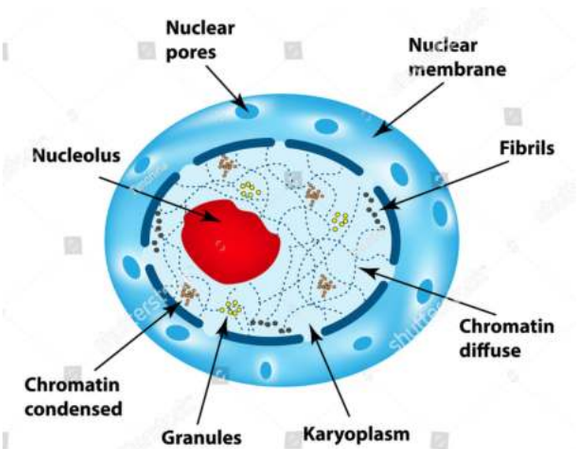
**Smooth endoplasmic reticulum**. It is a network of tubular sacs without ribosomes on the membrane. They play a role in the synthesis of lipids, steroids and also transport them within the cell.

## Nucleus - Everyone do what I say. Acting like the "Brain" of the cell

- Plant and animal cells have a nucleus inside the cytoplasm. It is surrounded by a nuclear envelope. One or two nucleolus and the chromatin body are present inside the nucleus. During cell division, the chromatin body is organised into a chromosome. Storage of genetic material and transfers heredity characters from generation to generation are the functions of chromosome.

### Functions of Nucleus

- In controls all the processes and chemical reactions that take place inside the cell.
- Inheritance of character from one generation to another.



Nucleus

## ACTIVITY 3

**Summarise what you have learnt**

Now you've studied the internal structure of a cell. Let us summerise what we have learnt so far Complete this table by filling the main function of each of the cell structures

| S.No | Cell Structure | Function(s) |
|---|---|---|
| 1 | Cell membrane | |
| 2 | Cell wall | |
| 3 | Cytoplasm | |
| 4 | Mitochondria | |
| 5 | Vacuole | |
| 6 | Chloroplast | |
| 7 | Endoplasmic reticulum | |




**Red blood cells**



Red blood cells do not contain a nucleus. Without a nucleus, these cells die quickly; about two million red blood cells die every second! Luckily, the body produces new red blood cells every day.

## POINTS TO REMEMBER

- Cells are the basic structural and functional units of all living organisms.
- Cells are microscopic and can be seen only under a microscope.
- Cell membranes are selectively permeable, which means they only allow certain substances to pass in and out of the cell.
- Plant cells have a cell wall around the cell membrane that is rigid and provides support and protection to the cell content.
- The Cytoplasm includes the organelles and the cytosol. The Cytosol is the jelly-like medium, in which many chemical reactions take cell. Everything inside the cell membrane, except the nucleus, is considered to be the cytoplasm.
- Mitochondria are responsible for cellular respiration, which releases the energy from the food.
- Plants have chloroplasts with chlorophyll pigments to produce food by photosynthesis.
- Stem cells are cells that have the ability to divide and develop into many different types of the cell.
- A group of different tissues makes up an organ.
- Organs working together in groups form a systems or organ systems.
- Organ systems make up an organism, such as a human.



**Evaluation**

EL7OG

## I. Choose the correct answer

1. Basis unit of life.
   A) Cell
   B) Protoplasm
   C) Cellulose
   D) Nucleus

2. I am the outer most layer of an animal cell. Who am I?
   A) Cell wall B) Nucleus
   C) Cell membrane D) Nuclear membrane



VII Std Science Term-2 EM Unit 4.indd 67 08/07/2022 17:17:39

3. Which part of the cell is called the brain of the cell?
   A) Lysosome B) Ribosome
   C) Mitochondria D) Nucleus

4. _____ helps in cell division
   A) Endoplasmic reticulum
   B) Golgi complex
   C) Centriole
   D) Nucleus

5. Suitable term for the various components of cell is__
   A) Tissue B) Nucleus
   C) Cell D) Cell organelle

## II Fill in the Blanks

1. The jelly like substance present in the cell is called _____
2. I convert the Solar energy into food for the plant. Who am I? ____
3. Mature Red blood cell do not contain a ____.
4. Unicellular organisms can only be seen under a _____.
5. Cytoplasm plus nucleoplasm is equal to___.

## III. True or False – If false give the correct answer

1. Animal cells have a cell wall.
2. Salmonella is a unicellular bacteria.
3. Cell membrane is fully permeable
4. Only plant cells have chloroplasts.
5. Human stomach is an organ.
6. Ribosomes are small organelles with a membrane.

## IV. Match the following

| | | |
|---|---|---|
| 1. | Transporting channel | Nucleus |
| 2. | Suicidal bag | Endoplasmic reticulum |
| 3. | Control room | Lysosome |
| 4. | Power house | Chloroplast |
| 5. | Food producer | Mitochondria |

## V. Analogy

1. Bacteria : microorganism :: mango tree : _____
2. Adipose : tissue :: eye : _____
3. Cell wall : plant cell :: centriole : ____
4. Chloroplast : photosynthesis :: mitochondria : ____

## VI. Choose the correct alternative from the following

1. **Assertion (A) :** Tissue is a group of dissimilar cells.
   **Reason (R) :** Muscle is made up of Muscle cell.
   a). Both A and R are true
   b). Both A and R are false
   c). A is true but R is false.
   d). A is false but R is true.
2. **Assertion (A) :** Majority of cells cannot be seen directly with naked eye because.
   **Reason (R) :** Cells are microscopic.
   a). Both A and R are true
   b). Both A and R are false
   c). A is true but R is false.
   d). A is false but R is true.

## VII. Very short answer

1. What are the functions of cell wall in plant cell?
2. Which organelle uses energy from sunlight to make starch?



VII Std Science Term-2 EM Unit 4.indd 68 08/07/2022 17:17:39

3. What are the main things in a nucleus?
4. What does cell membrane do?
5. Why lysosomes are known as scavengers of the cell?
6. Teacher said "A virus is not an organism" Do you agree with this statement or not? Explain Why?

## VIII. Give short Answer

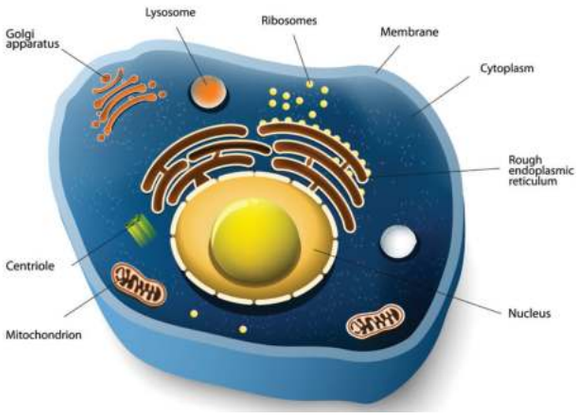
1. Why the cell is very important for us?
2. Distinguish between the following pairs
   Smooth ER and Rough ER
   Cell wall and cell membrane
   Chloroplast and mitochondria
3. Write correct sequence from cell to organism?
4. Write a short note on nucleus.
5. Classify the following terms into cells, tissues, organs and write in the tabular column given below
   Neuron, Lungs. Xylem, brain, adipose, Leaf, RBC, WBC, hand, muscle, heart, ovum, squamous, phloem, cartilage.

| Cell | Tissue | organ |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

6. On the lines given below, write about what you have learned from the activities done in this lesson.
   Let me tell you about some of the important things I've learned about cells. First, I'll start with…_____
   _____.

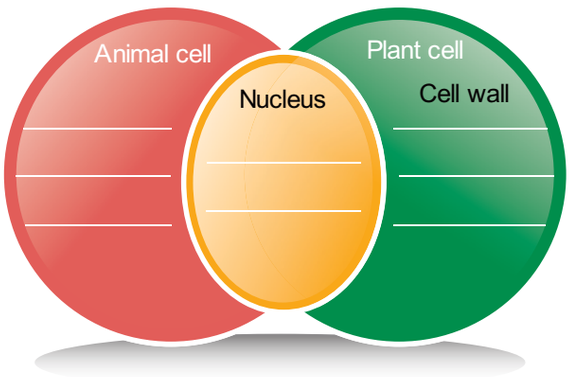
## IX. Give long answer

1. Write about any three organelles in detail.
2. In a situation, how to explain, while your friend ask what is this, never seen before?




Animal Cell

3. Compare the plant cell and the animal cell and complete the illustration given below.

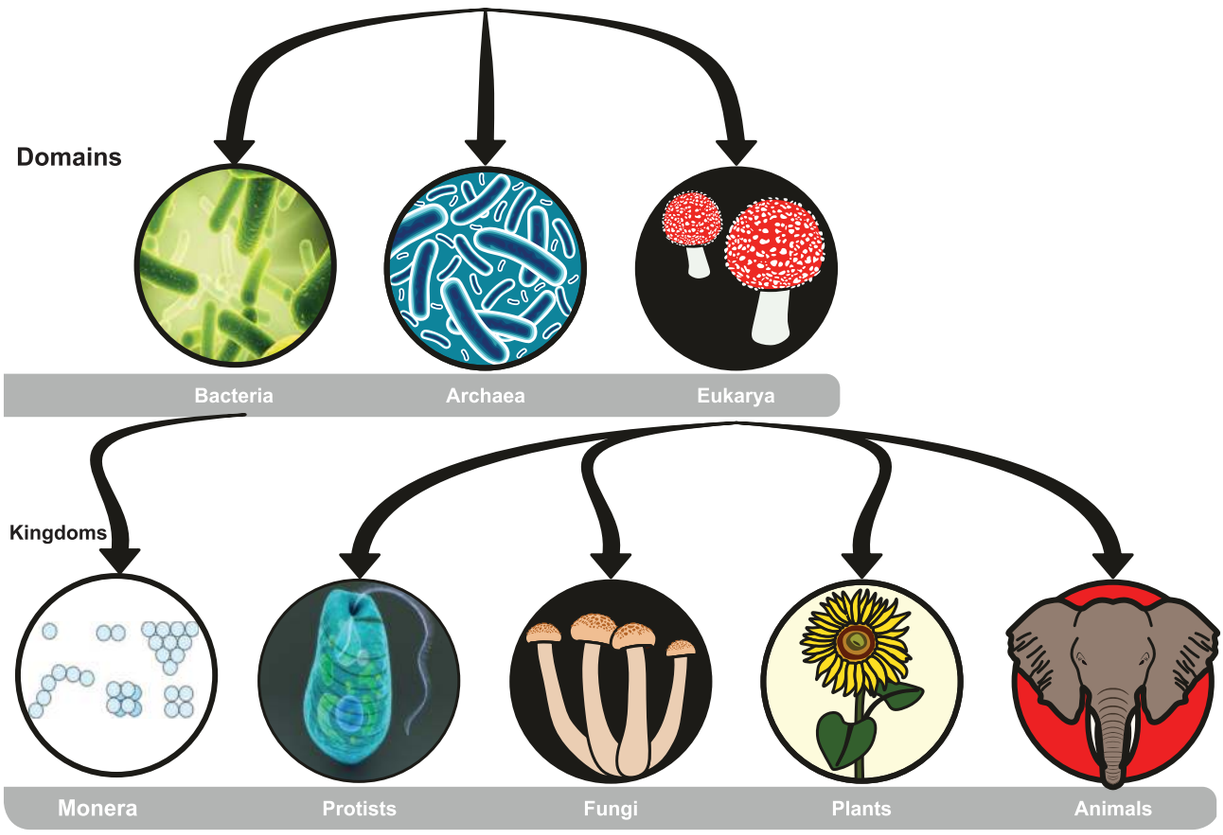



## X. Higher order thinking question

Virus is called Acellular. Why?

# Unit 5

# Basis of Classification




## Learning Objectives

- To understand the need for dichotomous classification
- To classify animals according to their characteristic features
- To know the classification of animals and get the knowledge about invertebrates and vertebrates
- To acquire knowledge about the classification of plants
- To know the importance of five kingdom classification
- To understand the Binomial Nomenclature

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VII Std Science Term-2 EM Unit 5.indd 70 09-07-2022 18:14:46

## Introduction

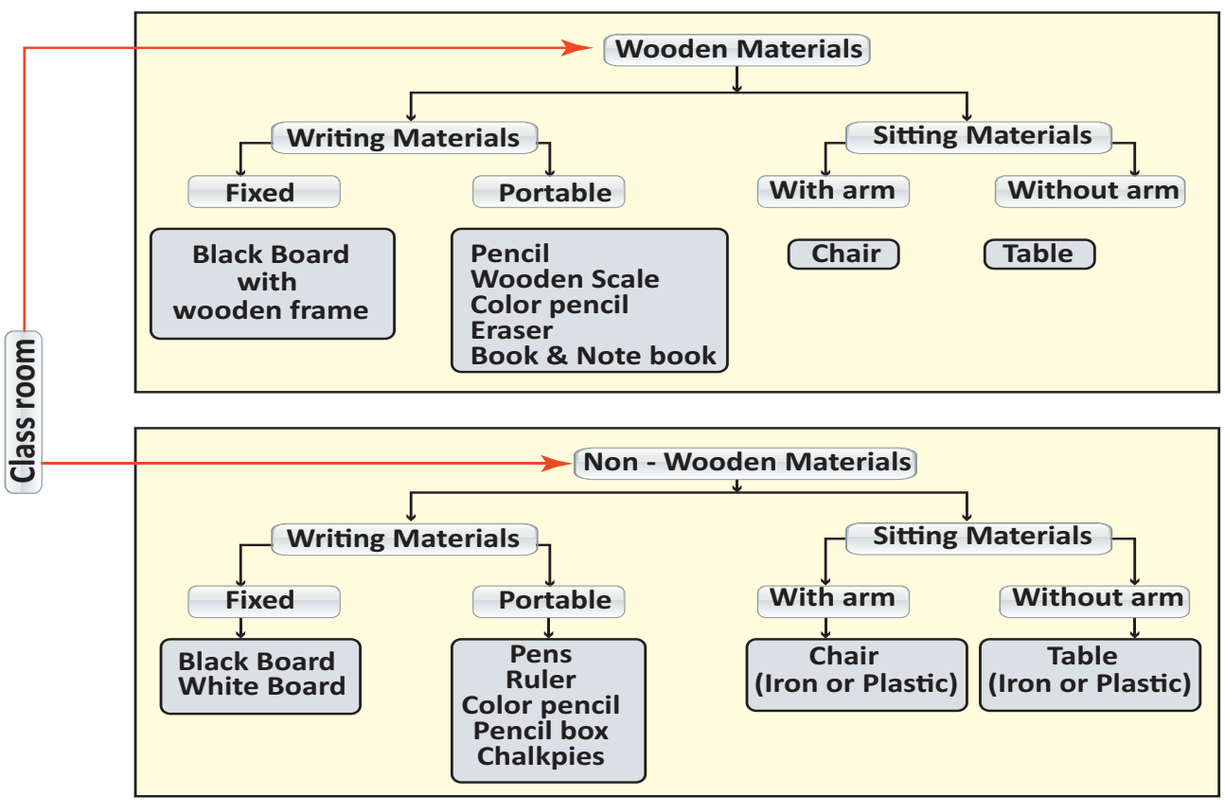
When you get ready to go to school, all your things - uniform, lunch box, water bottle, shoes etc., to be kept ready. Just imagine if all these things are not ready you will need to spend too much time to collect them. Likewise, in a grocery shop, medical shop and bakery all the items are systematically arranged. Sorting of things is very much required and important for all living beings. We see various plants and animals around us. It is estimated that about 8.7 million species of living organisms have been identified and named till now. However many scientists believe that, only a small portion of the total species existing on earth has been identified. In order to know about the behavior and relationship among organisms, that are known, biologists have classified them into two broad groups, plants and animals. Grouping of living organisms based on their common features is known as biological classification.

## List out things found in your class room

Chair, Table, Black board, Chalk piece, Cupboard, Fan, Light, Switches, School bag, Lunch bag, Text book, Note book, Water bottle, Pencil box, Pencil, Pen, Rubber, Ruler, Door, Window, Writing pad, Colour pencil, Eraser, Sharpener, Compass, and Chart papers.

1. Find out one common difference among these materials to classify the above things into two **Wooden / Non Wooden**
2. Find out another difference to classify each group into two sub groups Wooden sitting materials / Wooden writing materials and Non wooden sitting material / Non wooden writing materials.
3. Continue to identify differences to classify each small subgroups into two Fixed / Portable, With arm / Without arm

There are some similarities and differences exist among these materials. So we need to observe and identify those similarities and differences to



construct a dichotomous key. The dichotomous key allows us to make quick reference and identify a particular thing. Classification provides scientists a systematic easy way of studying organisms. Classification is done using this dichotomous key. What is dichotomous key? It is a tool used to classify organisms based on their similarities and differences.

## Features of dichotomous key

- A single feature that differentiate a group easily.
- One character selected to separate the group, as present or absent.
- Continue the 2nd step until only one item will remain at the end.

## Dichotomy of Animals

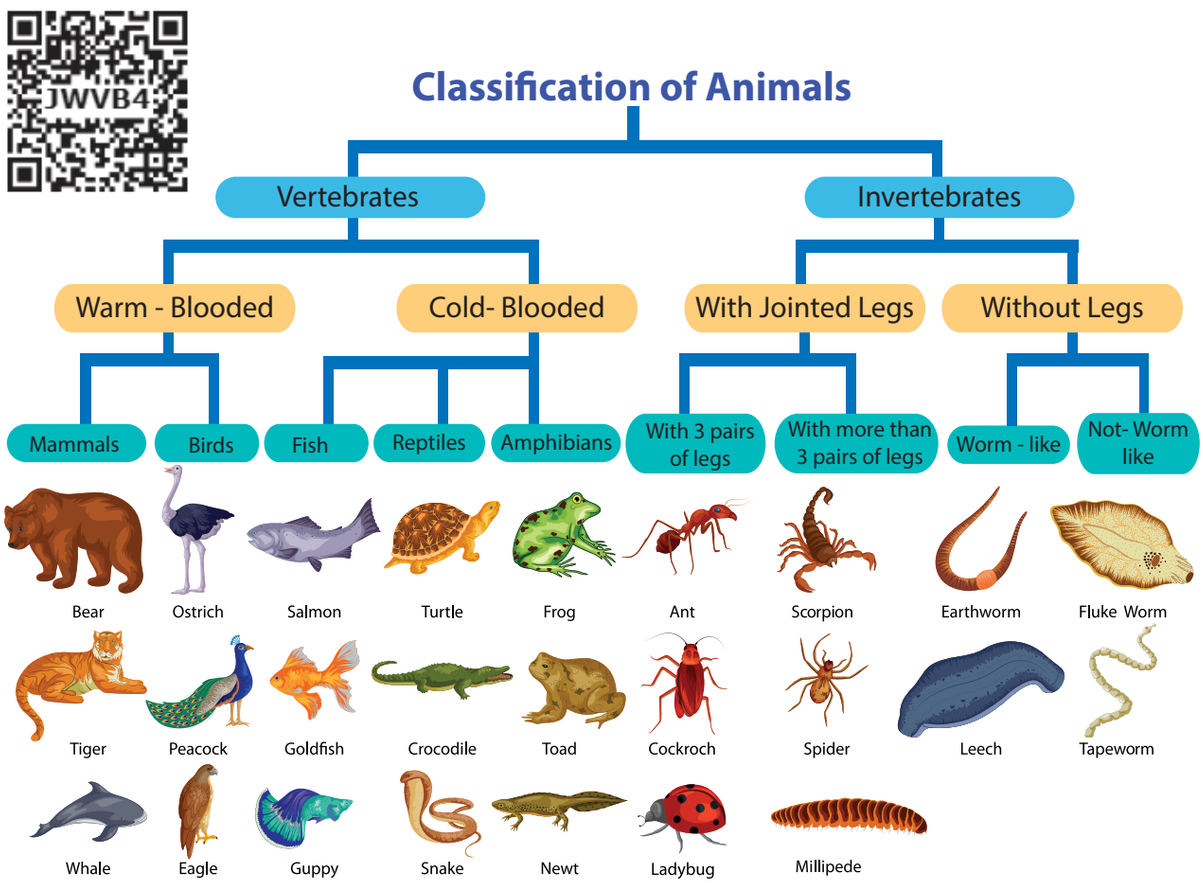
Using a dichotomy pattern, classify the given list of animals: Ostrich, peacock, monkey, frog, toad, turtle, snake, shark, goldfish, ant, tapeworm, earthworm and leech.

1. Presence or absence of back bone, we can classify them into two groups.
2. Animals with back bone can be divided into its subgroup based on its body temperature.
3. Further classification can be done based on its difference like presence of feather or hair, scales etc.

## 5.1. Basics of Classification:

Living organisms are so large in number that they need to be classified into smaller groups. Classification of living organisms is made on the basis of their characteristics, similarities and differences

**Identify animals with backbone and without backbone based on the figure.**



DO YOU KNOW?

**Aristotle** was a Greek philosopher and thinker who lived about 2400 years ago. Aristotle came up with the following grouping system that was used for almost 2000 years after his death!

- He classified all organisms into either animals or plants.
- Then he classified into those 'with blood' and those 'without blood'.
- Then the animals are classified into three groups based on their method of movement: walkers, flyers or swimmers.



## ACTIVITY 1

**Aim :** To sort out a box of given buttons and classify them into different types.

**Materials Required :** A box full of different types of buttons.

**Procedure:**

1. Take a box of given buttons.
2. Work in small groups of three or four and classify the buttons based on the following classification criteria.
   (i) Shape
   (ii) Buttons with four holes
   (iii) Buttons with two holes.
   (iv) Colour
3. Identify other features that can be used to sort out buttons into different groups.



Based on the, special features and characters, the students identify each button, according to its size, hole and colour. This is known as identification. Then teacher shall ask students to separate the buttons according to the size, hole and colours. This is known as assortment.

After assorting the buttons the teacher ask the students to gather the buttons according to their, size, hole and colours. This is termed as grouping. Identification, assortment and grouping, which results in classification

### Classification:

The method of arranging the organisms into groups is called classification. When we classify things we put them into groups based on their characteristics.

### Why do we classify things?

1. Classifying things makes it easy for us to know their similarities and differences.
2. Things with similar characters are classified into same group. These things are usually similar in at least one characteristic.
3. Things with different characteristics are classified into different groups. These things are usually different in at least one characteristic.
4. Classification helps us to understand, living and non – living things in better way. For example, we can classify a newly discovered organism, we would come to know, how it relates with other.

### Need for Classification

- ❖ Classification is needed to identify an organism correctly.
- ❖ It helps to know the origin and evolution of an organism.
- ❖ To establish the relationship among different organisms.



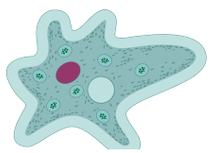
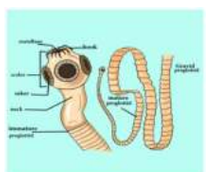
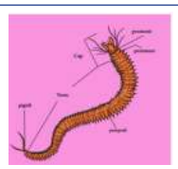
VII Std Science Term-2 EM Unit 5.indd 73 09-07-2022 18:14:50

- ❖ It provides the information about living things in different geographical regions.
- ❖ It helps in understanding how complex organisms must have evolved from simpler ones.

Scientists have been able to discover and classify more than 2 million organisms on the earth ranging from tiny bacteria to the largest blue whales. Each organism has been classified in a category based on its evolutionary relationship with other group of organisms. We can define hierarchy of organisms as:

"The system of arranging taxonomic categories in a descending order based on their relationships with other group of organism is called **hierarchy of categories"**. This system was introduced by Linnaeus and is called **Linnaean hierarchy.** There are seven main categories of hierarchies namely, **Kingdom, Phylum, Class, Order, Family, Genus and Species.** Species is the basic unit of classification

**Based on the above classification the following table shows different phylum, with general features and examples of different phyla and classes**

| S. NO | General Characters | Division |
|---|---|---|
| 1 | Microscopic unicellular, pseudopodia, flagella and cilia for locomotion, reproduce by fission or conjugation. | Phylum **Protozoa**<br>Eg. *Amoeba, Euglena* and *Paramoecium*  |
| 2 | Multicellular organisms with holes in the body. Skeleton formed of spicules, asexual and sexual reproduction. | **Phylum Porifera**<br>Eg. *Leucosolenia, Spongilla, Sycon.*  |
| 3 | Multicellular organisms Diploblastic, sessile or free swimming, solitary or colonial, asexual and sexual reproduction | Phylum **Coelenterata**<br>Eg. Hydra, Sea anemone, Jelly fish, Corals.  |
| 4 | Acoelomates, parasites inside the body of animals and human beings, mostly hermaphrodite (bisexual). | Phylum **Platyhelminthes**<br>Eg. *Planaria*, Liver fluke , Blood fluke, Tapeworm  |
| 5 | Unsegmented body, mostly parasites in human beings and animals, causing diseases, asexual reproduction. | Phylum **Aschelminthes** or Nematoda<br>Eg. *Ascaris lumbricoides*  |
| 6 | Triploblastic, segmented body, mostly hermaphrodite (bisexual and unisexual). | **Phylum Annelida**<br>Eg. Earthworm, Nereis, Leech.  |

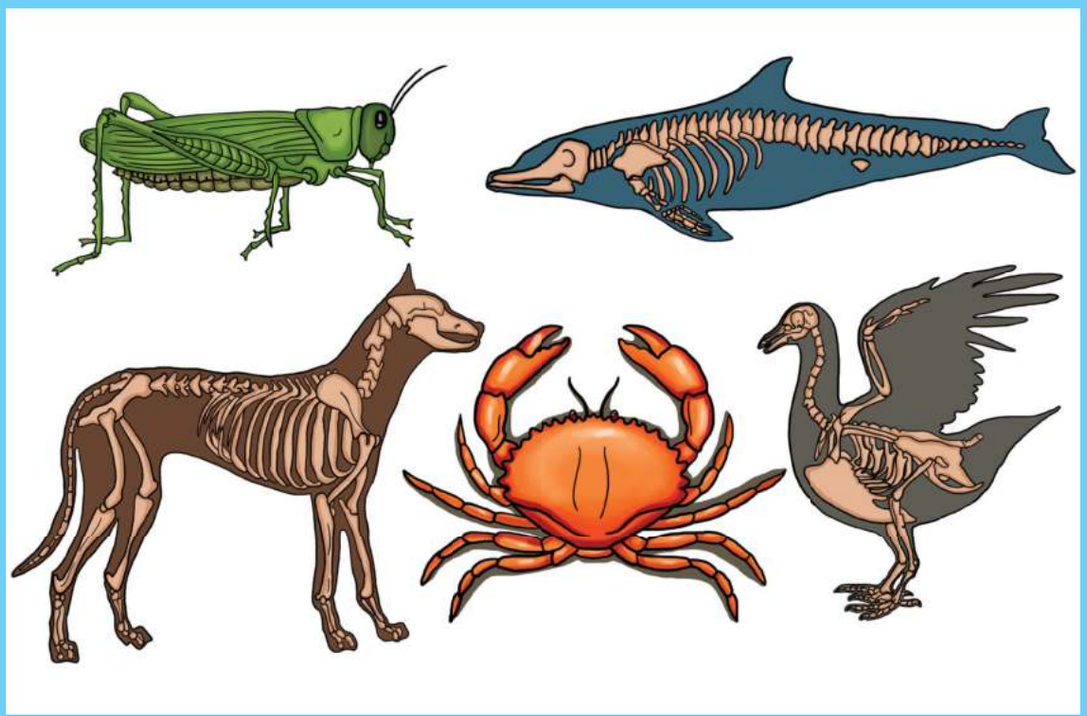
| | | |
|---|---|---|
| **7** | Segmented body, thick chitinous cuticle forming an exoskeleton, paired and jointed legs, unisexual exhibits sexual dimorphism. | Phylum **Arthropoda**<br>Eg. Crab, Prawn, Millipede, Insects, Scorpion, Spider  |
| **8** | Soft bodied, unsegmented, muscular head, foot and visceral mass, mantle, a calcareous shell, sexual reproduction. | Phylum **Mollusca**<br>Eg. Cuttle fish, Snail, Octopus  |
| **9** | Exclusively marine, spines and spicules over the body, water vascular system, tube feet, for feeding, respiration and locomotion, sexual reproduction. | Phylum **Echinodermata**<br>Eg. Starfish, Sea – Urchin, Brittle star, Sea cucumber and Sea- lily  |
| | **Phylum - CHORDATES** | |
| **10** | Aquatic, cold blooded vertebrates with boat shape body and jaws, locomotion by paired and median fins, sexual reproduction. | Class **Pisces**<br>Shark, Catla, Mullet, Tilapia  |
| **11** | Amphibious, cold- blooded, two pairs of limbs, sexual reproduction. | Class **Amphibia**<br>Eg. Frog, Toad, Salamander, Caecilian  |
| **12** | Cold- blooded , lung breathing, scales over the body, pentadactyl limb, adapted for climbing, running and padding, oviparous. | Class **Reptilia**<br>Garden lizard, House lizard, Turtles, Tortoise , Snakes, Crocodile  |
| **13** | Warm blooded, exoskeleton of feathers, flight adaptation, spongy bones with air cavities, powerful eyes, sexual reproduction, oviparous. | Class **Aves**<br>Wader bird, Roller bird, Hoopoe bird, Parrot, Sparrow, Hen, Ostrich, Kiwi  |
| **14** | Terrestrial warm blooded, external ear or pinna, muscular diaphragm, non – nucleated RBC, heterodont and diphyodont dentition, viviparous give birth to young ones. | Class **Mammalia**<br>Duck bill Platypus, Kangaroo, Cat, Dog, Tiger, Zeebra, Man  |



VII Std Science Term-2 EM Unit 5.indd 75 09-07-2022 18:14:51

## ACTIVITY 2

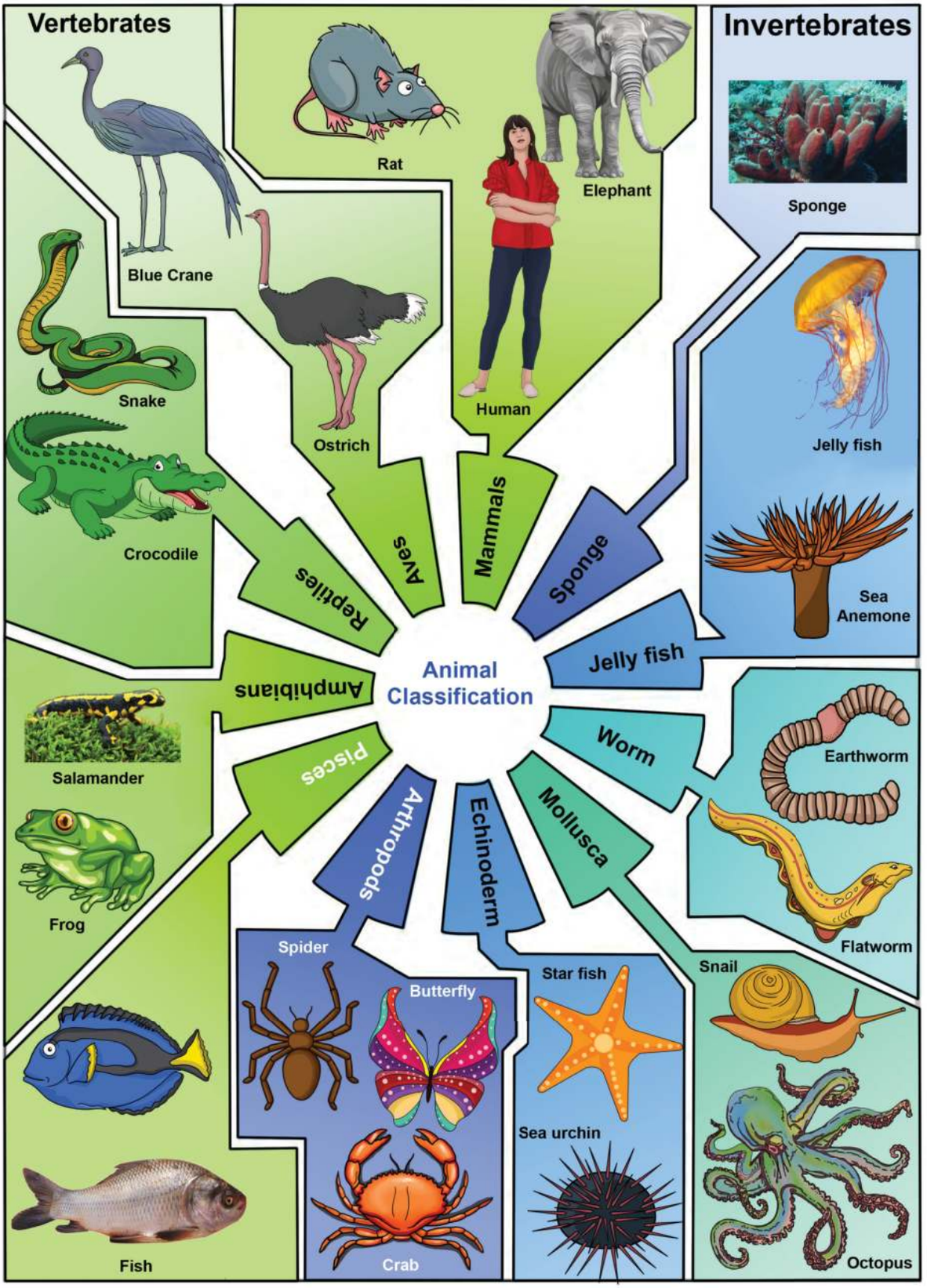
**Fill up the blanks with the suitable organisms**



1. Vertebrates _____, _____ and _____
2. Invertebrates _____, _____ and _____.
3. Name the vertebrates with wings _____, _____.
4. Name the invertebrates with wings _____, _____.
5. Name the invertebrates with segmented legs _____, _____.
6. Name the invertebrates with Jointed legs _____, _____ .
7. Name the warm blooded vertebrates _____
8. Name the cold blooded vertebrates _____.
9. Name the vertebrates with lungs respiration _____, _____.
10. Name the animal with beak _____.



VII Std Science Term-2 EM Unit 5.indd 76 09-07-2022 18:14:52






VII Std Science Term-2 EM Unit 5.indd 77 09-07-2022 18:14:53

## ACTIVITY 3

**Given table shows the name of the phylum and its characteristic features. Write name of the animals belonging to the respective phylum.**

| Phylum | Characters | Example |
|---|---|---|
| Porifera | Pore bearers | |
| Coelenterata | Gastro vascular cavity | |
| Platyhelminthes | Flame cells | |
| Aschelminthes | Thread like worms | |
| Annelida | Body is segmented | |
| Arthropoda | Have jointed legs | |
| Mollusca | Soft bodied with shells | |
| Echinodermata | Spines on the skin | |
| Chordata | Have back bone | |

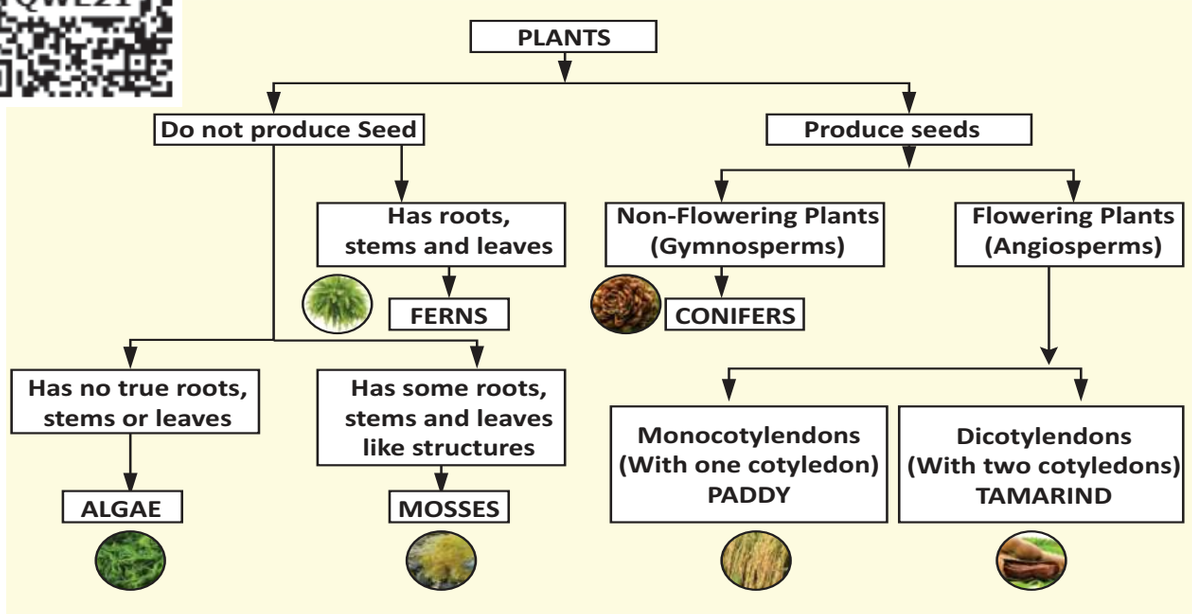
## 5.2. Classification of Plants

Based on dichotomy, plants also can be classified into two main groups – seed producing plant and Non – seed producing plant. Non – seed producing plants do not produce seeds and seed producing plants produce seeds. Based on their nature of plant body, Non – seed producing plants are classified into three types: algae, mosses and ferns. Based on their fruit body, seed producing plants are classified into two types: gymnosperms and angiosperms.

### Algae

- Plant is thallus, not well-differentiated into root, stem, and leaves.
- They are predominantly aquatic.
- They are unicellular or multicellular - filamentous. Example - Chara

QWL21





*Chara*

## Mosses

- Plant body is not differentiated into true root, stem and leaves.
- They are water living plants, needs moisture to complete its life cycle. Hence they are referred to as amphibious plants.
- They do not have any specialized vascular tissues for conduction of water and food. Examples: *Funaria*

## Ferns

- Plant body is well-differentiated into root, stem, and leaves. Leaves may be large or small.
- Specialized vascular tissues are found for the conduction of water and food.
- Basically they are the first land plants which grows well in shady, moist, and cool places. (Examples: *Adiantum*)



*Adiantum*

## Gymnosperms

- Plants are perennial, woody, evergreen with true root, stem and leaves.
- They possess vascular tissues, xylem without vessels and phloem without companion cells.
- Ovules are naked, without ovary. Hence they do not produce fruits. Seed are naked. (Examples: ***Pinus, Cycas***)



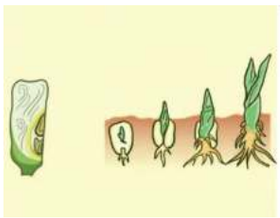
***Pinus***

## Angiosperms

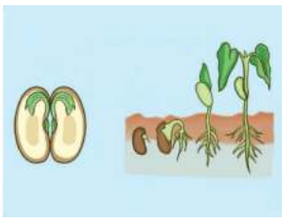
- Plant body is well differentiated into true root, stem, and leaves.
- They produce flower with four whorls (calyx, corolla, androecium and gynoecium), hence known as flowering plants.
- Female reproductive organ, ovary is present inside the flower which develops into fruit and ovule develops into seed.
- Plant possess well developed vascular system with xylem vessels and phloem – companion cells.

Angiosperms are the dominant plant forms of present day. Based on the number of cotyledons, angiosperms are broadly divided into two groups. **a) monocotyledons b) dicotyledons**. Plant seeds which have only one

cotyledon are said to be monocots. Plant seeds which have two cotyledons are known as dicots. Example- Paddy (monocot), Tamarind (dicot).



Paddy



Tamarind



Monocotyledon



Dicotyledon

## 5.3 The Five Kingdom Classification

The five kingdom classification was proposed by **R.H. Whittaker** in 1969. Five kingdoms were formed on the basis of characteristics such as cell structure, mode of nutrition, source of nutrition and body organization.

### Monera

### Kingdom Monera - Bacteria

All prokaryotes belong to the Kingdom Monera, which do not posses true nucleus. Cells of prokaryotes do not have a nuclear membrane and any membrane bound organelles. Most of






**Family**

the bacteria are heterotrophic, but some are autotrophs. Bacteria and Blue green algae are examples for monera.



Bacteria

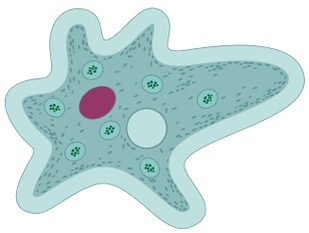


Blue green alge

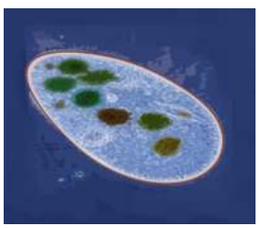
## Kingdom Protista:

The Kingdom Protista includes unicellular and a few simple multicellular eukaryotes.

There are two main groups of protists. The plant like protists are photosynthetic and are commonly called algae. Algae include unicellular and multicellular types. Animals like protists are often called **protozoans**. They include *Amoeba* and *Paramecium*.



***Amoeba***



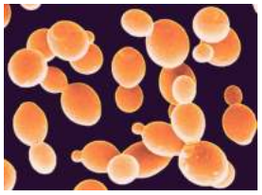
***Paramecium***

## Kingdom Fungi:

Fungi are eukaryotic, and mostly are multicellular. They secrete enzymes to digest the food and absorb the food after digested by the enzymes. Fungi saprophytes as decomposers (decay –causing organisms) or as parasites. Kingdom Fungi includes molds, mildews, mushrooms and yeast.



**Mushroom**



**Yeast**

## Kingdom Plantae:

Planatae (plants) are multicellular eukaryotes that carry out photosynthesis. Plant cells have cell wall and specialized functions, such as photosynthesis, transport of materials and support. Kingdom Plantae includes ferns, cone bearing plants and flowering plants.



**Ferns**



**Cone bearing plants**



**Flowering plants**

## Kingdom Animalia:

Animalia (animals) are multicellular, eukaryotic and heterotrophic animals. Cells have no cell wall. Most members of the animal kingdom can move from place to place. Eg. Invertebrates like sponges, hydra, flatworms round worms, insects, snails, starfishes. Vertebrates like Fish, amphibians, reptiles, birds, and mammals including human beings belong to the kingdom Animalia.



**Fish** (Pisces)



Frog (Amphibian)



Crocodile (Reptiles)



Cow (Mammals)



Bird (Aves)

## IMPORTANT CHARACTERISTICS OF FIVE KINGDOMS

| Characteristics | Monera | Protista | Fungi | Plantae | Animalia |
|---|---|---|---|---|---|
| 1. Cell Type | Unicellular, Prokaryotic. | Unicellular, Eukaryotic. | Multicellular, Non – green and Eukaryotic. | Multicellular, Eukaryotic. | Multicellular, Eukaryotic. |
| 2. Nucleus | Absent. | Present. | Present. | Present. | Present. |
| 3. Body Organisation | Cellular level of organization | Cellular level of organization is | Multi cellular with loose tissue. | Tissue level and organ level. | Tissue, organ and organ system. |
| 4. Mode of Nutrition | Auto (or) Heterotrophic. | Auto (or) Heterotrophic. | Saprophytic, parasitic sometime symbiotic | Autotrophic. | Heterotrophic. |
| 5. Example | Bacteria and Blue green algae. | Spirogyra and Chlamydomonas. | Rhizopus and Agaricus. | Herb, Shrub and Trees. | Fish, frog, crocodile, Birds and human being |

### Merits of five Kingdom Classification

- ❖ This system of classification is more scientific and natural.
- ❖ This system of classification clearly indicates the cellular organization, mode of nutrition, and characters for early evolution of life.
- ❖ It is the most accepted system of modern classification as the different groups of organisms are placed phylogenetically.
- ❖ It indicates gradual evolution of complex organisms from simpler one.

### Demerits of five Kingdom Classifications

- ❖ In this system of classification of viruses have not been given a proper place.
- ❖ Multicellular organisms have originated several times from protists.



VII Std Science Term-2 EM Unit 5.indd 82 09-07-2022 18:14:59

- ❖ This type of classification has drawn back with reference to the lower forms of life.
- ❖ Some organisms included under protista are not eukaryotic.

## 5.4. Binomial Nomenclature

**Gaspard Bauhin** in 1623, introduced naming of organisms with two names which is known as Binomial nomenclature, and it was implemented by **Carolus Linnaeas** in 1753. He is known as **'Father of Modern Taxonomy'.**

**Binomial nomenclature** is an universal system of naming organisms. As per this system, each organism has two names – the first is the **Genus** name and the second is the **Species** name. Genus name begins with a capital letter and Species name begins with a small letter.

**Example:** The nomenclature for onion is ***Allium sativam***. Genus name is ***Allium***, species name is ***sativam.***

Vernacular name is a local name that is familiar for a particular place. Binomial name is an universal name which never changes. Binomial nomenclature and classification helps scientists to identify any organisms and to place them at a particular hierarchy.

### ACTIVITY 4

Field trip to sanctuaries / zoo should be arranged. Students are guided to observe the animals and explain about the feature of animals how they are protected and maintained in the zoo. Note the displayed names of the plants and animals. Discuss your observation in the class

DO YOU KNOW?

**Scientific Names of Some Organisms**

| S.No | Common Name | Scientific Name |
|---|---|---|
| 1. | Human being | *Homo sapiens* |
| 2. | Onion | *Allium sativum* |
| 3. | Rat | *Rattus rattus* |
| 4. | Pigeon | *Columba livia* |
| 5. | Tamarind | *Tamirindus indica* |
| 6. | Lime | *Citrus aurantifolia* |
| 7. | Neem Tree | *Azadirachta indica* |
| 8. | Frog | *Rana hexadactyla* |
| 9. | Coconut | *Cocos nucifera* |
| 10. | Paddy | *Oryza sativa* |
| 11. | Fish | *Catla catla* |
| 12. | Orange | *Citrus sinensis* |
| 13. | Ginger | *Zingiber officinale* |
| 14. | Papaya | *Carica papaya* |
| 15. | Date | *Phoenix dactylifera* |

## POINTS TO REMEMBER

- ❖ Classification of living organisms is made on the basis of their characteristics, similarities and differences.
- ❖ Classification is needful to identify living organisms and to study about them conveniently
- ❖ Kingdom is the largest division of the living world and species is the basic unit of classification.
- ❖ Kingdom Animalia is divided into 2 sub kingdoms.
  - Invertebrates (Animals without back bone)
  - Vertebrates (Animals with back bone)
- ❖ Invertebrates are classified into nine phyla
- ❖ Vertebrates are classified into five classes



VII Std Science Term-2 EM Unit 5.indd 83 09-07-2022 18:14:59

- ❖ Plants are classified into flowering and non – flowering plants and further classified into groups based on their nature of plant body and fruiting body.
- ❖ In 1969, R.H. Whittakar proposed a five kingdom classification of living organisms.
- ❖ The Five kingdom classification includes five kingdom namely – Monera, Protista, Fungi, Plantae and Animalia.
- ❖ Gaspard Bauhin is 1623, introduced the binomial nomenclature and it was implemented by Carolus Linnaeus in 1753.
- ❖ Binomial nomenclature is an universal system of naming organisms. It contain two names
- ❖ The first name of binomial is genus name and the second name is species name
- ❖ Carolus Linnaeus is known as Father of Modern Taxonomy

## Evaluation

SPYLF

### I. Choose the correct answer.

1. The following characteristics are essential for classification.
   (a) Similarities (b) Differences
   (c) Both of them (d) None of them
2. Approximately _____ species of living organisms found in the earth.
   (a) 8.7 million (b) 8.6 million
   (c) 8.5 million (d) 8.8 million
3. The largest division of the living world is _____
   (a) Order (b) Kingdom
   (c) Phylum (d) Family
4. Who proposed the five kingdom of classification?
   (a) Aristotle (b) Linnaeus
   (c) Whittakar (d) Plato
5. The binomial name of pigeon is _____
   (a) *Homo sapiens* (b) *Rattus rattus*
   (c) *Mangifera indica* (d) *Columbo livia*

### II. Fill in the blanks.

1. _____ in 1623, introduced the binomial nomenclature.
2. Species is the _____unit of classification.
3. _____ are non- green and non-photosynthetic in nature.
4. The binomial name of onion is _____
5. Carolus Linnaeus is known as the Father of _____

### III. True (or) False. If false write the correct answer.

1. Classification helps to know the origin and evolution of an organism.
2. Fishes are aquatic vertebrates.
3. In the year 1979, Five kingdom classification was proposed.
4. True nucleus is seen in prokaryotic cell.
5. Animal cells have cell wall.

### IV. Match the following.

| | | | |
|---|---|---|---|
| 1. | Monera | – | Moulds |
| 2. | Protista | – | Bacteria |
| 3. | Fungi | – | Neem |
| 4. | Plantae | – | Butter fly |
| 5. | Animalia | – | Euglena |



VII Std Science Term-2 EM Unit 5.indd 84 09-07-2022 18:14:59

## V. Assertion and Reason Questions

1. **Assertion:** Binomial name is the universal name and contains two names.

**Reason :** It was first introduced by Carolus Linnaeus

   a. Assertion is correct, Reasoning is correct
   b. Assertion is correct, Reasoning is incorrect
   c. Assertion is incorrect Reasoning is correct
   d. Assertion and Reasoning are incorrect

2. **Assertion: I**dentification, assortment and grouping are essential for classification

**Reason :** These are basic steps of taxonomy

   a. Assertion is correct, Reasoning is correct
   b. Assertion is correct, Reasoning is incorrect
   c. Assertion is incorrect Reasoning is correct
   d. Assertion & Reasoning is incorrect

## VI. Give very short answer

1. What is classification?
2. List out the five kingdoms classification
3. Define – dichotomous key
4. Write two examples of Monera.
5. What is binomial nomenclature?
6. Write the binomial name of a) Human being b) Paddy
7. Write two features of protista

## VII. Give short answer

1. Write the levels of classification.
2. Differentiate plantae and animalia
3. Write any two merits of Five Kingdom classification.

## VIII. Give answer in Detail

1. Explain about five kingdom classification
2. Write short notes on – Binomial Nomenclature.
3. Give an account on the classification of invertebrates with few general features and examples.

## IX.HOTS

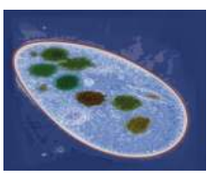
Which kingdom has saprophytic, parasitic and symbiotic nutrition. Why?

## X. See the Diagram and write the kingdom :

Pictures of some living organisms are given below. Identify the kingdom to which each of these belong and write the kingdom name in the blanks provided.



(a) _____



(b) _____



(c) _____



(d) _____



(e) _____

ICT CORNER

# CLASSIFICATION

**This activity enables the students to identify vertebrates And invertebrates.**




**PROCEDURE :**

**Step 1:** Type the URL link given below in the browser or scan the QR code. A page opens with tinytap and "PLAY" button

**Step 2:** Click it it opens into another page

**Step 3:** The page shows animals with the words "Invertebrate or vertebrate" in a box near the animal

**Step 4:** When you click the correct option vertebrate or invertebrate it goes to next picture



**Step 1**



**Step 2**

**Classification URL:**

https://www.tinytap.it/activities/g1fca/play/vertebrates-and-invertebrates

*Pictures are indicative only

*If browser requires, allow Flash Player or Java Script to load the page.



VII Std Science Term-2 EM Unit 5.indd 86 09-07-2022 18:15:00

# Unit 6

# Digital Painting




## Learning Objectives

After learning this lesson, the students will be able to

- know how to draw a picture through the software Tux Paint
- explore their creative thinking
- learn arithmetic calculations through the software Tux Math

L49BE



VII Std Science Term-2 EM Unit 6.indd 87 27/06/2023 12:41:33

**In this chapter, the students will learn to use the software Tux Paint and Tux Math.**

## What is Tux Paint?

Tux Paint is a free drawing program designed for young children. It has a simple, easy-to-use interface, fun sound effects, and an encouraging cartoon mascot which helps to guide children as they use the program.

Choose a Tool from the options on the left side of the screen. Then, make choices from the right side of the screen. Directions are provided at the bottom of the screen.

## Title Screen

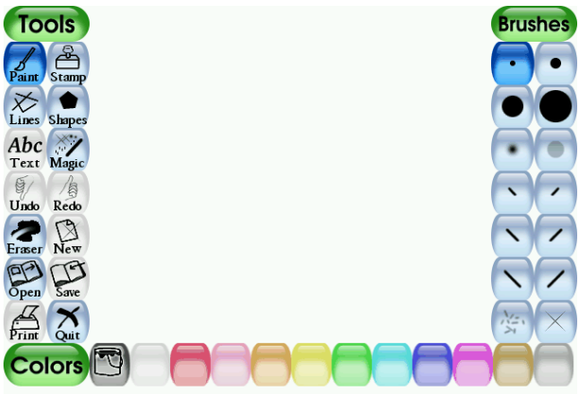
When Tux Paint first loads, a title/credits screen will appear.




Once loading is complete, press a key or click on the mouse to continue. (Or, after about 30 seconds, the title screen will go away automatically.)

## Main Screen

The main screen is divided into following sections:




## Left Side: Toolbar

This toolbar has the control options to draw and to edit images.

## Middle: Drawing Canvas

This is the largest part of the screen dedicated to draw and edit images.

## Right Side: Selector

When a tool is selected from the left side tool bar, the right side bar will display the options associated with the specific tool. (E.g.- When the line tool is selected, the right side bar shows the various lines available. When the shape tool is selected, different shape options can be seen on the right side.)

## Lower: Colors

A palette of available colors are shown near the bottom of the screen.

## Bottom: Help Area

At the very bottom of the screen, Tux, the Linux Penguin, provides tips and other information while you draw.

## Tools Icons




The Paint Brush tool lets you draw freehand, using various brushes (chosen in the Selector on the right) and colors.



VII Std Science Term-2 EM Unit 6.indd 88 27/06/2023 12:41:33




The Stamp tool is like a set of rubber stamps or stickers (images).



Use the Left and Right arrows to cycle through the collections.




This tool is used to draw Lines.




This tool is lets you draw some simple filled, and un-filled shapes.




This tool is used to type texts.




Magic tool is a set of special tools, selecting one of the 'magic' effects from the selector situated in the right side. This tool provides countless number of special visual effects if it is used in various combination with other tools. This tool can be used either by clicking or by dragging the effect directly on to the image to apply it.




This tool is appears similar to the Paint Brush, but it is used to erase the picture.




This tool is used to cancel a command given earlier.




This tool is used to reverse the action of Undo.




Clicking the "New" button will start a new drawing.




This tool is used to open are existing file.




This tool is used to save your current picture.




This tool is used to print your current picture.




This tool is used to close Tux Paint window.

## Shortcut Keys

| Tool Name | Keyboard Shortcut Key |
|---|---|
| New | Ctrl+N |
| Open | Ctrl+O |
| Save | Ctrl + S |
| Print | Ctrl+P |
| Quit | Esc |
| Undo | Ctrl + Z |
| Redo | Ctrl+Y |

## Tux Math

Tux Math is an open source arcade – style video game for learning arithmetic. The main goal is to make learning effective and fun.

## Tittle Screen

Math Command Training Academy: choose this to go to a list of over fifty prepared lessons, starting with simple typing



VII Std Science Term-2 EM Unit 6.indd 89 27/06/2023 12:41:33

of single digit numbers, and progressing to multiplication and division involving negatives and "missing number" questions (e.g. "-17 x ? = 119"). The player wins if the question list is completed successfully. Successfully completed lessons are indicated with a flashing gold star.




**Play Arcade Game:** This option can be used to select and play one of the four open-ended "arcade style" games, meaning the game gets faster and faster as long as the player can keep up, with the goal to get the highest score possible.



## The options include:

- Space Cadet - simple addition.
- Scout - addition and subtraction to ten.
- Ranger - addition, subtraction, multiplication and division to ten.
- Ace - all four operations with operands to 20, including negative numbers and "missing number" type questions.

**Play Custom Game:** This option can be used to play a game based on the config file in the player's home directory.

**More Options -** These options have "Demo" mode as well as credits and project information.

## Keys

- Use the [UP] and [DOWN] arrow keys to select what you wish to do, and then press [ENTER / RETURN / SPACEBAR]. Or, use the mouse to click the menu item.
- Pressing [ESCAPE] will quit the program.

# Evaluation

## I. Choose the correct answer.

I. Tux paint software is used to……
a) Paint b) Program
b) Scan c) PDF

2. Which toolbar is used for drawing and editing controls in tux paint software?
a) Left Side: Toolbar
b) Right side : Toolbar
c) Middle : Tool bar
d) Bottom : Tool bar

3. What is the shortcut key for undo option?
a) Ctrl + Z b) Ctrl + R
c) Ctrl + Y d) Ctrl +N



VII Std Science Term-2 EM Unit 6.indd 90 27/06/2023 12:41:33

4. Tux Math software helps in learning the _____
   a) Painting
   b) Arithmetic
   c) Programming
   d) Graphics

5. In Tux Math, Space cadet option is used for ……
   a) Simple addition
   b) Division
   c) Drawing
   d) Multiplication

## Answer the following Questions

1. What is Tux Paint ?
2. What is the use of Text Tool ?
3. What is the Shortcut key for Save option?
4. What is Tux Math?
5. What is the use of Ranger ?

## GLOSSARY

| | | |
|---|---|---|
| *Animal Cell* | – | விலங்கு செல் |
| *Battery* | – | மின்கல அடுக்கு |
| *Binomial* | – | இருசொல் பெயர் |
| *Boiling* | – | கொதித்தல் |
| *Cell* | – | மின்கலன் |
| *Conventional current* | – | மரபுமின்னோட்டம் |
| *Conductors* | – | கடத்திகள் |
| *Conductivity* | – | கடத்துத்திறன் |
| *Corals* | – | பவளங்கள் |
| *Classification* | – | வகைப்பாடு |
| *Chloroplast* | – | பசுங்கணிகம் |
| *Chromoplast* | – | வண்ணக்கணிகம் |
| *Cell wall* | – | செல் சுவர் |
| *Contraction* | – | சுருங்குதல் |
| *Condensation* | – | ஆவி சுருங்குதல் |
| *Crystallization* | – | படிகமாக்கல் |
| *Curdling* | – | பால் உறைந்து தயிராதல் |
| *Diaphragm* | – | உதரவிதானம் |
| *Dry cell* | – | உலர்மின்கலன் |
| *Dicotyledons* | – | இரு வித்திலைத் தாவரங்கள் |
| *Electric current* | – | மின்னோட்டம் |
| *Electrical circuit* | – | மின்சுற்று |
| *Endoplasmic reticulum* | – | எண்டோபிளாச வலைப்பின்னல் |
| *Expension* | – | விரிவடைதல் |
| *Fuse* | – | மின்உருகி |
| *Flame cells* | – | சுடர் செல்கள் |
| *Freezing* | – | உறைதல் |
| *Fermentation* | – | நொதித்தல் |
| *Green gland* | – | பச்சை சுரப்பி |
| *Heating effect* | – | வெப்பவிளைவு |



VII Std Science Term-2 EM Unit 6.indd 91 27/06/2023 12:41:34

| | | |
|---|---|---|
| *Insulator* | – | காப்பான்கள் |
| *Identification* | – | இனங்காணல் |
| *Invertebrates* | – | முதுகெலும்பற்றவை |
| *Leucoplast* | – | வெளிர்கணிகம் |
| *Magnetic effect* | – | மின்காந்தவிளைவு |
| *Monocotyledons* | – | ஒரு வித்திலைத் தாவரங்கள் |
| *Malpighian tubules* | – | மல்பீஜியன் நுண் குழல்கள் |
| *Microscope* | – | நுண்ணோக்கி |
| *Malleability* | – | தகடாகும் தன்மை |
| *Million* | – | பத்து லட்சம் |
| *Nephridia* | – | நெஃப்ரீடியா |
| *Nucleus* | – | உட் கரு |
| *Non – periodic change* | – | கால ஒழுங்கற்ற மாற்றம் |
| *Oyster* | – | முத்துசிப்பி (கிளிஞ்சல்) |
| *Oviparous* | – | முட்டையிடுபவை |
| *Organelle* | – | நுண் உறுப்பு |
| *Parallel circuit* | – | பக்கஇணைப்பு |
| *Parental care* | – | பெற்றோர் பாதுகாப்பு |
| *Plant Cell* | – | தாவர செல் |
| *Plastids* | – | கணிகங்கள் |
| *Plasmodesmata* | – | செல்களின் இணைப்புச் சவ்வு |
| *Periodic change* | – | கால ஒழுங்கு மாற்றம் |
| *Resistivity* | – | மின்தடை |
| *Rusting* | – | துருப்பிடித்தல் |
| *Series circuit* | – | தொடர்இணைப்பு |
| *Short circuit* | – | குறுக்குசுற்று |
| *Specific resistance* | – | தன்மின்தடை |
| *Solenoid* | – | கம்பிச்சுருள் |
| *Spicules* | – | முட்கள் |
| *Stem cell* | – | மூலச்செல் |
| *Taxonomy* | – | வகைப்பட்டியல் |
| *UniCellular organisms* | – | ஒரு செல் உயிரினங்கள் |
| *Viviparous* | – | குட்டிஈனுபவை |
| *Vernacular Name* | – | வட்டார பெயர் |
| *Vertebrates* | – | முதுகெலும்புள்ளவை |
| *Viscosity* | – | பாகுத்தன்மை |
| *Vapourization* | – | ஆவியாதல் |
| *Water vascular system* | – | நீர்க்குழல் மண்டலம் |



VII Std Science Term-2 EM Unit 6.indd 92 27/06/2023 12:41:34

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VII Std Science Term-2 EM Unit 6.indd 93 27/06/2023 12:41:34

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# STANDARD SEVEN

## TERM - II

## VOLUME - 3

# HISTORY



7th Social Science_Term II English Unit 01.indd 94 27/06/2023 12:48:23

# CONTENTS


| History | | | |
|---|---|---|---|
| **Unit** | **Titles** | Page No. | Month |
| 1. | Vijayanagar and Bahmani Kingdoms | 96 | October |
| 2. | The Mughal Empire | 108 | November |
| 3. | Rise of Marathas and Peshwas | 122 | November & December |
| **Geography** | | | |
| 1. | Resources | 135 | October |
| 2. | Tourism | 146 | November |
| **Civics** | | | |
| 1. | State Government | 163 | October |
| 2. | Media and Democracy | 171 | November |


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7th Social Science_Term II English Unit 01.indd 95 27/06/2023 12:48:23

# Unit -1

# Vijayanagar and Bahmani Kingdoms



## Learning Objectives

- To know the circumstances that led to the rise and expansion of Vijayanagar and Bahmani kingdoms
- To familiarise ourselves with the administration, military organisation and the economic life during the time of their reign
- To know the contribution of Vijayanagar and Bahmani rulers to literature art and architecture

TOC3Y

## Introduction

The political condition of India in the fourteenth century provided great opportunities for the rise of new kingdoms in the south. The repressive measures of the temperamental Muslim king Muhammad-bin-Tughlaq led to the rise of many new independent states. In the south, Vijayanagar and Gulbarga or Bahmani emerged as two great kingdoms. The Bahmani kingdom spread all over the Maharashtra region and partly over Karnataka. Ruled by 18 monarchs, it lasted for nearly 180 years. Early in the sixteenth century, it collapsed and split into five sultanates – Bijapur, Ahmednagar, Golconda, Bidar and Berar. The state of Vijayanagar continued to flourish for nearly 200 years. Ultimately Vijayanagar's wealth and prosperity induced the Muslim Deccan kingdoms to launch a combined war against it. In 1565, the battle of Talikota, finally they could succeed in crushing Vijayanagar Empire.

## Foundation of Vijayanagar Empire

Vijayanagara, the 'city of victory', was established in southern Karnataka by two brothers named Harihara and Bukka. According to one tradition, Vidyaranya, head of the Saivite Sringeri mutt, instructed them to abandon their service to the Tughluqs and rescue the country from Muslim authority. The new kingdom was called Vidyanagara for a time in honour of the spiritual teacher Vidyaranya, before it came to be called Vijayanagara. Four dynasties, namely



7th Social Science_Term II English Unit 01.indd 96 27/06/2023 12:48:23

Sangama (1336–1485), Saluva (1485–1505), Tuluva (1505–1570) and Aravidu (1570–1646), ruled this kingdom.



Harihara and Bukka

The fertile regions between the rivers Krishna and Tungabhadra and the Krishna-Godavari delta were the zones of conflict among the rulers of Vijayanagar, Bahmani and Odisha. The valour of the first two brothers, Harihara and Bukka, of the Sangama dynasty protected the new kingdom from the superior forces of the Bahmani sultanate, which had been established about a decade after the foundation of Vijayanagara.

Bukka I's son Kumara Kampana ended the sultanate in Madurai and succeeded in establishing Nayak kingdom there. The conquest of the Madurai Sultanate by the Vijayanagara empire is described in detail in the poem *Madura Vijayam* composed by Kumara Kamapana's wife Gangadevi.

## End of Sangama Dynasty

When King Bukka died, he had left behind a large territory to his son Harihara II to rule. Harihara II's impressive achievement was securing Belgaum and Goa from the Bahmani kingdom. Harihara's son Devaraya I defeated Gajapati kings of Odisha. His successor Devaraya II was the greatest ruler of the Sangama dynasty. He began the practice of recruiting Muslim fighters to serve him and to train him in the new methods of warfare.

## Rise of Saluva Dynasty

After Devaraya II, the Vijayanagar Empire went through a crisis. The able commander of the Vijayanagar army, Saluva Narasimha, making use of the situation declared himself the emperor, after murdering the last ruler of Sangama dynasty, Virupaksha Raya II. But the Saluva dynasty founded by Saluva Narasimha came to an end with his death. When Naras Nayaka, his able general, seized power, it ushered in the Tuluva dynasty.

## Krishnadevaraya

Krishnadevaraya who reigned for 20 years was the most illustrious rulers of the Tuluva dynasty. His first step after ascending the throne was to bring under control the independent chieftains in the Tungabhadra river basin. After succeeding in this effort, his next main target was Gulbarga. The Bahmani sultan, Mahmud Shah, had been overthrown and kept in imprisonment by his minister. Krishnadevaraya freed the sultan and restored him to the throne. Similarly, he forced a war on Prataparudra, the Gajapati ruler of Odisha. Prataparudra negotiated for peace and offered to marry off his daughter to him. Accepting



7th Social Science_Term II English Unit 01.indd 97 27/06/2023 12:48:23

the offer, Krishnadevaraya returned the territory he had conquered from Prataparudra. Krishnadevaraya, with the assistance of the Portuguese gunners, could easily defeat the Sultan of Golconda and subsequently take over Raichur from the ruler of Bijapur.



Krishnadevaraya

## A Great Builder

Krishnadevaraya built huge irrigation tanks and reservoirs for harvesting rainwater. He built the famous temples of Krishnaswamy, Hazara Ramaswamy and Vithalaswamy in the capital city of Hampi. He distributed the wealth he gained in wars to all major temples of South India for the purpose of constructing temple gateways (gopura), called 'Rayagopuram,' in his honour.



Vithalaswamy Temple

He recruited a large army and built many strong forts. He imported large number of horses from Arabia and Iran, which came in ships to Vijayanagar ports on the west coast. He had good friendly relationship with the Portuguese and Arabian traders, which increased the Empire's income through customs.

## Patron of Literature, Art and Architecture

Krishnadevaraya patronised art and literature. Eight eminent luminaries in literature known as *ashtadiggajas* adorned his court. Alasani Peddana was the greatest of them all. Another notable figure was Tenali Ramakrishna.

## Battle of Talikota and the Decline of Vijayanagar

Krishnadevaraya was succeeded by his younger brother Achtyuda Deva Raya. After the uneventful reigns of Achtyuda Deva Raya and his successor Venkata I, Sadasiva Raya, a minor, ascended the throne. His regent Rama Raya, the able general of the kingdom, continued as a de facto ruler, even after Sadashiva Raya attained the age for becoming the king. He relegated Sadasiva Raya to a nominal king. In the meantime, the sultans of Deccan kingdoms succeeded in forming a league to fight the Vijayanagar Empire. The combined forces of the enemies met at Talikota in 1565. In the ensuing battle, known as Raksha Tangadi (Battle of Talikota), Vijayanagar was defeated. There was terrible human slaughter and pillaging the capital city of Hampi. All the buildings, palaces and temples were destroyed. The beautiful carvings and sculptures were desecrated. The glorious Vijayanagar Empire had ceased to exist.



7th Social Science_Term II English Unit 01.indd 98 27/06/2023 12:48:25



Hampi Virupaksha Temple

The site of the city of Vijayanagar on the bank of the river Tungabhadra in eastern Karnataka is now called Hampi. Hampi is in ruins and the UNESCO has declared it a heritage site.

## Aravidu Dynasty

Rama Raya was killed on the battlefield and his brother Tirumaladeva Raya managed to escape along with the king Sadasiva Raya. Tirumaladeva Raya moved to Chandragiri carrying all the treasures and wealth that could be salvaged. There he began the rule of Aravidu dynasty.

The Aravidu dynasty built a new capital at Penukonda and kept the empire intact for a time. Internal dissensions and the intrigues of the sultans of Bijapur and Golconda, however, led to the final collapse of the empire about 1646.

## Vijayanagar Administration

### State

Kingship was hereditary, based on the principle of primo geniture. But in some instances, the reigning rulers, in order to ensure peaceful succession, nominated their successors. There were also instances of usurpation. Saluva Narasimha usurped the throne and it led to the replacement of Sangama dynasty with Saluva dynasty. The practice of appointing a regent to look after the administration, when a minor succeeded the throne, was also prevalent.

## Structure of Governance

The empire was divided into different *mandalams* (provinces), *nadus* (districts), *sthalas* (taluks) and finally into *gramas* (villages). Each province was administered by a governor called Mandalesvara. The lowest unit of the administration was the village. Each village had a grama sabha. Gauda, village headman, looked after the affairs of the village.

The army consisted of the infantry, cavalry and elephant corps. The army was modernised and Vijayanagar army began using firearms. The combination of firearm and cavalry made them one of the most feared armies in India.

## Economic Condition

The Vijayanagar Empire was one of the richest states then known to the world. Several foreign travellers, who visited the empire during the fifteenth and the sixteenth centuries, left behind glowing accounts of its splendour and wealth.The emperors issued a large number of gold coins called Varahas.



Gold Coins of Vijayanagar Empire



7th Social Science_Term II English Unit 01.indd 99 27/06/2023 12:48:25

## Agriculture

It was the policy of its rulers to encourage agriculture in different parts of the empire by following a wise irrigation policy. Apart from the state, there were wealthy landholders and temples that invested in irrigation to promote agriculture. Abdur Razzaq, the visiting Persian emissary to Krishnadevaraya's Court, records the huge tank built with the help of Portuguese masons. Channels were constructed to supply water from the tank to different parts of the city. The city was well stocked with a variety of agricultural goods.

## Cottage Industries

Vijayanagar's agricultural production was supplemented by numerous cottage-scale industries. The most important of them were textile, mining and metallurgy. Crafts and industries were regulated by guilds. Abdur Razzaq, the makes a reference to separate guild for each group of tradesmen and craftsmen.

## Trade

During the Vijayanagar Empire, inland, coastal and overseas trade flourished in goods such as silks from China, spices from the Malabar region and precious stones from Burma (Myanmar). Vijayanagar traded with Persia, South Africa, Portugal, Arabia, China, Southeast Asia and Sri Lanka.

## Contribution to Literature

Under the patronage of Vijayanagar rulers, religious as well as secular books were written in different languages such as Sanskrit, Telugu, Kannada and Tamil. Krishnadeva Raya wrote *Amuktamalyada,* an epic in Telugu and also a Sanskrit drama *Jambavati Kalyanam.* Tenali Ramakrishna authored *Pandurangamahatyam.* Scholars like Srinatha, Pothana, Jakkama and Duggana translated Sanskrit and Prakrit works into Telugu.

*Amuktamalyada* is considered a masterpiece in Telugu literature. It relates the story of the daughter of Periazhvar, Goda Devi (Andal), who used to wear the garlands intended for Lord Ranganatha before they were offered to the deity, and hence the name Amuktamalyada who wears and gives away garlands.

## Contribution to Architecture

The temple building activity of the Vijayanagar rulers produced a new style called the Vijayanagara style. Prominence of pillars and piers, in large numbers, and the manner in which they were sculptured are hallmarks of the Vijayanagara style. Horse was the most common animal to be depicted on the pillars. The structures have a *mandapam* (open pavilion) with a raised platform, generally meant for seating the deity on special occasions. These temples also have a marriage hall with elaborately carved pillars.

## Bahmani Kingdom

## Foundation and Consolidation of the Bahmani Kingdom

Ala-ud-din Hasan, also known as Hasan Gangu, seized Daulatabad and declared himself sultan under the title of Bahman Shah in 1347. In his effort, this Turkish officer of Daulatabad (Devagiri) was supported by other military leaders in rebellion against the sultan of Delhi,



7th Social Science_Term II English Unit 01.indd 100 27/06/2023 12:48:25




Muhammad bin Tughluq. In two years, Ala-ud-din Hasan Bahman Shah shifted his capital to Gulbarga. His successors found it difficult to organise a stable kingdom even around Gulbarga. So the capital was again shifted to Bidar in 1429. There were 18 monarchs of the Bahmani dynasty.

## Ala-ud-din Hasan Bahman Shah (1347–1358)

Ala-ud-din Hasan ruled for 11 years. His attempt to exact an annual tribute from the state of Warangal, the Reddi kingdoms of Rajahmundry and Kondavidu, led to frequent wars. Ala-ud-din Bahman Shah divided the



7th Social Science_Term II English Unit 01.indd 101 27/06/2023 12:48:26

kingdom into four territorial divisions called *tarafs*. A governor was appointed for each province. He commanded an army, was solely responsible for its administration and for the collection of the revenue. The system worked well under a powerful king, but its dangers became apparent during the reign of a weak ruler.



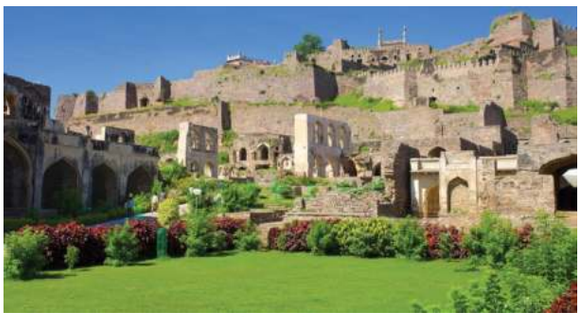
Ala-ud-din Hasan Bahman Shah

## Muhammad Shah I (1358–1375)

Muhammad shah I succeeded Bahman Shah. He waged two wars with Vijayanagar but couldn't gain from it. But his attack on Warangal in 1363 earned him a large property and wealth, including the important fortress of Golconda and his treasured turquoise throne, which thereafter became the throne of the Bahmani kings.

Turquoise is a semi-precious stone sky blue in colour. Turquoise throne is one of the bejewelled royal seats of Persian kings described in Firdausi's *Shah Nama.*

Muhammad Shah laid a solid foundation for the kingdom. His system of government continued even after the Bahmani kingdom disintegrated into five sultanates. He built two mosques at Gulbarga. One, the great mosque, completed in 1367, measures 216 by 16 feet and has a roofed courtyard. A large number of Arabs, Turks and notably Persians began to immigrate to the Deccan, many of them at the invitation of Sultan Muhammad I and there they had a strong influence on the development of Muslim culture during subsequent generations.



Golconda Fort

The Golconda Fort is located about 11 kilometres from Hyderabad on a hill 120 meters height. The fort is popular for its acoustic architecture. The highest point of the fort is Bala Hissar. It is believed that there is a secret underground tunnel, which leads from the Durbar Hall to one of the palaces at the foot of the hills.



Gulbarga Mosque

## Successors of Muhammad Shah I

Mujahid, the son of Muhammad shah, ascended the throne. However, on his return



7th Social Science_Term II English Unit 01.indd 102 27/06/2023 12:48:26

to Gulbarga from the expedition against Vijayanagar, he was assassinated and the nephew of the conspirator, Daud, the uncle of Muhammad, was enthroned in 1378 as Muhammad II. Muhammad II's reign was peaceful, and the sultan spent much of his time building his court as a centre of culture and learning.

There were constant wars between the Bahmani and Vijayanagar rulers over the fertile Tungabhadra–Krishna region. The threat also came from the north, especially from Malwa and Gujarat. The noteworthy ruler after eight and a half decades (1377 to 1463) was Muhammad III (1463–1482). Muhammad III reigned for 19 years. For most of these years, the lieutenant of the kingdom was Mahmud Gawan, the most notable personality of the time.

**Eight ministers of the Bahmani state:**
1. Vakil-us-saltana or lieutenant of the kingdom, who was the immediate subordinate authority of the sovereign. 2. Peshwa who was associated with the lieutenant of the kingdom; 3. Waziri-kull who supervised the work of all other ministers; 4. Amir-i-jumla, minister of finance; 5. Nazir, assistant minister for finance; 6. Wasir-i-ashraf, minister of foreign affairs; 7. Kotwal or chief of police and city magistrate in the capital; and 8. Sadr-i-jahan or chief justice and minister of religious affairs and endowments.

## Mahmud Gawan

A Persian by birth, Mahmud Gawan was well-versed in Islamic theory, Persian and Mathematics. He was also a poet and a prose writer. The Bahmani king Ala-ud-din Hasan Bahman Shah greatly impressed by his wisdom and military genius, recruited him. He served with great distinction as the Prime Minister under Muhammad III and contributed extensively to the development of the Bahmani kingdom.

Gawan was known for his military campaigns as well as administrative reforms. He used Persian chemists to teach the Bahmani army about the preparation and the use of gunpowder. In his war against the Vijayanagar kings in Belgaum, he used gunpowder. In order to tighten the administration and to curb the power of provincial governors, who often functioned as virtual kings, Gawan divided the existing four provinces of the Bahmani Sultanate into eight provinces so as to limit the area under the rule of each governor and to make the provincial administration more manageable.

He also placed some districts in the provinces directly under the central administration. Gawan sought to curtail the military powers of the governors by allowing them to occupy only one fort in their territory. The sultan kept the other forts under his direct control. The royal officers who were given land assignments as pay were made accountable to the sultan for their income and expenditure.

The administrative reforms introduced by Gawan improved the efficiency of the government, but curtailed the powers of the provincial chiefs, who were mostly *Deccanis*. So the already existing rivalry among nobles such as Deccanis and *Pradesis* (foreigners) further intensified and conflicts broke out.



7th Social Science_Term II English Unit 01.indd 103 27/06/2023 12:48:26

Gawan became a victim of this tussle for power. The Deccani nobles grew jealous of his success and considered him as an obstacle to their rise. They manipulated by forging a letter to implicate Gawan in a conspiracy against the sultan. Sultan, who himself was not happy with Gawan's dominance, ordered his execution.

## Decline of Bahmani Kingdom

Gawan's execution prompted several of the foreign nobles who were considered the backbone of the state to leave for their provinces. After Sultan Muhammad III's death, Mahmud or Shihab-ud-din Mahmud reigned as the sultan until his death in 1518. His long rule is noted for the beginnings of the process of disintegration. After him, four of his successors on the throne were kings only in name. During this period, the Sultanate gradually broke up into five independent Deccan kingdoms: Bidar, Bijapur, Ahmednagar, Berar and Golconda.

## Contribution of Bahmani Sultans

### Architecture

The contribution of Bahmani kings to architecture is evident in Gulbarga. Archaeological excavations done in the site of the kingdom has helped to unearth palaces, halls of public audience, ambassadors' residences, arches, domes, walls and citadels. These finds are illustrative of their architectural skill.

## Education

The founder of the Bahmani kingdom Ala-ud-din Hasan Shah was educated at Multan at the initiative of Zabar Khan, a general of Ala-ud-din Khalji. On his accession, he took special care in founding a school to educate his sons. His son Muhammad I was a patron of learning. He opened institutions for the purpose of educating the children of noble families in the art of soldiery. Sultan Firoz, the eighth Bahmani king was a linguist and a poet. Later his successors founded schools in Gulbarga, Bidar, Daulatabad and Kandahar. Boarding and lodging at the king's expenses were provided in these schools. Mahmud Gawan's world famous madrasa in Bidar, with a large library, containing a collection of 3000 manuscripts, is illustrative of the importance given to scholarship and education by Gawan.



Mahumad Gawan Madrasa

## Summary

- The foundation of Vijayanagar kingdom by two brothers Harihara and Bukka and its consolidation by their successors notably Devaraya II are described.
- The most illustrious ruler Krishnadeva Raya's career and achievements are highlighted.
- Defeat of Vijayanagar at the hands of combined forces of Deccan Sultanates is narrated.
- Vijayanagar's system of governance and economy are explored.
- Contributions of Vijayanagar to literature, art and architecture are also dealt with.



7th Social Science_Term II English Unit 01.indd 104 27/06/2023 12:48:27

- ❖ Establishment of Bahmani kingdom by Ala-ud-din Hasan Bahman Shah and its consolidation by his able successor Muhammad I are detailed.
- ❖ The administrative system introduced by Bahman Shah and measures adopted by Muhammad I and later by Mahmud Gawan during the kingship of Muhammad III are analysed.
- ❖ Bahmani kings' contribution to architecture and education are also examined.

| Glossary | | | |
|---|---|---|---|
| 1. | conflict | a serious disagreement | முரண்பாடு / மோதல் |
| 2. | ascending | leading upwards | ஏறுவரிசையில் |
| 3. | subsequently | after a particular thing | நிகழ்ச்சிக்குப்பிறகு |
| 4. | adorned | decorated | அலங்கரிக்கப்பட்ட |
| 5. | pillaging | robbing, using violence, especially in wartime | கொள்ளையடிப்பு |
| 6. | intrigue | conspire, plot | சதிதிட்டம் / சூழ்ச்சி |
| 7. | primogeniture | the right of succession belonging to the first child | முதல் குழந்தைக்கு வாரிசுரிமை |
| 8. | splendour | magnificent | கம்பீரம் / சிறப்புவாய்ந்த |
| 9. | flourishing | growing successfully | செழிக்கும் |
| 10. | prominence | the state of being important | முக்கியத்துவம் |
| 11. | indemnity | guarantee, surety | உத்திரவாதம் |

## Evaluation

### I. Choose the correct answer

1. Who was the greatest ruler of Sangama Dynasty?
   a) Bukka
   b) Devaraya II
   c) Harihara II
   d) Krishna Devaraya
2. Which was the most common animal depicted on the pillars of Vijayanagara style?
   a) Elephant b) Horse
   c) Cow d) Deer
3. Who was the last ruler of the Sangama Dynasty?
   a) Rama Raya b) Tirumaladeva Raya
   c) Devaraya II d) Virupaksha Raya II
4. Who ended the Sultanate in Madurai?
   a) Saluva Narasimha b) Devaraya II
   c) Kumara Kampana d) Tirumaladeva Raya



7th Social Science_Term II English Unit 01.indd 105 27/06/2023 12:48:27

5. Name the Bahmani King who was a linguist and a poet.

   a) Ala-ud-din Hasan Shah

   b) Muhammad I

   c) Sultan Firoz

   d) Mujahid

## II. Fill in the Blanks

1. _____was the capital of Aravidu dynasty.
2. Vijayanagar emperors issued a large number of gold coins called_____.
3. Mahmud Gawan used_____ chemists to teach the preparation and use of gunpowder.
4. In Vijayanagara administration _____ looked after the affairs of villages.

## III. Match the following

| | | | |
|---|---|---|---|
| 1. | Vijayanagara | - | Ruler of Odisha |
| 2. | Prataparudra | - | Ashtadiggajas |
| 3. | Krishna Devaraya | - | Pandurangamahatyam |
| 4. | Abdur Razzaq | - | City of victory |
| 5. | Tenali Ramakrishna | - | Persian emissary |

## IV. 1. Assertion (A): The Vijayanagar army was considered one of the feared armies in India.

**Reason (R):-Vijayanagar armies used both firearm and cavalry.**

a) R is not the correct explanation of A

b) R is correct explanation of A

c) A is correct and R is wrong

d) (A) and (R) are Correct

**2. Find out the wrong pair**

| | | | |
|---|---|---|---|
| a) | Silk | - | China |
| b) | Spices | - | Arabia |
| c) | Precious stone | - | Burma |
| d) | Madurai Vijayam | - | Gangadevi |

**3. Find the odd one out**

Harihara II, Muhammad I Krishnadeva Raya, Devaraya I.

**4. Consider the following statements and find out which is/are correct**

I. Turquoise throne is one of the bejewelled royal seats of Persian kings described in Firdausi's Shah Nama.

II. The fertile regions between the rivers Krishna and Tungabhadra and Krishna–Godavari delta were the zones of conflict among the rulers of Vijayanagar, and Bahmani.

III. Muhammad I was educated at Multan.

IV. Mahmud Gawan served with great distinction as the Prime Minister under Muhammad III.

a). i), ii), iv) are correct

b). i), ii), iii) are correct

c). ii), iii), iv) are correct

d). iii), iv), are correct

## V. True or False

1. Harihara and Bukka were the founder of Bahmani kingdom.
2. Krishnadeva Raya, who reigned for 20 years, was the most illustrious rulers of Sangama dynasty.
3. Alasani Peddana was the greatest of all Ashtadiggajas.
4. Kingship of Vijayanagar administration was hereditary, based on the principle of primo geniture.
5. There were 18 monarchs of the Bahmani dynasty.



7th Social Science_Term II English Unit 01.indd 106 27/06/2023 12:48:27

## VI. Answer in one or two sentences

1. The four dynasties of Vijayanagara kingdom with reference to prominent rulers of each dynasty.
2. Battle of Talikota.
3. The structure of governance in Vijayanagar kingdom.
4. The five independent kingdoms of Deccan Sultanate.
5. The educational reforms of Ala-ud-din Hasan Shah

## VII. Answer in detail

1. Discuss the career and achievements of Krishna Devaraya.

## VIII. HOTs

Discuss the causes for the decline of Vijayanagar rule. To what extent the Bahmani sultans contributed to it?

## IX. Map

1. Highlight the boundaries of Vijayanagar Empire and Bahmani kingdom.

## X. Answer Grid

| | |
|---|---|
| 1. Name the kingdom ruled by 18 monarchs which lasted for nearly 180 years. | 2. Name the Bahmani Sultan who was restored to the throne by Krishna Devaraya |
| 3. Name the book written by Krishnadevaraya in Sanskrit. | 4. Where did Hasan Bahman Shah shift his capital. |

## XI. Student Activity

Collect information about temples in Tamil Nadu with the influence of Vijayanagara style of art and architecture. Also read the stories of Tenali Ramakrishna in the classroom.

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7th Social Science_Term II English Unit 01.indd 107 27/06/2023 12:48:27

# Unit -II

# The Mughal Empire

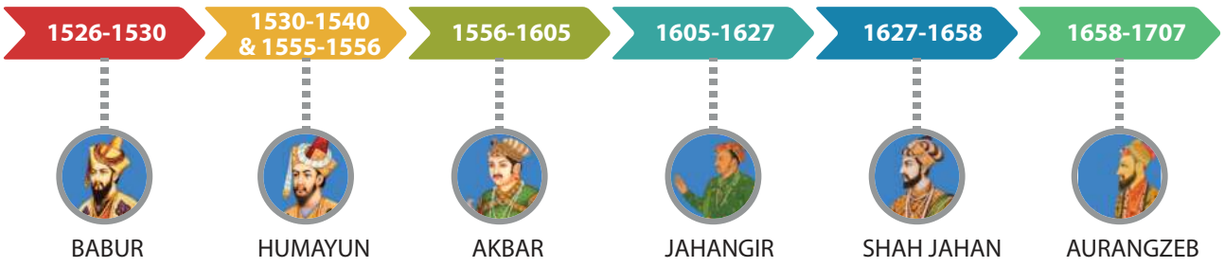


Tajmahal

## Learning Objectives

- To trace the foundation and establishment of Mughal Empire in India.
- To acquaint ourselves with the career and achievements of six great Mughal kings.
- To understand the administrative and religious policies of the Mughal rulers.
- To gain knowledge about the cultural contributions of Mughals.

B3AJP




## Introduction

A new empire began in India with the arrival of the Mughal king Babur. Except for the brief reign of Sher Shah of Sur dynasty, the Mughal rule lasted from A.D.(CE) 1526 to 1707. These were the years when the fame of the Great Mughals of India spread all over Asia and Europe. After six Great Mughal Emperors, the empire began to disintegrate.

## Babur (1526–1530)

### Ancestry and His Early Career

Zahir-ud-din Muhammad Babur, popularly known as Babur, was the founder of the Mughal Empire in India. The term 'Mughal' can be traced to Babur's ancestors. Babur was the great grandson of Timur (on his father's side). On his mother's side, his grandfather was Yunus Khan of Tashkent, who was known as the Great



7th Social Science_Term II English Unit 02.indd 108 27/06/2023 12:53:43

Khan of the Mongols and the thirteenth in the direct line of descent of Chengiz Khan. Babur was born on 14 February 1483. He was named Zahir-ud-din (Defender of Faith) Muhammad. He inherited Farghana, a small kingdom in Central Asia, when he was 12 years old. But he was soon driven out from there by Uzbeks. After 10 years of adversity, Babur established himself as the ruler of Kabul.



Babur

## Foundation of the Mughal Empire

In Kabul, Babur set his sights eastward, reminded by the memory of Timur's Indian invasion. In 1505, the very year after he took Kabul, Babur led his first expedition towards India. Yet he was preoccupied with the Central Asian affairs. He did not have any ambition beyond Punjab till 1524. Then a greater opportunity came knocking. Dilawar Khan, who was Daulat Khan Lodi's son, and Alam Khan, who was the uncle of Sultan of Delhi, arrived in Kabul to seek Babur's help in removing Ibrahim Lodi from power. Babur defeated Ibrahim Lodi in the famous Battle of Panipat in 1526 and occupied Delhi and Agra. Following Babur's victory in this battle, Mughal dynasty came to be established in India with Agra as its capital.

## Babur's Military Conquests

Babur defeated Rana Sanga and his allies at Khanwa in 1527. He won the war against the chief of Chanderi in 1528 and prevailed over the Afghan chiefs of Bengal and Bihar in 1529. Babur died in 1530 before he could consolidate his victories. Babur was a scholar in Turkish and Persian languages. He recorded his impressions about Hindustan, its animals, plants and trees, flowers and fruits in his autobiography Tuzuk-i-Baburi.



Rana Sanga

Following the tradition set by Chengiz Khan, who nominated the most deserving among his sons as his heir, Babur chose his favourite and eldest son, Humayun, as his heir.

## Humayun (1530–1540 and 1555–1556)

Humayun, on his accession to the throne, divided his inheritance as per his father's will



7th Social Science_Term II English Unit 02.indd 109 27/06/2023 12:53:44

and accordingly his brothers, Kamran, Hindal and Askari, got a province each. Yet each of the brothers aspired for the throne of Delhi. Humayun also had other rivals and notable among them was the Afghan Sher Shah Sur, the ruler of Bihar and Bengal. Sher Shah defeated Humayun at Chausa (1539) and again at Kanauj (1540). Humayun, defeated and overthrown, had to flee to Iran. With the help of the Persian ruler Shah Tahmasp of the Safavid dynasty, Humayun succeeded in recapturing Delhi in 1555. But he died in 1556 when he fell down the stairs of his library in Delhi.



Humayun Tomb

## Sher Shah (1540–1545)

Sher Shah was the son of the Afghan noble Hasan Suri, ruler of Sasaram in Bihar. After overthrowing Humayun, Sher Shah started the rule of Sur dynasty at Agra. During his brief reign, he built an empire stretching from Bengal to the Indus, excluding Kashmir. He also introduced an efficient land revenue system. He built many roads, and standardised coins, weights and measures.



Sher Shah

## Akbar (1556–1605)

### Accession to Throne

After the death of Humayun in 1556, his 14-year-old son Akbar was crowned the King. Humayun's trusted general Bairam Khan became the regent and ruled on behalf of Akbar, as the latter was a minor.

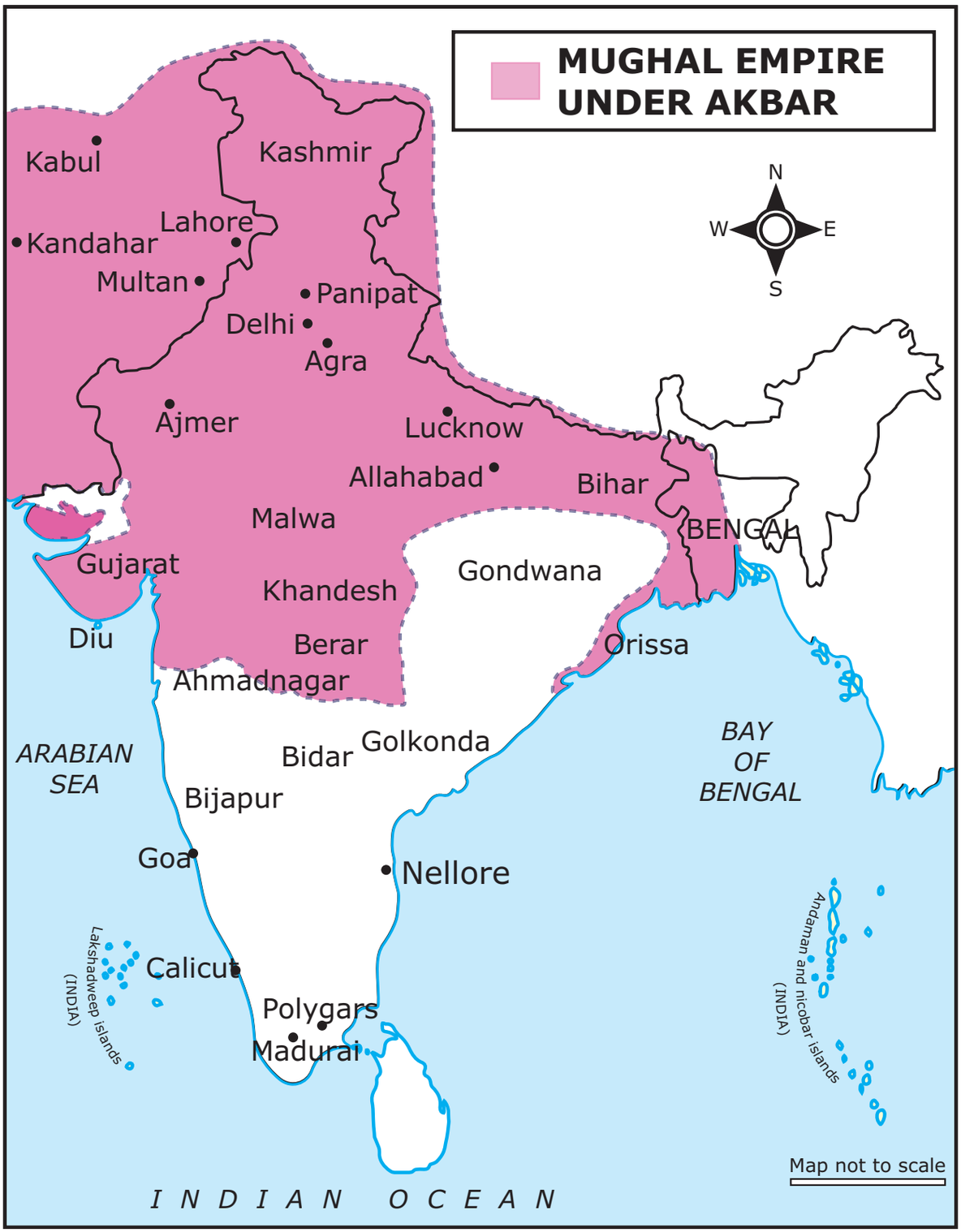


Akbar



7th Social Science_Term II English Unit 02.indd 110 27/06/2023 12:53:46

Hemu, a general of Sur dynasty, soon captured Agra and Delhi in 1556. In the same year, Bairam Khan defeated and killed Hemu in the battle at Panipat (Second Battle of Panipat, 1556). As Bairam Khan was murdered in Gujarat, allegedly at the instance of Akbar who could not tolerate his dominance in day-to-day governance of the kingdom, Akbar assumed full control of the government. Akbar brought most of India under his control through conquests and alliances.






7th Social Science_Term II English Unit 02.indd 111 27/06/2023 12:53:46

## Conquests of Women Rulers

Akbar conquered Malwa and parts of Central India. His defeat of Rani Durgavati, a ruler in the Central Province, is not appreciated, since the brave Rani did him no harm. Yet urged by his ambition to build an empire, Akbar had no consideration for the good nature of the ruler. Similarly, another woman ruler Akbar had to confront in South India was the famous Rani Chand Bibi, regent of Ahmednagar. The fight this woman put up impressed the Mughal army so much that they gave her favourable terms of peace.



Rani Durgavati

## Battle of Haldighati

Akbar defeated Rana Uday Singh of Mewar and captured the fort of Chittoor in 1568 and then Ranthambore in 1569. In 1576, he won over Uday Singh's son Rana Pratap at the Battle of Haldighati. Though defeated, Rana Pratap escaped on his horse, Chetak, and continued his fight, leading a life in the jungle. The memory of this gallant Rajput is treasured in Rajputana, and many a legend has grown around him.



Rana Pratap

## Commercial Access to Arabia, Southeast Asia and China

Akbar's conquest of Gujarat helped him to establish control over Gujarat's overseas trade with the Arabs and the Europeans. Akbar's military campaigns in East Bihar and Odisha and victory over Bengal facilitated access to Southeast Asia and China.

## Military Campaigns in the North-West (1585–1605)

Among other conquests of Akbar, the important were the campaigns he launched in the North–West of India. Akbar added Kandahar, Kashmir and Kabul to the Mughal Empire. His battles in the Deccan led to the annexation of Berar, Khandesh and parts of Ahmednagar. Under Akbar, the Mughal Empire extended from Kashmir in the north to Godavari in the south, and from Kandahar in the west to Bengal in the east.

Akbar died in 1605 and his mortal remains were buried at Sikandra near Agra.



7th Social Science_Term II English Unit 02.indd 112 27/06/2023 12:53:47

## Akbar's Religious Policy

Akbar, realising that the gains of affection would be more enduring than the gains of the sword, made all out efforts to win the goodwill of the Hindu nobles and the Hindu masses. He abolished the jizya (poll tax) on non-Muslims and the tax on Hindu pilgrims. He also married a girl of a noble Rajput family. Later, he married off his son to a Rajput girl as well. He appointed Rajput nobles to important and top positions in his Empire. Raja Man Singh of Jaipur was sent as governor of Kabul once.

Akbar treated all the religious groups fairly with generosity of spirit. The Sufi saint Salim Chishti and the Sikh Guru Ramdas received Akbar's utmost respect and regard. Guru Ramdas was gifted a plot of land in Amritsar, where the Sikh shrine Harmandir Sahib was later built. In Ibadat Khana, a hall in the new Fatehpur Sikri city, constructed by Akbar, scholars of all religions met for a discourse.

## Contributions to culture

Akbar was a great patron of learning. His personal library had more than four thousand manuscripts. He patronised scholars of all beliefs and all shades of opinions. He extended his benevolence to authors such as Abul Fazl, Abul Faizi and Abdur Rahim Khan-i-Khanan, the great storyteller Birbal, competent officials like Raja Todar Mal, Raja Bhagwan Das and Raja Man Singh. The great composer and musician Tansen and artist Daswant adorned Akbar's court as well.

## Jahangir (1605–1627)

Akbar was succeeded by Prince Salim, his son through a Rajput wife, who was also named Nur-ud-din Muhammad Jahangir (Conqueror of the World). Jahangir was more interested in



Jahangir

art and painting and gardens and flowers, than in running the government. So Jahangir's wife, Mehr-un-nisa, known as Nur Jahan, was the real power behind the throne. Jahangir carried on to some extent his father's traditions. The toleration of religions of Akbar's time continued in Jahangir's time.



Nur Jahan



7th Social Science_Term II English Unit 02.indd 113 27/06/2023 12:53:48

But Jahangir ordered the execution of Sikh leader Guru Arjun (or Arjan) for helping his rebellious son Khusrau, who contested for the throne. This resulted in a prolonged fight between the Sikhs and the Mughals. As a result of this confrontation, the Mughals had to lose control over the trade routes to Afghanistan, Persia and Central Asia. The loss of Kandahar exposed India to invasions from the North-West. Ahmednagar, though conquered by Jahangir, remained a source of trouble throughout his reign.

Jahangir granted trading rights to the Portuguese and later to the English. Thomas Roe, a representative of King James I of England, visited Jahangir's court and this agreement paved the way for the British establishing their first factory in Surat.

## Shah Jahan (1627–1658)



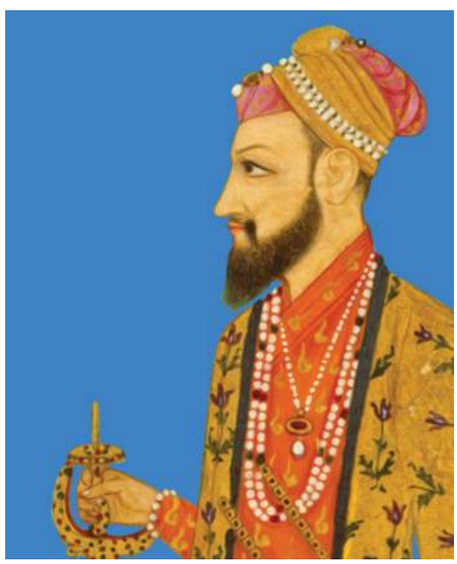
Shah Jahan

Prince Khurram, after a struggle for power, succeeded Jahangir as Shah Jahan (King of the World). Shah Jahan ruled for thirty years. He led a campaign against Ahmednagar and annexed it in 1632. Bijapur and Golconda were also conquered later. Some Maratha warriors, notably Shahji Bhonsle (Shivaji's father), entered the services of the Deccan kingdoms and trained bands of Maratha soldiers to fight against the Mughals. So there was a sustained resistance in the Deccan to the Mughals from the Marathas too. Shah Jahan was intolerant towards other religions than Islam. In his reign came the climax of Mughal splendour, which is detailed in the next part of this lesson.

Shah Jahan fell ill in 1657 and a war of succession broke out among his four sons. Aurangzeb emerged successful after killing his three brothers, Dara, Shuja and Murad. Shah Jahan passed the last eight years of his life as a prisoner in the Shah Burj of the Agra Fort.

## Aurangzeb (1658–1707)

Aurangzeb, the last of the Great Mughals, started off his reign by imprisoning his old father. He assumed the title Alamgir (the Conqueror of the World). He reigned for 48 years. He was no lover of art like his grandfather Jahangir and architecture like his father Shah Jahan.



Aurangzeb

He tolerated no religion excepting Islam. He re-imposed the jizya tax on Hindus and excluded them from office as far as possible. Between 1658 and 1681, Aurangzeb remained in the North and suppressed the revolt of Bundelas, Jats, Satnamis and Sikhs. Aurangzeb's expansion in the North-East resulted in a war with the Ahoms of Kamarupa (Assam). The kingdom came under repeated attacks of the Mughals, but it could not be subdued totally.






7th Social Science_Term II English Unit 02.indd 115 27/06/2023 12:53:49

## Relationship with Rajputs and Marathas

Aurangzeb's hostility towards Rajputs led to prolonged wars with them. To make matters worse, his rebellious son, Prince Akbar, joined the forces of Rajputs and created troubles to him. Prince Akbar entered into a pact with Shivaji's son Shambuji in the Deccan. So Aurangzeb had to march to the Deccan in 1689.

In the Deccan, Aurangzeb brought Bijapur and Golconda into submission. Shivaji had carved out a kingdom, proclaiming himself the Emperor of Maratha State (1674). Aurangzeb could not stop the rise of Shivaji in the south-west. But he vanquished Shivaji's son and successor Shambuji, who was captured and executed by him. Aurangzeb remained in the Deccan until his death in 1707, at the age of nearly 90.

By the end of Aurangzeb's rule, the British had firmly established their trade centres at Madras (Chennai), Calcutta (Kolkata) and Bombay (Mumbai). The French had their main trade centre in Pondicherry (Puducherry).

## The Mughal Administration

### Central Administration

The Mughals provided a stable administration in larger parts of India. The Emperor was the supreme head of the Mughal administrative system. He was the law maker, the chief executive, the commander-in-chief of the army and the final dispenser of justice. He was assisted by a council of ministers. The most important officials were the Wakil (Prime Minister) and Wazir or diwan (in charge of the revenue and expenditure). Mir Bhakshi was in-charge of the army. The Mir Saman looked after the royal household. The Qazi was the Chief Judge. Sadr-us-Sudr was minister for enforcing Islamic law (Sharia).

### Provincial Administration

The empire was divided into several Subhas (provinces). Each Subha was under the control of an officer called Subedar. The Subhas were further divided into districts called Sarkars. The Sarkars were subdivided into Parganas. A group of villages (Gramas) formed a Pargana.

### Local Administration

The towns and cities were administered by Kotwals. Kotwals maintained law and order. The administration of villages was left in the hands of local village panchayats (informal institution of justice in villages). The Panchayatdars (jury) dispensed justice.

### Army

The Mughal army comprised infantry, cavalry, war elephants and artillery. The Emperor maintained a large number of trained and well-armed bodyguards and palace guards.

### Mansabdari System

Akbar introduced the Mansabdari system. According to this system, the nobles, civil and military officials were combined to form one single service. Everyone in the service was given a mansab, meaning a position or rank. A Mansabdar was a holder of such a rank. Mansabdar rank was dependent on Zat and Sawar. The former indicated one's status. Sawar was the number of horses and horsemen he had to maintain. His salary was fixed on the basis of the number of soldiers each Mansabdar received ranging from 10 to 10,000. The Mansabdars



7th Social Science_Term II English Unit 02.indd 116 27/06/2023 12:53:49

were paid high salary by the Emperor. Before receiving the salary, a Mansabdar had to present his horsemen for inspection. Their horses were branded to prevent theft. The Emperor could use the troops maintained by a Mansabdar whenever he wished. The rank of Mansabdar was not hereditary during Akbar's time. After him, it became hereditary.

## Land Revenue Administration

Land revenue administration was toned up during the reign of Akbar. Raja Todar Mal, Revenue Minister of Akbar, adopted and refined the system introduced by Sher Shah. Todar Mal's zabt system was put in place in the north and north-western provinces. According to this system, after a survey, lands were classified according to the nature and fertility of the soil. The share of the state was fixed at one-third of the average produce for 10 years. During the reign of Shah Jahan, the zabt or zabti system was extended to the Deccan provinces.

The Mughal emperors enforced the old iqta system, renaming it jagir. It is a land tenure system developed during the period of Delhi Sultanate. Under the system, the collection of the revenue of an area and the power of governing it were bestowed upon a military or civil official now named Jagirdar. Every Mansabdar was a Jagirdar if he was not paid in cash. The Jagirdar collected the revenue through his own officials. The Amal Guzar or the revenue collector of the district was assisted by subordinate officers like the Potdar, the Qanungo, the Patwari and the Muqaddams.

Those appointed to collect the revenue from the landholders were called zamindars. Zamindars collected taxes and maintained law and order with the help of Mughal officials and soldiers. The local chieftains and little kings were also called zamindars. But at the end of the sixteenth century, the zamindars were conferred hereditary rights over their zamin. The zamindar was empowered to maintain troops for the purpose of collecting revenue. The emperor granted lands to scholars, holy men and religious institutions. These lands called suyurghal were tax-free.

## Religious Policy

The Mughal emperors were the followers of Islam. Akbar was very liberal in his religious policy. In Akbar's court, the Portuguese missionaries were great favourites. Akbar tried to include the good principles in all religions and formulated them into one single faith called Din-I-Ilahi (divine faith). Jahangir and Shah Jahan also followed the policy of Akbar. Aurangzeb rejected the liberal views of his predecessors. As we pointed out earlier, he re-imposed the jizya and pilgrim tax on the Hindus. His intolerance towards other religions made him unpopular among the people.

## Art and Architecture




Babur introduced the Persian style of architecture to India by building many structures at Agra, Biana, Dholpur, Gwalior and Kiul (Aligarh), but only a few of them exist today. Humayun's palace in Delhi, Din-i-Panah, was probably destroyed by Sher Shah Sur who built the Purana Qila in its place. The most prominent monument of Sher Shah's reign was his mausoleum built at Sasaram in Bihar.



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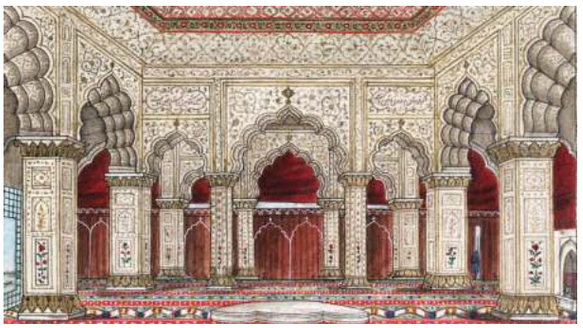
Purana Qila

The Diwan-i-Khas, Diwan-i-Am, Panch Mahal (pyramidal structure in five stories), Rang Mahal, Salim Chishti's Tomb and Buland Darwaza were built during Akbar's time. Jahangir completed Akbar's tomb at Sikandara and the beautiful building containing the tomb of Itmad-ud-daula, father of Nur Jahan, at Agra.



Buland Darwaza

Shah Jahan's time witnessed the climax of Mughal splendour. The famous peacock throne, covered with expensive jewels, was made for the Emperor to sit on. Then rose the world famous Taj Mahal, by the side of the Yamuna river at Agra. Besides Taj, he built the Moti Masjid, the pearl mosque at Agra, the great Jama Masjid of Delhi and the Diwan-i-Khas and Diwan-i-Am in his palace in Delhi.



Diwan-i-Khas



Diwan-i-Am

During Aurangzeb's reign, architecture did not receive much patronage. The Bibi Ka Maqbara in Aurangabad, a mausoleum built by his son Prince Azam Shah as a loving tribute to his mother in the late seventeenth century, is, however, worth mentioning.

**Red Fort**



Red Fort, also called Lal Qila, in Delhi was the residence of the Mughal emperors. Constructed in 1639 by Emperor Shah Jahan as the palace of his fortified capital Shajahanabad. The Red Fort is named for its massive enclosing walls of red sandstone.



7th Social Science_Term II English Unit 02.indd 118 27/06/2023 12:53:50

## Summary

- Babur founded the Mughal Empire in 1526 after defeating Ibrahim Lodi in the Battle of Panipat (1526). Humayun's unsettled conditions and Sher Shah's victory over him in the Battle of Kanauj; Sher Shah's efficient land revenue administration; and the introduction of coin system and standardised weights and measures are dealt with in this chapter.
- Humayun's retrieval of the Mughal Empire and his untimely death leading to the accession of his son Akbar, with Bairamkhan as the regent, and defeating Hemu, the great general of Sur dynasty, in the Battle of Panipat (1556) are described.
- Akbar's military conquests as well as his religious policy are explained.
- Jahangir's disinterest in state governance leading to dominance of his wife Nur Jahan in the Mughal Court is elaborated upon.
- Shahjahan extending Mughal rule in the Deccan and the resultant conflict with Marathas are analysed.
- Aurangzeb's conquests helped to expand the Mughal Empire, but his policies against Rajputs, Marathas and Sikhs provoked resistance from them, paving the way for its downfall.
- Mughal administration headed by the Emperor, who in turn was assisted by various officials, is described. Akbar's Mansabdari system and the land revenue policy formulated by Raja Todar Mal according to the zabt system are examined.
- Mughals' contributions to culture, notably to art and architecture, are highlighted.

| Glossary | | | |
|---|---|---|---|
| 1. | expedition | a journey undertaken with the purpose of war | போர்பயணம் |
| 2. | prolonged | lengthy | நீண்ட |
| 3. | subdued | conquered | அடக்குதல் |
| 4. | rebellious | showing a desire to resist authority | கலகக்கார |
| 5. | bestowed | awarded | மதிப்பளித்தல் |
| 6. | hereditary | inheritance of a title, office, or right | பாரம்பரிய |
| 7. | Enduring | lasting over a period of time | நீடித்த / நீடித்த காலம் |

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7th Social Science_Term II English Unit 02.indd 119 27/06/2023 12:53:51

## Evaluation

### I. Choose the correct answer

1. Who introduced the Persian style of architecture in India?
   a) Humayun b) Babur
   c) Jahangir d) Akbar
2. In which battle did Akbar defeat Rana Pratap?
   a) Panipat b) Chausa
   c) Haldighati d) Kanauj
3. Whose palace in Delhi was destroyed by Sher Shah?
   a) Babur b) Humayun
   c) Ibrahim Lodi d) Alam Khan
4. Who introduced Mansabdari system?
   a) Sher Sha b) Akbar
   c) Jahangir d) Shah Jahan
5. Who was the revenue minister of Akbar?
   a) Birbal b) Raja Bhagwan Das
   c) Raja Todarmal d) Raja Man Singh

### II. Fill in the Blanks

1. _____was the name of the horse of Rana Pratap.
2. _____ was a hall at FatehpurSikri where scholars of all religions met for a discourse.
3. The Sufi saint who received Akbar's utmost respect was _____.
4. During the reign of _____ the Zabti system was extended to the Deccan provinces.
5. _____ were tax-free lands given to scholars and religious institutions.

### III. Match the following

| | | | |
|---|---|---|---|
| 1. | Babur | - | Ahmednagar |
| 2. | Durgavati | - | Jaipur |
| 3. | Rani Chand Bibi | - | Akbar |
| 4. | Din IIahi | - | Chanderi |
| 5. | Raja Man Singh | - | Central Province |

### IV. True or False

1. Babur inherited Farghana, a small kingdom in Central Asia.
2. Humayun succeeded in recapturing Delhi in 1565.
3. Aurangzeb married a girl of a notable Rajput family.
4. Jahangir ordered execution of Sikh leader Guru Arjun for helping his son Khusrau.
5. During Aurangzeb's reign, architecture received much patronage.

### V. Consider the following statements. Tick (✓) the appropriate answer.

1. **Assertion (A):** The British established their first factory at Surat.

   **Reason (R):** Jahangir granted trading rights to the English.

   a) R is the correct explanation of A.
   b) R is not the correct explanation of A.
   c) A is wrong and R is correct.
   d) (A) and (R) are wrong.



7th Social Science_Term II English Unit 02.indd 120 27/06/2023 12:53:51

2. **Assertion (A):** Aurangzeb's intolerance towards other religions made him unpopular among people.

   **Reason (R):** Aurangzeb re-imposed the jizya and pilgrim tax on the Hindus.

   a) R is the correct explanation of A.
   b) R is not the correct explanation of A.
   c) A is wrong and R is correct.
   d) (A) and (R) are wrong.

3. **Find out the correct statements**

   (a) Kamran was the son of Afghan noble, Hasan Suri, ruler of Sasaram in Bihar.

   (b) Akbar abolished the jizya poll tax on non-Muslims and the tax on Hindu pilgrims.

   (c) Aurangzeb acceded the throne after killing his three brothers.

   (d) Prince Akbar entered into a pact with Shivaji's son Shambuji in the Deccan.

   (a), (ii) and (iii) are correct
   (b), iii) and (iv) are correct
   (c), (iii) and (iv) are correct
   (d), (iii), (iv) and (i) are correct

4. **Arrange the battles in chronological order**

   (a) Battle of Khanwa
   (b) Battle of Chausa
   (c) Battle of Kanauj
   (d) Battle of Chanderi

5. **Arrange the following administrative divisions in descending order**

   (a) Sarkars
   (b) Parganas
   (c) Subhas

**Match the father and son**

| Father | Son |
|---|---|
| 1. Akbar | Dilawar Khan |
| 2. Daulat Khan Lodi | Rana Pratap |
| 3. Hasan Suri | Humayun |
| 4. Babur | Sher Shah |
| 5. Uday Singh | Jahangir |

## VI. Give short answer

1. Write the circumstance that led to the Battle of Panipat in 1526.
2. Mention the Humayun recapture the Delhi throne in 1555?
3. Write a note on Mansabdari system.

## VII. Answer the following

1. Describe the land revenue administration of the Mughals.
2. Estimate Akbar as a patron of learning.

## VIII. HOTs

1. Shah Jahan's time witnessed the climax of Mughal splendour. Support this statement in comparison with the times of other Mughal rulers.

## Map

Mark the extent of Mughal Empire during the reign of Akbar and Aurangzeb with special focus on important battle fields.

## IX. Activity

Collect information about the scholars in Akbar's court and conduct a mock Ibadat khana in the class.



7th Social Science_Term II English Unit 02.indd 121 27/06/2023 12:53:51

# Unit -III

# Rise of Marathas and Peshwas



## Learning Objectives

- To trace the origin and the growth of Maratha kingdom with particular emphasis on the role played by Shivaji in strengthening it.
- To know about the administrative structure introduced by Shivaji.
- To examine how far the Marathas were responsible for the decline of the Mughals.
- To assess the role of Peshwas in carrying on Maratha power.

K61LO

## Introduction

The rising power of the Marathas in the south-west posed the real danger to the Mughal Empire. Shahji Bhonsle, Shivaji's father, an officer of the Ahmednagar State and later Bijapur, proved to be a thorn in the flesh of the Mughals, even in Shah Jahan's period. But it was his son, Shivaji, who attained glory among the Marathas as he could stop the Mughal Empire's expansion in the Deccan. Shivaji was a gallant fighter, army general and a guerilla leader. He built up a band of brave mountaineers, who were loyal to him. With their help, he captured many forts and gave Aurangzeb's commanders a tough time. As Marathas grew stronger, the Mughal Empire weakened. The Mughal Emperor had to recognise the right of the Marathas to collect their Chauth tax all over the Deccan. Warfare opened opportunities for talented commanders who contributed to the vigorous expansion of Maratha power early in the eighteenth century. The prime minister of Maratha rulers, called the Peshwas from the time of Shahu, held real power. Under the aegis of Maratha power, the Peshwas continued their supremacy until 1761.

## Factors Responsible for the Rise of Marathas

### Geographical Features

The physical features of the Maratha country developed certain peculiar qualities among the Marathas, which distinguished them



7th Social Science_Term I English Unit 03.indd 122 09-07-2022 14:30:54

from the rest of the people of India. During the sixteenth century, the sultans of Bijapur and Ahmednagar had recruited them to serve in cavalry. Their presence was helpful to the sultans in balancing the political ambitions of the Muslim soldiers in their service. The rocky and mountainous terrain gave protection to the Marathas from invaders. It proved to be advantageous in guerrilla warfare for Marathas.

## Bhakti Movement and the Marathas

The spread of the Bhakti movement in Maharashtra helped the Maratha people develop consciousness of their identity and oneness. It promoted a feeling of unity, especially in terms of social equality, among the Marathas. In the Maratha region, the religious leaders were drawn from different social groups. Eknath, Tukaram and Ramdas were the noted Bhakti saints. Tukaram and Ramdas had considerable influence on the life of Shivaji.



Tukaram



Ramdas

## Literature and Language of the Marathas

Marathi language and literature also served to develop unity among the people. Hymns composed in the Marathi language by Bhakti saints were sung by people of all castes and classes.

## Shivaji

Shivaji, born in 1627, grew up under the care of his mother, Jijabai, who influenced him

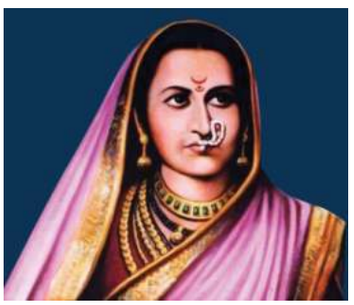


Shivaji

with stories from the Hindu epics, Ramayana and the Mahabharatha. Shivaji's teacher and guardian, Dadaji Kondadev, trained him in the art of horse riding, warfare and state administration. At the age of eighteen in 1645, when he had just entered the military career, he successfully captured Kondana, a fort near Poona. The following year, he took the fort of Torna. Then he succeeded in conquering Raigarh, which was rebuilt by him.



Shahji Bhonsle



Jijabai

## Shivaji's Confrontation with Sultan of Bijapur

Shivaji became totally independent after the death of his guardian Kondadev (1649). He also got his father's jagir transferred to him, which was earlier looked after by Kondadev. The strength of his army was Mavali foot soldiers. With their help, Shivaji conquered many of the

hill forts near Poona. He captured Puranthar from the Mughals. Shivaji's military raids angered the Sultan of Bijapur. He held Shivaji's father captive and released him only after Shivaji promised to suspend his military raids. Shivaji kept his word and remained at peace with Bijapur from then on till his father Shahji's death. During this period he toned up his administration.






7th Social Science_Term I English Unit 03.indd 124 09-07-2022 14:30:55

## Consolidation of Maratha Power

Shivaji resumed his raids after his father's death and conquered Javali (1656) from the Maratha chief Chandrarao More. He also reduced all the lesser Maratha chiefs around Pune to subordination. The soldiers of Bijapur from the hill fortresses acquired by Sultan of Bijapur were driven out and replaced with his own commanders. These moves and the defeat of Bijapur army sent to punish Shivaji alarmed the Mughal officials. When the Mughals made a punitive expedition, Shivaji boldly confronted them. In 1659 he killed Afzal Khan, a notable general of Bijapur. In 1663 he wounded and chased away the Mughal general and Aurangzeb's uncle Shaista Khan. To cap these bold acts, he audaciously directed his soldiers to plunder Surat (1664), the major Mughal port on the Arabian Sea.

## Shivaji and Aurangzeb

After Shivaji plundered Surat, Aurangzeb swung into action. An army under the command of a Rajput general, Raja Jai Singh, was ordered to destroy Shivaji and annex Bijapur. Shivaji finally sought peace, yielded the fortresses he had seized and accepted service as a mansabhdar in the Mughal service for the conquest of Bijapur. He also agreed to visit the imperial court at Agra, on the advice of Jai Singh only to suffer humiliation, which led him to escape, by hiding in a basket.

Aurangzeb was determined to stop the Maratha interference in his expeditions against the Deccan kingdoms. He attempted to patch up with Shivaji, but those efforts failed. In 1670, the Mughal army was helpless when Shivaji again plundered Surat. In 1674, Shivaji crowned himself by assuming the title of Chhtrapati and the coronation of Shivaji was celebrated with great splendour at Raigarh, as the occasion was the founding of a new kingdom and a new dynasty. Shivaji's aged mother Jijabai, who had lived to see her son crowned the king, passed away a few days after the coronation, with her life wish fulfilled. Shivaji spent his last years trying to bring his son Shambhuji into his ways as he had defected to the Mughals. He fell ill with fever and dysentery and died in 1680.

Chhatra (parasol) pati (master or lord),is the Sanskrit equivalent of king or emperor, and was used by the Marathas, especially Shivaji.

## Maratha Administration under Shivaji

Shivaji's political system consisted of three circles. At the centre was the swaraj. Shivaji was caring and would not allow the people to be harassed in any way. In the second circle, Shivaji claimed suzerainty, but he did not administer them himself. He protected the people from loot and plunder for which they were required to pay Chauth (one-fourth of the revenue as protection money) and Sardeshmukhi (an extra one-tenth, as the chieftain's due). In the third circle, Shivaji's only objective was plunder.

Deshmukhs held sway over rural regions and their control was over between twenty and hundred villages. Each village had a powerful headman (Patil), who was assisted by a village accountant of a keeper of records (Kulkarni). In the absence of a strong central government, these local community level officials functioned as the true government.



7th Social Science_Term I English Unit 03.indd 125 09-07-2022 14:30:55

## Army

Shivaji gave utmost attention to his army and training of its personnel. In the beginning, the backbone of his army was the infantry. But as his campaigns extended into the plains, his cavalry grew in size and importance. Every soldier was selected personally by Shivaji and was taken into service on the assurance of a soldier already in service. Shivaji took great care in the maintenance and security of his forts. Retired captains holding a high reputation were put in charge of guarding the forts.

## Ashtapradhan

Shivaji designated eight ministers as the Ashtapradhan, each holding an important portfolio. Peshwa was the equivalent of a modern prime minister in the Maratha Empire. Originally, they were subordinates to the Chhatrapati. But, in course of time, especially from the time of Sahu Maharaja, Peshwa became the de facto Maratha ruler while the Chhatrapati was reduced to the position of a nominal ruler.

Shivaji was influenced by the Mughal revenue system. The assessments were made on the actual yield, with three-fifths left to the cultivator and two-fifths taken by the government. In judicial administration, civil cases continued to be decided by the panchayat, the village council, while criminal law was based on the shastras, the Hindu law books.

## Responsibilities of the Ashtapradhan

| | |
|---|---|
| Pantpradhan / Peshwa | Prime Minister |
| Amatya / Mazumdar | Finance Minister |
| Shurunavis/Sacheev | Secretary |
| Waqia-Navis | Interior Minister |
| Sar-i-Naubat / Senapati | Commander-in-Chief |
| Sumant / Dubeer | Foreign Minister |
| Nyayadhish | Chief Justice |
| Panditrao | High Priest |

## Shambhuji

Shambhuji succeeded Shivaji after a succession tussle with Anaji Datto. There were family feuds splintering the Maratha kingdom. Durgadas of Rathore Marwar and Aurangzeb's rebel son Akbar arrived in Maharashtra and took shelter in Shambhuji's court. Aurangzeb viewed these developments very seriously and took all out efforts to finish off Shambhuji. Marathas under Shambhuji were in no position to resist the Mughals. Aurangzeb himself arrived in the Deccan in 1681. Aurangzeb's main goal was the annexation of Bijapur and Golconda. These two sultanates fell to Aurangzeb by 1687. In little over a year, Shambhuji was captured by the Mughals and, after torture, put to death.



Shambhuji



7th Social Science_Term I English Unit 03.indd 126 09-07-2022 14:30:55

Shambhuji was under the wicked influence of his family priest Kavi Kalash. Kavi Kalash was the caretaker of Shambhuji in Varanasi during Shivaji's flight from Agra. He later brought Shambhuji safely to Raigarh. His dominance in the Court became absolute in course of time, as Shambhuji looked to his advice for everything. Kavi Kalash was a distinguished scholar and poet. But he was a practitioner of witchcraft. So the orthodox Hindus in the court had developed a deep hatred for him. When Shambhuji was captured by the Mughal army, he was found to be in the company of Kavi Kalash. So both of them were subjected to all forms of torture and then executed by the orders of Aurangzeb.

## Shahu Maharaja

Shivaji's grandson Shahu means honest, originally a name given by Aurangzeb to contrast his character with that of Shivaji) ruled from 1708 to 1749. During the first half of the eighteenth century, consolidation of royal power was achieved through conferment of royal entitlements upon those who served Shahu.



Shahu Maharaja

During Shahu's 40-year reign there was increase in the territory under the Maratha control, from which tribute was regularly extracted. More centralised and strong state structure also began to take shape. Every household, including that of landed household, profited from state employment.

## Peshwas

Balaji Vishwanath (1713–1720) began his career as a small revenue official and became Peshwa in 1713. Much against the advice from his close circles, Shahu appointed 20-year-old Viswanath's eldest son Bajirao to occupy the office of Peshwa.



Balaji Vishwanath

## Bajirao (1720–1740)

Bajirao decided to launch a major Maratha onslaught against the Mughals and the Nizam of Hyderabad. He assumed the powers of the commander-in-chief. He was wise in his choice of commanders for these campaigns. Instead of relying on the traditional elite group, namely Deshmukhs, he gave commands to the Gaikwad,



7th Social Science_Term I English Unit 03.indd 127 09-07-2022 14:30:56

Holkar and Shinde or Scindhia families who had been loyal to the emperor Shahu, his father Balaji Viswanath and to him.



Bajirao

## The Prominent Maratha families

- Gaikwad at Baroda
- Bhonsle at Nagpur
- Holkar at Indore
- Shinde or Scindhia at Gwalior
- Peshwa at Pune

Bajirao proclaimed wars against Malwa and Gujarat and freed them from Mughal domination. The Mughal army and the troops of the Nizam that intervened on behalf of the Mughals were defeated. Bajirao succeeded in getting the recognition of Shahu as the king of Maharashtra and overlord of the rest of the Deccan, from which the tribute of Chauth and Sardeshmukhi could be legally collected by the Maratha officials. Bajirao centralised the fiscal functions in Pune. This helped to receive the prompt transmission of tribute from the Deccan.

The Maratha army, which consisted of no more than 5000 horsemen and no artillery, had by 1720 had doubled in its size. Yet they were no match for the Mughals and the Nizam. The success of Marathas against the Mughals was mainly due to the weakness of the latter. The Maratha dominance in the Deccan is also attributed to the qualities of Maratha officials and generals who grew up under Shahu and the Peshwas.

## Balaji Bajirao (1740–1761)



Balaji Bajirao

When Balaji Bajirao was the Peshwa, Emperor Shahu died (1749). A possible succession struggle among factions of the royal family was averted, thanks to the timely intervention of Balaji Bajirao. He summoned all the contending factions and forced them to accept the conditions he laid down. He decided that the capital of the kingdom would henceforward be Pune, not Satara. All power and authority was now concentrated in the Peshwas's office. Balaji Bajirao now commanded an army of paid soldiers. The Maratha peasant warrior band was reconfigured and its run came to an end. Maratha soldiers were not permitted now to retire from battle fields each year for the purpose of cultivating their land. Soldiers were required to live in forts and towns far away from



7th Social Science_Term I English Unit 03.indd 128 09-07-2022 14:30:56

their home. They were trained as infantrymen as well as horsemen. The large guns were nominally under the command of Maratha officers. But those who fired and maintained them were mostly Portuguese, French and British.

During the period of the Peshwa Balaji Bajirao, the northern frontiers of the Maratha state were rapidly touching Rajasthan, Delhi and the Punjab. At some point, the Maratha tributary regime extended itself to within fifty miles of Delhi. The Marathas launched raids from Nagpur against Bihar, Bengal and Odisha. Notwithstanding the conflict between the Marathas and the Nizam over Karnataka, Tamil, Kannada and Telugu regions were effectively brought under the control of the Marathas. Between 1745 and 1751 plundering expeditions were launched yearly by the Maratha chieftain Rahuji Bhonsle.

## Maratha Administration under Peshwas

The revenue administration of Peshwas was headed by a key official called the Kamavisdar. He was appointed by the Peshwa. He was empowered to maintain a small body of soldiers to police the administrative area, from where tribute or tax had to be collected. A small staff of clerks and servants were employed to maintain the revenue records. These records were randomly checked by the office of the Peshwa. The contracts for revenue collection was auctioned annually after the revenue for a particular place was estimated by the Peshwa's civil servants, based on previous years' yields. A prospective tax or revenue collector who won the contract was expected to have a reputation for wealth and probity. He was required to pay a portion of the whole of the anticipated revenue – one-third to one half – either out of his own wealth or from the money borrowed from bankers. Judging from the ledgers of correspondence and account books, it is evident that the Peshwas were keen on accurate record-keeping. The Peshwa regimes looked distinctly modern in comparison with the Mughals to whose fall they contributed militarily.

## The Fall of Marathas

The imperial moment of the Marathas sadly ended at Panipat near Delhi in 1761. The Marathas' attempt to extend their domain beyond Punjab was checked by the king of the Afghans, Ahmad Shah Abdali.



Ahmad Shah Abdali

Abdali invaded eight times before finally marching onto Delhi. The Marathas were now divided among several commanders, who approached the battle with different tactics. Artillery decided the battle in January 1761. The mobile artillery of the Afghans proved lethal against both Maratha cavalry and infantry. The Maratha army was shattered and the surviving men took six months to return to Maharashtra from Panipat to report the tragedy. By then Maratha supremacy over the sub-continent was effectively over.



7th Social Science_Term I English Unit 03.indd 129 09-07-2022 14:30:56

## Summary

- The factors responsible for the rise and expansion of Maratha rule are explored.
- Early life of Shivaji and the influences that worked on him are traced.
- Shivaji's military raids and victory over Bijapur Sultan's army inviting Aurangzeb's intervention are discussed.
- Confrontation of Shivaji with Aurangzeb and their fallout in the Deccan are dealt with.
- Maratha administration under Shivaji is highlighted.
- Maratha affairs after the death of Shivaji under Shambhuji and Sahu are analysed.
- Peshwas emerging de facto rulers and their contribution to the continuance of Maratha power are explained.
- Modernisation of administration under the Peshwas and the end of Maratha supremacy after the Third Battle of Panipat are detailed.

| Glossary | | | |
|---|---|---|---|
| 1. | hymns | poems in praise of God | துதிபாடல்கள் / பாசுரங்கள் |
| 2. | audaciously | boldly | துணிச்சலான |
| 3. | fortresses | a strongly fortified town | கோட்டை / அரண் |
| 4. | suzerainty | the right of a country to rule over another country | மேலாதிக்கம் |
| 5. | conferment | granting of (a title) | வழங்கப்பட்ட |
| 6. | summoned | ordering the presence of | வரவழைக்கப்பட்ட |
| 7. | shattered | (heart)broken, broken (glass), upset | மனமுடைந்த |

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7th Social Science_Term I English Unit 03.indd 130 09-07-2022 14:30:56

## Evaluation

### I. Choose the correct answer

1. Who was the teacher and guardian of Shivaji?
   a) Dadaji Kondadev b) Kavi Kalash
   c) Jijabai d) Ramdas
2. How was the Prime Minister of Maratha kings known?
   a) Deshmukh b) Peshwa
   c) Panditrao d) Patil
3. Name the family priest of Shambhuji who influenced him in his day-to-day administration.
   a) Shahu b) Anaji Datta
   c) Dadaji Kondadev d)Kavi Kalash
4. What was the backbone of Shivaji's army in the beginning?
   a) Artillery b) Cavalry
   c) Infantry d)Elephantry
5. Who proclaimed wars and freed Malwa and Gujarat from Mughal domination?
   a) Balaji Vishwanath b) Bajirao
   c) Balaji Bajirao d) Shahu

### II. Fill in the Blanks

1. The spread of the _____ movement in Maharashtra helped the Maratha people develop consciousness and oneness.
2. _____ was the key official of revenue administration of Peshwa.
3. The imperial moment of the Marathas sadly ended at _____ in 1761.
4. _____was the foreign minister in the Ashtapradhan.
5. Shambhuji succeeded Shivaji after a succession tussle with_____.

### III. Match the following

| | | |
|---|---|---|
| 1. Shaji Bhonsle | - | Mother of Shivaji |
| 2. Shambhuji | - | General of Bijapur |
| 3. Shahu | - | Shivaji's father |
| 4. Jijabai | - | Son of Shivaji |
| 5. Afzal khan | - | Shivaji's grandson |

### IV. True or False

1. The rocky and mountainous terrain gave protection to the Marathas from invaders.
2. Hymns composed in Sanskrit by the Bhakti saints were sung by people of all castes and classes.
3. Shivaji captured Puranthar from the Mughals.
4. Deshmukhs held sway over rural regions and their control was over between twenty and hundred villages.
5. Abdali invaded ten times before finally marching on Delhi.

### V. Consider the following statements. Tick (✓) the appropriate answer:

1. **Assertion (A):** Soldiers were to live in forts and towns far away from home

   **Reason (R):** Maratha soldiers were not permitted to retire from battle fields each year for the purpose of cultivating their land.

   a) R is correct explanation of A



7th Social Science_Term I English Unit 03.indd 131 09-07-2022 14:30:56

b) R is not the correct explanation of A

c) A is Wrong and R is correct

d) A and R are wrong

2. **Statement I :** Judging from the ledgers of correspondence and account books, Peshwas were keen on accurate record-keeping.

**Statement II:** Artillery decided the battle at Panipat in 1761.

a) I is correct

b) II is correct

c) I and II are correct

d) I and II are false

3. **Find the odd one out**

Shahji, Shivaji, Shambhuji, Shahu, Rahuji Bhonsle.

4. **Find out the wrong pair**

| | |
|---|---|
| 1. Gaikwad | Baroda |
| 2. Peshwa | Nagpur |
| 3. Holkar | Indore |
| 4. Shinde | Gwalior |

5. **Arrange the events in chronological order**

I) Shivaji became totally independent after the death of his guardian Kondadev.

II) Emperor Shahu died when Balaji Bajirao was Peshwa.

III) Shivaji resumed his military raids after his father's death and conquered Javali.

IV) Balaji Vishwanath became Peshwa.

## VI. Answer in one or two sentences

1. The impact of Bhakti movement on Marathas.
2. Chauth and Sardeshmukhi
3. Role of Kamavisdar in Maratha revenue administration.
4. Execution of Shambhuji by Mughal Army.
5. Battle of Panipat fought in 1761.

## VII. Answer the following.

1. Examine the essential features of Maratha administration under Shivaji.

## VIII. HOTs

1. Compare the revenue administration of the Peshwas with that of Shivaji.

## IX. Map

1. Maratha Empire with prominent cities and forts.

## X. Student Activity

1. **Match the responsibilities of Ashtapradhan**

| A | | B |
|---|---|---|
| Amatya | - | Foreign Minister |
| Waqia – Navis | - | Commander-in-Chief |
| Sumant | - | Finance Minister |
| Senapati | - | Interior Minister |

2. **Group Activity**

Collect information about the Thanjavur Marathas with special reference to their contribution to education, art and architecture.



7th Social Science_Term I English Unit 03.indd 132 09-07-2022 14:30:56

ICT CORNER

# Explore 'The Marathas'

**Lets' Explore, Quiz and 'Play'**



**PROCEDURE :**

**Step 1:** Type the URL https://www.marathaempire.in/ or scan the QR code to open the website.

**Step-2:** You can explore the timeline, historical locations, and map. Animations, Photo gallery of the forts of Maratha Empire.

**Step-3:** You can take self-evaluation through 'Quiz Me Now' in this website.

**Step-4:** You can play 'Square Me' in this website by using the instructions given there.



Step 1



Step 2



Step 3

**The Marathas URL:**

https://www.marathaempire.in/

*Pictures are indicative only

*If browser requires, allow Flash Player or Java Script to load the page.



7th Social Science_Term I English Unit 03.indd 133 09-07-2022 14:30:56

www.tnschoolbooks.in

# GEOGRAPHY



7th Social Science_Term_II_Geography_ Unit_1.indd 134 20/06/2023 18:19:47

# Unit -I

# Resources



## Learning Objectives

- To know the importance of resources
- To describe the renewable resources
- To understand the non-renewable resources
- To identify the fossil fuel resources

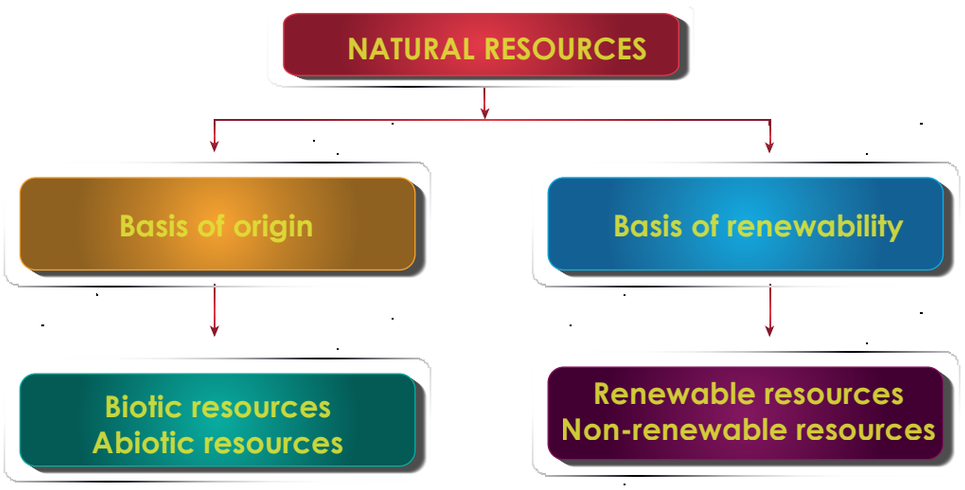
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## Introduction

A country's socio, economic and political strength lies in the distribution, utilization and conservation of its resources. Anything which can be used for satisfying the human needs are called resource. Natural resources are resources that exist without action of humankind. Natural resources are obtained from environment. Many natural resources are essential for human survival. Resources always cannot be consumed in its original form, but they can be processed into usable commodities and usable things.

## Importance of resource

- Natural resources satisfy are daily needs such as food, clothing and shelter.
- Natural resources also contribute immensely to boost up a nation's economy.



On the basis of origin, resources may be divided into two types. They are:

1. Biotic resources
2. Abiotic resources

## 1. Biotic resources

Biotic resources are found in the biosphere which are obtained from living and organic materials. It includes forests, crops, birds, animals, fishes, man and materials that can be obtained from them. Fossil fuels such as coal and petroleum are also included in this category because they are formed from decayed organic matter.

## 2. Abiotic resources

Abiotic resources are the non-living parts of an environment. Examples of abiotic resources include land, water, air, sunlight and heavy metals including ores such as gold, iron, copper, silver etc.

On the basis of renewability, resources are divided into two types. They are:

1. Renewable resources
2. Non - renewable resources

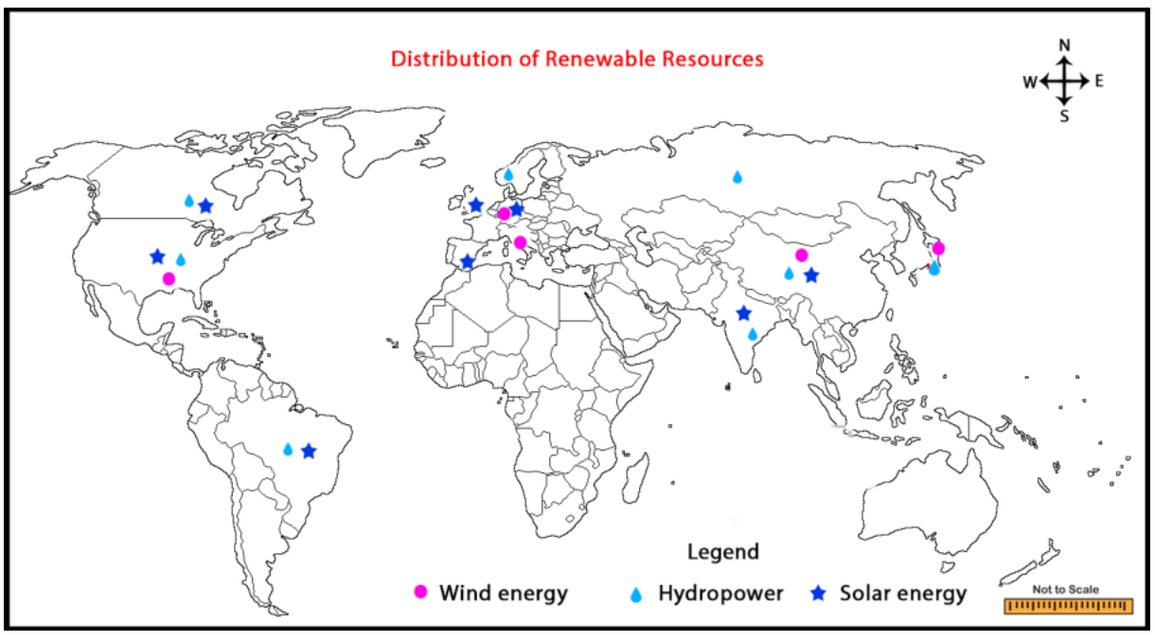
## 1. Renewable resources

A renewable resource is a resource which can be used repeatedly and replaced naturally. Renewable resources harvested and used rationally will not produce pollution. The use of renewable resources and energy sources is increasing worldwide.

**Example:** solar energy, wind energy, and hydropower.

## Solar energy

The sun produces energy in the form of heat and light. Solar energy is not harmful to the environment. Photovoltaic devices or solar cells, directly convert solar energy into electricity. Individual solar cell in group panel can perform small applications from charging calculator, watch batteries, to large such as to power residential dwellings. Photovoltaic power plants and concentrating solar power plants are the largest solar applications covering acres. India, China, Japan, Italy and United States of America are major utilizers of solar energy in the world.



DO YOU KNOW?

Kamuthi solar power project is one of the largest solar power projects in the world. It is situated in Ramanathapuram District in Tamilnadu. The Kamuthi solar power project was completed on 21st September 2016. Investment of this project is around 4,550 Crores. The installed capacity of this project is 648 MW.



Kamuthi solar power plant

## Wind energy

Wind power is clean energy since wind turbines does not produce any emissions. In recent years, most used wind energy has become one of the most economical and renewable energy technologies. The Classic Dutch windmill harnessed the wind's energy hundreds of years ago. Modern wind turbines with three blades dot the landscape today, turning wind into electricity. Major wind energy producing countries are United States, China, Germany, Spain, India, United Kingdom, Canada and Brazil.



Wind mill

## Major wind farms in India

| S. No. | Wind Forms | District | State | Installed Capacity (MW) |
|---|---|---|---|---|
| 1. | Muppandal | Kanyakumari | Tamil Nadu | 1,500 |
| 2. | Jaisalmer | Jaisalmer | Rajasthan | 1,064 |
| 3. | Brahmanvel | Dhule | Maharashtra | 528 |
| 4. | Dhalgaon | Sangli | Maharashtra | 278 |
| 5. | Damanjodi | Damanjodi | Odisha | 99 |

## Hydropower

Water is considered as a great source of energy. At present, water is used for producing hydroelectric power. Hydroelectricity is generated from moving water with high velocity and great falls with the help of turbines and dynamos. Hydroelectricity power is the cheapest and most versatile source of energy out of all the known energy. Hydroelectric power is a renewable resource. China, Canada, Brazil, United States of America, Russia, India, Norway and Japan are some countries producing hydroelectricity. China is the largest producer of hydro-electricity.



Itaipu Dam, Brazil and Paraguay

| Hydro - electric power project in India | | | |
|---|---|---|---|
| **S. No.** | **Hydro - electricity project** | **Installed Capacity (MW)** | **State** |
| 1. | Tehri Dam | 2,400 | Uttarakhand |
| 2. | Srisailam Dam | 1,670 | Telangana |
| 3. | Nagarjuna Sagar Dam | 960 | Andhra Pradesh |
| 4. | Sardar Sarovar Dam | 1,450 | Gujarat |
| 5. | Bhakra Nangal Dam | 1,325 | Punjab |
| 6. | Koyna Dam | 1,960 | Maharashtra |
| 7. | Mettur dam | 120 | Tamil Nadu |
| 8. | Idukki dam | 780 | Kerala |

| Hydro - electric power project in World | | | | |
|---|---|---|---|---|
| **S.No.** | **Name of the Project** | **Country** | **River** | **Installed Capacity in MW** |
| 1. | Three gorges Dam | China | Yangtze | 22,500 |
| 2. | Itaipu Dam | Brazil and Paraguay | Parana | 14,000 |
| 3. | Xiluodu Dam | China | Jinsha | 13,860 |
| 4. | Guri Dam | Venezuela | Caroni | 10,235 |
| 5. | Tucurui Dam | Brazil | Tocantins | 8,370 |




Three Gorges Dam in China is the largest hydroelectricity project in the world. It's construction started in 1994 and ended in 2012. The installed capacity of the dam is 22,000MW.



Three Gorges Dam, China

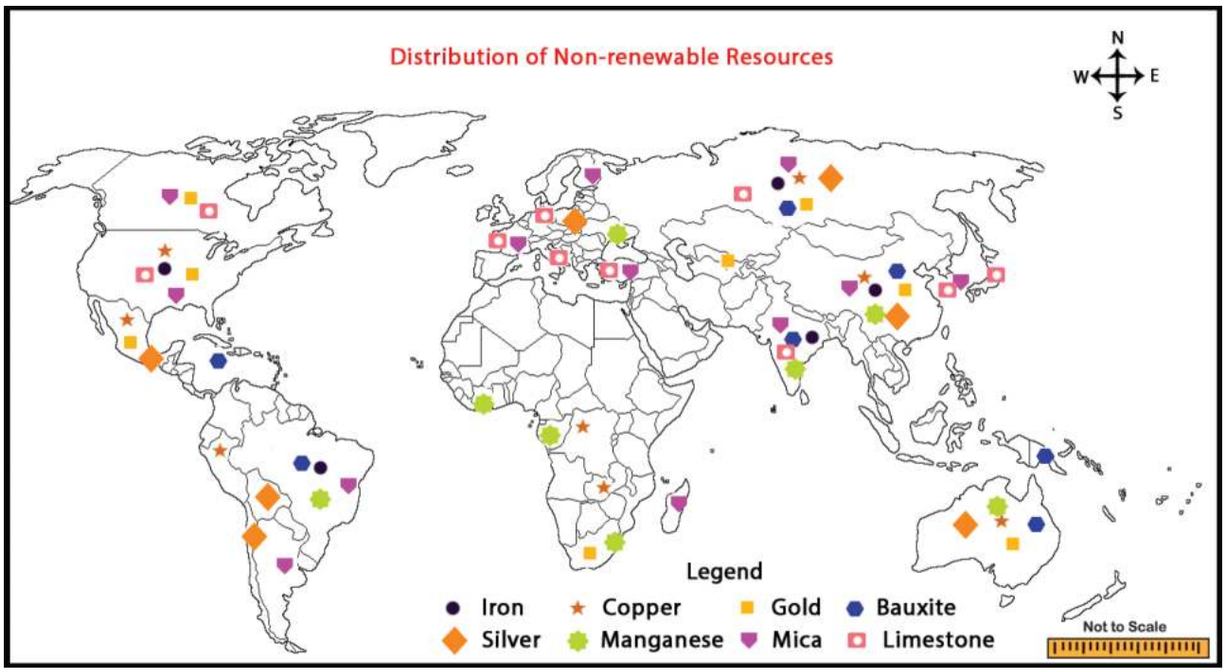
## Non-renewable resources

Natural resources that once consumed and cannot be replaced is called non-renewable resources. Continuous consumption of non-renewable resources ultimately leads to exhaustion. Examples of non-renewable resources include fossil fuels such as coal, petroleum, natural gas and mineral resources such as iron, copper, bauxite, gold, silver and others. Non-renewable resources can be divided into three types. They are:

- ❖ Metallic resources
- ❖ Non - Metallic resources
- ❖ Fossil fuel resources



7th Social Science_Term_II_Geography_ Unit_1.indd 138 20/06/2023 18:19:50




## Metallic resources

Metallic resources are the type of resources that are composed of metals. These are hard substances, which are the good conductors of heat and electricity. Example for metallic resources are iron, copper, gold, bauxite, silver, manganese, etc.

## Iron

Iron is the fourth most common element in the Earth's crust and the most widely available metal. Magnetite and hematite are the common ore for iron, which occurs normally in the rocks of the crust. Iron ore is the key raw material in making steel and 98% of the iron ore extracted is used to make Steel. Pure iron ore is very soft, but its strength is increased many folds by adding small amount of carbon and manganese. It's low cost and high earth strength makes it usable in engineering applications, such as the construction of machinery and machine tools, automobiles, construction of large ships, structural components of building, bridges etc.

Iron ore is mined in about 50 countries. Among the iron ore producing countries China, Australia, Brazil, India and Russia are the principal producers accounting for 85% of the world's total output of iron ore. These countries have 70% of the total reserves of the world. Jharkhand, Odisha, Madhya Pradesh, Chhattisgarh, Karnataka and Goa account for over 95 per cent of the total reserves of India. Iron ores found at Kanjamalai in Tamil Nadu.

## Copper

Copper is one of the first metals known and used by man. Copper ranks as the third most consumed industrial metal in the world after Iron and Aluminium. Copper is good conductor of heat and electricity. About three quarters of copper is used to make electrical wires, telecommunication cables and electronics.

Chile is the world's number one country in the production of copper. Other copper producing countries are Peru, China, United States, Congo and Australia.



7th Social Science_Term_II_Geography_ Unit_1.indd 139 20/06/2023 18:19:50

## Gold

It is a rare and precious metal. Hence, it has high demand in world markets. Formerly, it was used for minting coins, but now it is used for making ornaments and in dentistry. It is regarded as a symbol of prosperity and a form of wealth.

China is the world's largest producer of gold. Also, Australia, Russia, United States, South Africa and Canada are the major producers of gold. Among these countries, Australia has 9500 tons reserves of gold ore and it is world's leading country in gold ore reserves. Karnataka is the largest producer of gold in India.



Kolar Gold Field

## Bauxite

Aluminium is produced from bauxite ore. There are several ores that contain aluminium but bauxite contains more aluminium. Aluminium has wide range of uses compared to other metals. Aluminium is light in weight and its tough and cheaper, which makes it a popular metal for constructional purpose. It is mainly used in the construction of aircrafts, ship, automobiles, railway coaches and etc. Aluminium is a good conductor of electricity and heat, hence, it is used for making electrical cables. It is highly resistant to corrosion. By the addition of small quantities of other metals to aluminium, it creates superior alloy than pure aluminium. **E.g:** Duralumin.

Australia is the world's leading bauxite producer. Apart from that, China, Brazil, India, Guinea, Jamaica and Russia also play an important role in bauxite production. One fourth of the bauxite mineral deposits found in Guinea alone. Odisha, Gujarat, Jharkhand, Maharashtra, Chhattisgarh, Tamil Nadu and Madhya Pradesh are the main bauxite producing states in India. The bauxite deposits are mainly found in the Shervaroy hills of Salem district, Tamil Nadu.

## Silver

Silver is also a precious metal like gold. It has a wider variety of uses than gold. It is used in making jewellery, dentistry, photographic goods, electroplating industry and in the manufacture of luxury goods. About two-third of silver is used for monetary purposes. Like gold, silver also resists corrosion.

Mexico is the world's leading silver producer. Following Mexico, Peru, China, Russia, Australia and Chile produce more silver. More than 50% of silver is found only in South American countries.

## Manganese

Manganese is a steel-greyed, hard, shiny and brittle metal. The common ores of manganese are Pyrolusite Manganese, Psilomelane and Rhodochrosite. Manganese is essential for the production of good quality Steel. Manganese is used in making electrical batteries. It is also used as colouring material in bricks, pottery, floor tiles. Manganese compounds are used in making disinfecting liquids, bleaching powder, fertilizers etc.



7th Social Science_Term_II_Geography_ Unit_1.indd 140 20/06/2023 18:19:50

South Africa is the world's leading producer of manganese. The significant producers of manganese in the world are China, Australia, Gabon, Brazil and India. All these producers have large reserves of manganese and are significant exporters in the world.

## Non-metallic resources

Non-metallic resources can be described as the resources that do not comprise of metals. These are not hard substances, and they are not good conductors of heat and electricity. Example for non-metallic resources are mica, limestone, gypsum, dolomite, phosphate, etc.

## Mica

Muscovite and Biotite are the common ores of Mica. It is one of the indispensable minerals that is used in electrical and electronics industry. It is used as an insulating material in electrical industry and in powder form, it is used for making lubricating oils and decorative wallpapers.

China is the world's top producer of mica. Russia, Finland, United States, Turkey and Republic of Korea also play a major role in the production of mica. About 95 per cent of India's mica is found in just three states of Andhra Pradesh, Rajasthan and Jharkhand.

## Limestone

Limestone is a sedimentary rock, composed mainly by skeletal fragments of marine organisms such as coral, foraminifera and molluscs. About 10% of sedimentary rocks are limestones. Mostly limestone is made into crushed stone and used as a construction material. It is used for facing stone, floor tiles, stair treads, windows sills and many other purposes. Crushed limestone is used in smelting and other metal refining process. Portland cement is made from limestone.

China produces more than half of limestone production in the world. Beside this, United States, India, Russia, Brazil and Japan also produce more Limestone. Madhya Pradesh, Rajasthan, Andhra Pradesh, Gujarat, Chhattisgarh and Tamil Nadu Produce over three-fourths of the total limestone of India. In Tamil Nadu, Large scale limestone reserve found in Ramanathapuram, Tirunelveli, Ariyalur, Salem, Coimbatore and Madurai districts.

## Fossil fuel resources

Fossil fuel resources are normally formed from the remains of dead plants and animals. They are often referred to as fossil fuels and are formed from hydrocarbon. When fossil fuels are burned, they become a great source of heat energy. Example for fossil fuel resources are coal, petroleum and natural gas.

## Coal

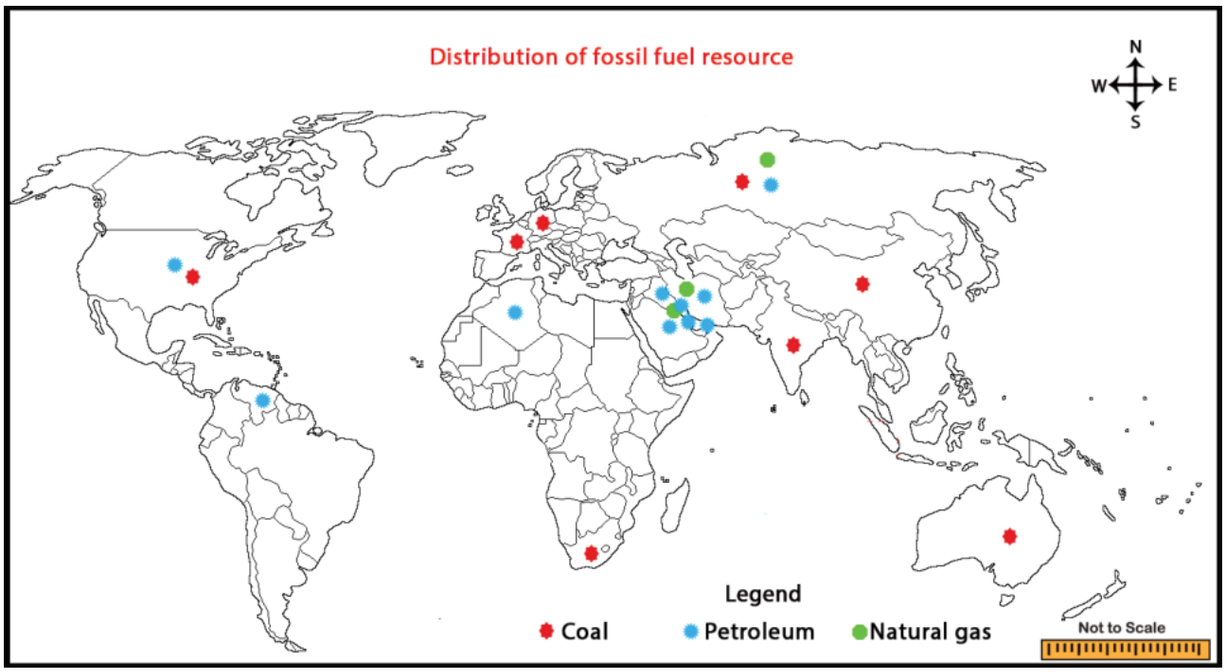
This is the most abundantly found fossil fuel that forms when dead plant matter is converted into peat. It is used as a domestic fuel, in industries such as iron and steel, steam engines to generate electricity. Electricity produced from coal is called Thermal Power. Coal is classified into four types based on carbon content. They are:

1. Anthracite
2. Bituminous
3. Lignite
4. Peat.

The leading coal producers of the world is China. Beside this, India, USA, Australia, Indonesia and Russia also produce more coal. The coal producing areas of India are Raniganj in West Bengal, Neyveli in Tamil Nadu, Jharia, Dhanbad, and Bokaro in Jharkhand.



7th Social Science_Term_II_Geography_ Unit_1.indd 141 20/06/2023 18:19:50






Neyveli coal field




Most of the coal deposits that we use now, were formed about 300 million years ago. Much of the earth was covered with steamy swamps. As the plants and trees are dead, their remains were buried underneath the swamps. Eventually, they were transformed into coal beneath the ground due to excessive heat and pressure.

## Petroleum

Petroleum is found between the layers of rocks and is drilled from oil fields located in Offshore and coastal areas. This is sent to refineries which process crude oil and produce variety of products like diesel, petrol, kerosene, wax, plastics and lubricants. Petroleum and its derivatives are called **Black Gold** as they are very valuable.

The chief petroleum producing countries are Saudi Arabia, Iran, Iraq and Qatar. The other major producers are USA, Russia, Venezuela, Kuwait, UAE and Algeria. The leading producers in India are Digboi in Assam, Bombay High in Mumbai and the deltas of Krishna and Godavari rivers.



Bombay High oil field

## Natural gas

Natural gas is found with petroleum deposits and is released when crude oil is brought to the surface. It can be used as a domestic and industrial fuel.

More than 50% of the global natural gas reserves are found in United States of America, Russia, Iran and Qatar.

In India, Krishna and Godavari Delta, Assam, Gujarat and some areas of offshore in Mumbai have natural gas resources.

## Wrap up

- Natural resources are obtained from environment.
- Renewable resources can be used repeatedly and replaced naturally.
- Non-renewable resources once consumed, cannot be replaced.
- Solar energy is not harmful to the environment.
- Hydroelectricity is generated from moving water with high velocity and great falls with the help of a turbines and dynamos.
- Metallic resources are iron, copper, gold, bauxite, silver, manganese etc.
- Non-metallic resources are mica, limestone, gypsum, dolomite, phosphate, etc.
- Fossil fuels resources are normally formed from the remains of dead plants and animals.

| Glossary | | | |
|---|---|---|---|
| 1. | Biotic resources | obtained from living and organic materials | உயிரியல் வளங்கள் |
| 2. | Abiotic resources | obtained from non-living, non-organic materials | உயிரற்ற வளங்கள் |
| 3. | Hydroelectricity | generated from moving water with high velocity and great falls with the help of turbines and dynamos | நீர் மின் சக்தி |
| 4. | Metallic resources | resources that are composed of metals | உலோக வளங்கள் |
| 5. | Non-metallic resources | resources that do not comprise of metals | உலோகம் அல்லாத வளங்கள் |
| 6. | Duralumin | a hard, light alloy of aluminium with copper and other elements | துராலுமின் |
| 7. | Fossil fuel | formed from the remains of dead plants and animals | படிம எரிபொருள் |
| 8. | Thermal Power | Electricity produced from coal | அனல் மின் சக்தி |
| 9. | Black Gold | Petroleum and its derivatives | கருப்புத் தங்கம் |
| 10. | Precious metal | a metal that is valuable and usually rare | விலை மதிப்பற்ற உலோகம் |



7th Social Science_Term_II_Geography_ Unit_1.indd 143 20/06/2023 18:19:51

## Evaluation

### I. Choose the correct answer

1. Which one of the following is renewable resource?

   a) Gold b) Iron
   c) Petrol d) solar energy

2. At wichthe largest solar power project situated in India?

   a) Kamuthi b) Aralvaimozhi
   c) Muppandal d) Neyveli

3. Which is one of the first metals known and used by man?

   a) Iron b) copper
   c) Gold d) Silver

4. ----------is one of the indispensable minerals used in electrical and electronics Industry.

   a) Limestone b) Mica
   c) Manganese d) Silver

5. Electricity produced from coal is called----------

   a) Thermal Power b) Nuclear power
   c) Solar power d) Hydel power

### II. Fill in the blanks

1. ---------- is the largest producer of hydro-electricity.
2. Iron ores are found at ---------- in Tamil Nadu.
3. ---------- is produced from bauxite ore.
4. ----------is used in making electrical batteries.
5. Petroleum and its derivatives are called----------.

### III. Match the following

| | | |
|---|---|---|
| 1. | Renewable resource | - Iron |
| 2. | Metallic resource | - Mica |
| 3. | Non-metallic resource | - Wind energy |
| 4. | Fossil fuel | - Sedimentary rock |
| 5. | Limestone | - Petroleum |

### IV. Consider the following statement and tick (✓) the appropriate answer

**1. Assertion (A) :** Wind power is Clean Energy.

**Reason (R) :** Wind turbines do not produce any emissions

a. A and R are correct and R explains A
b. A and R are correct but R does not explain A
c. A is incorrect but R is correct
d. Both A and R are incorrect

**2. Assertion (A) :** Natural gas is found with petroleum deposits.

**Reason (R) :** It can be used as a domestic and industrial fuel.

a. A and R are correct and R explains A
b. A and R are correct but R does not explain A
c. A is incorrect but R is correct
d. Both A and R are incorrect

### V. Answer the following

1. Define - Resource.
2. What are the uses of iron?
3. What are the major utilizers of solar energy in the world?
4. Name the types of coal based on carbon content.
5. Give a short note on Duralumin.

### VI. Distinguish the following

1. Biotic resources and abiotic resources
2. Renewable resources and non-renewable resources
3. Metallic resources and non-metallic resources



7th Social Science_Term_II_Geography_ Unit_1.indd 144 20/06/2023 18:19:51

## VII. Give reason

1. Aluminium has wide range of uses compared to other metals.
2. Water is considered as a great source of energy.

## VIII. Answer in a paragraph

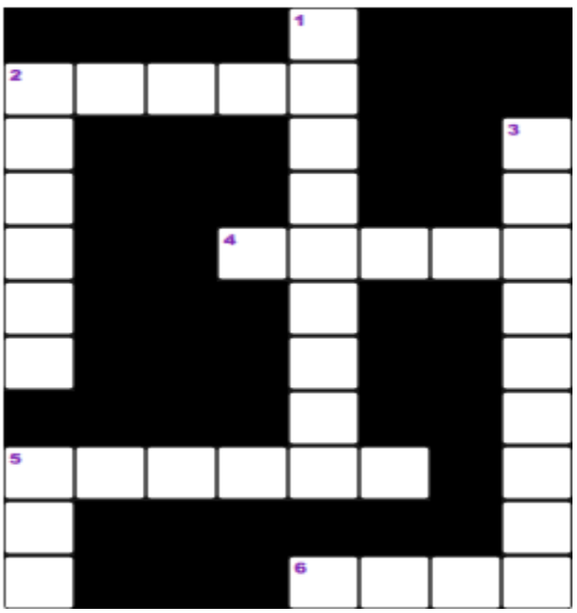
1. Explain the different types of renewable resources.
2. Describe the non-metallic resources.
3. What are the different types of fossil fuel resources? Explain them.

## IX. Activity

1. Mark the metallic resources on the given outline map of the world.



2. Crossword puzzle




**Across**

2. The leading coal producers of the world
4. Considered as a great source of energy
5. Precious metal like gold
6. Used as an insulating material in electrical industry

**Down**

1. Used in making electrical batteries
2. Good conductor of heat and electricity
3. The largest producer of gold in India
5. Produces energy in the form of heat and light

## References

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7th Social Science_Term_II_Geography_ Unit_1.indd 145 20/06/2023 18:19:51

# Unit -II

# Tourism



## Learning Objectives

- Define the concept of tourism
- Appreciate the basic and geographical components of tourism
- Understand the types of tourism
- Identify the places of tourist attraction in India
- Explain the places of tourist attraction in Tamil Nadu

4R12K

## Introduction

The word tourist was derived from an old English word "tourian" which refers to a person who travels out of his usual environment for not more than one year and less than 24 hours. The purpose of travel may be religious, recreation, business, historical and cultural.

## The Basic components of Tourism

Tourism has become an important source of income for many regions and even for the entire countries of the world. Tourism is an essential part of the life of the society because of its direct impact on social, cultural, educational and economic sector of the nation and on their international relations too.

The three main components of tourism are

- Attraction
- Accessibility
- Amenities.

These three components are together known as A3 concept.

## Attractions

Attractions mainly comprise of two types such as:

- Natural attraction
- Cultural attraction

**Natural attraction** includes landscape, seascape, beaches, climatic condition and forests. **Cultural attraction** are historic monuments and other intellectual creations. Apart from this, cultural attractions also includes fairs and festivals.



7th Social Science_Term_II_Geography_ Unit_2.indd 146 27/06/2023 12:50:40

## Accessibility

Accessibility means reachability to a particular place of attraction through various means of transportation such as road, rail, water and air. Transport decides the cost of travel and the time consumed in reaching or accessing a specific attraction.

## Amenities

Amenities are the facilities that cater to the needs of a tourist.

1. Accommodations in terms of hotels, restaurants, cafes and other staying units.
2. Travel organizers, Tour operators and Travel Agents
3. Foreign exchange centres, passport and visa agencies
4. Sectors related to Travel Insurance, Safety and Security

## Types of Tourism

From the ancient times, travel is a fascination for mankind. Tourism can be divided on the basis of nature, utility, time and distance as indicated below.

- Religious tourism
- Cultural tourism
- Historical tourism
- Eco-Tourism
- Adventure tourism
- Recreational tourism

## Religious Tourism

Religious tourism is one of the oldest type of tourism, wherein people travel individually or in groups for pilgrimage to a religious location such as temples, churches, mosques and other religious places. Religious tour to Kasi (Varanasi) by Hindus, to Jerusalem by Christians and to Mecca by Muslims are few of the examples for religious tourism.

## Historical Tourism

It focuses on visiting historically important places like museums, monuments, archaeological areas, forts, temples and so on. Angkorwat of Cambodia, Tajmahal of India and Pyramids of Egypt are some of the examples to quote for Historical Tourism.

## Eco-Tourism

Eco tourism typically involves travel to destinations where plants and animals thrive in a naturally preserved environment. Amazon rain forest, African forest safari, trekking in the slopes of Himalayas are the famous incredible Eco friendly attractions.




Gastronomy refers to an aspect of **cultural tourism.**

## Adventure Tourism

Adventure tourism is a type of tourism involving travel to remote or exotic places in order to take part in physically challenging outdoor activities. For e.g. sky dive in Australia, Bungee jumping in New Zealand, mountaineering in the peaks of Himalayas, rafting in the Brahmaputra River at Arunachala Pradesh.

## Recreational Tourism

This type of tourism aims at enjoyment, amusement or pleasure are mainly for 'fun activity'. Waterfalls, hill stations, beaches, and amusement parks are the attractive spots for recreational tourism.



7th Social Science_Term_II_Geography_ Unit_2.indd 147 27/06/2023 12:50:40

Apart from this, there are certain modern types of tourism, which got developed in recent years.

**They are**

- ❖ Annual Holiday tourism
- ❖ Industrial Tourism
- ❖ Seasonal Tourism
- ❖ International Tourism
- ❖ Group Tourism
- ❖ Sports Tourism
- ❖ Health Tourism
- ❖ Farm and Rural Tourism.

**Inbound Tourism:** Touring within the native country.

**Outbound Tourism:** Touring in foreign countries

## International Tourism

International tourism is undertaken to visit the places of international importance and to gather knowledge about international culture and customs. For this, there are certain travel forms and formalities to be fulfilled by the tourists, such as passport, Visa, Foreign Currency, Air ticket, Travel insurance, and other immigration details.



Singapore

VISA – A document issued to a person (or) a stamp marked on the passport of a person who wants to visit other country.

Tourist VISA - Recreation sight seeing

Student VISA – Higher education

Employment VISA – Work in a country

Medical VISA – Medical treatment in a reputed hospital of a country

## Basic Elements of Tourism attractions

Certain elements are fundamental to attract tourists as travel destinations. They are

- ❖ Pleasant weather
- ❖ Scenic beauty
- ❖ Historical and cultural monuments

## Geographical Components of Tourism

**1. Landforms** : Mountains, Plateaus, Canyons, Valleys, Caves, Cirques, Sand dunes, Coral reefs, Cliffs, etc.,

**2. Water** : Rivers, Lakes, Waterfalls, Hot springs and Geysers, Snow and Glacier, Water Currents, Tides and Waves.

**3.Vegetation :** Forest, Grasslands, Moors, Deserts etc.,

**4.Climate:** Sunshine, Clouds, Admirable Temperature, Rain and Snow.

**5.Animal life:-**

(a) Wildlife : Birds, Game Reserves, Zoos.

(b) Hunting and Fishing

**6. Settlement features:-**

(a) Towns, Cities, Villages

(b) Historical remains and Monuments



7th Social Science_Term_II_Geography_ Unit_2.indd 148 27/06/2023 12:50:42

**7. Culture:-**

Ways of life, traditions, folklore, arts and crafts.




**Game Reserves:** An area of land set aside for the protection of wild animals.

## Tourism Attractions in India

India is a country known for its gentle hospitality with spicy food and culture. Visitor friendly traditions with varied life style, culture, heritage, colourful fairs and festivals are abiding attractions for the tourists. All types of land form, varied climate, rich resources for eco and adventure tourism are the versatile speciality of India. Technological parks and science museums, pilgrimage centers with wonderful art and architecture are an added advantage for tourists. Yoga, Ayurveda and Natural remedial Health resorts attract tourists from all over the world.

## Religious Tourism

India being a multi-religious country, religious tourism is the most popular type of tourism. Various package tours are organized for the people to attend the religious rituals and to visit places of religious importance. Most famous religious spots of India are as follows:

| | |
|---|---|
| Rameswaram | - Tamil Nadu |
| Kanchipuram | - Tamil Nadu |
| Varanasi(Kasi) | - Uttarpradesh |
| Saranath | - Uttarpradesh |
| Vaishnavadevi temple | - Jammu & Kashmir |
| St. Francis Xavier Cathedral | - Goa |
| Amritsar | - Punjab |
| Monasteries of Ladakh | - Jammu & Kashmir |

Scenic attraction is a very important factor in tourism. Scenery consisting of Mountains, Lakes, Waterfall, Glacier, Forests, and Deserts are the major features attracting people to visit them. India is blessed with nature and gifted with immense beauty from rolling hills to deep valley and snow covered mountains to lush green carpet.

## Hill Stations in India

The Indian sub continent has seven principal mountains ranges and the largest of all is the Himalayas that lie in the northern part of India. Most of the Himalayan hill stations in India are located in states of Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, West Bengal, Arunachal Pradesh, Nagaland and Meghalaya. Maharashtra, Karnataka, Tamil Nadu and Kerala have hill stations in the Western Ghats. Andhra Pradesh, Odisha have hill stations in the Eastern Ghats.



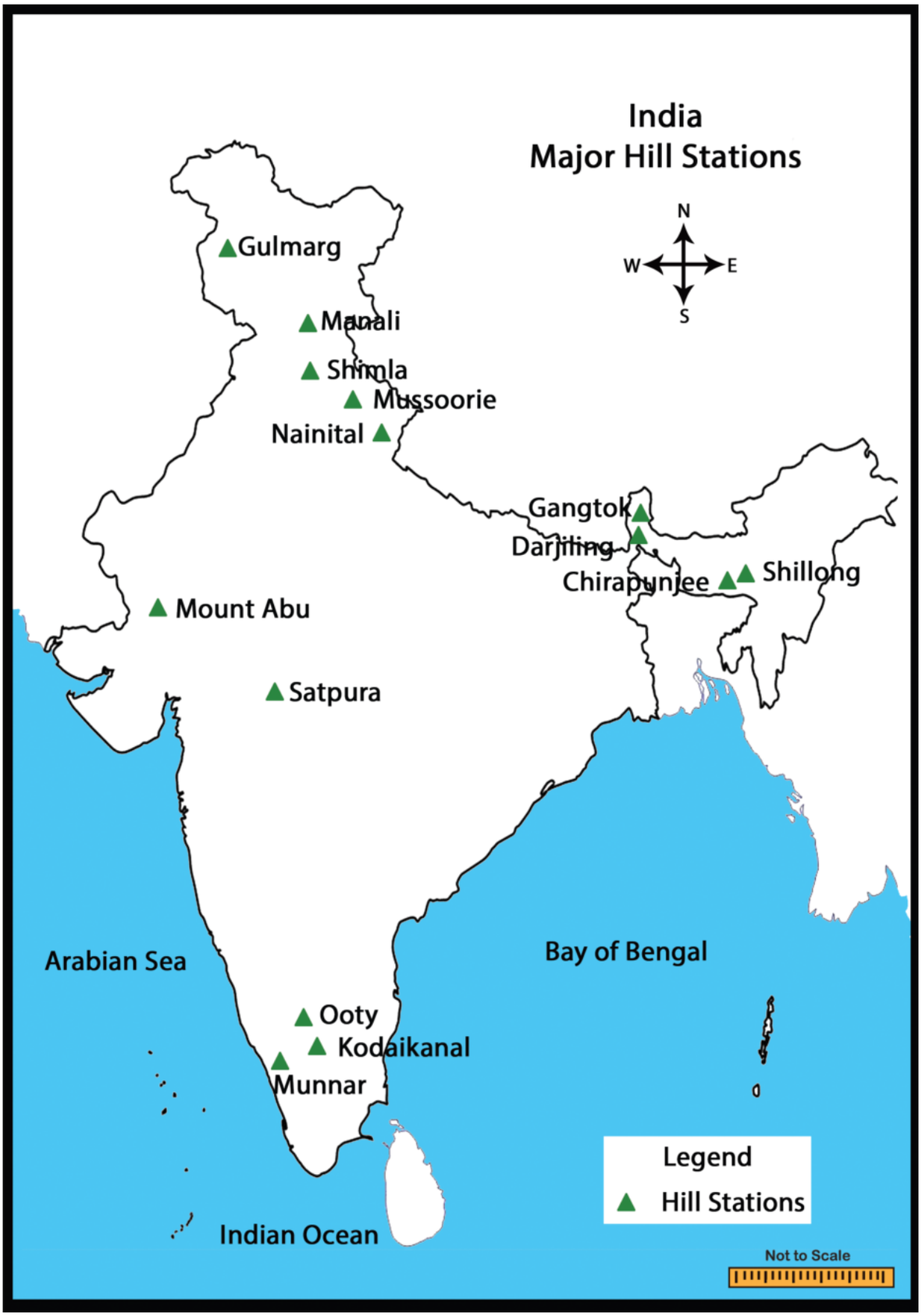
Kodaikanal Hill Station

## The beautiful hill stations in India

| | | |
|---|---|---|
| Kodaikanal, Ooty | - | Tamil Nadu |
| Nainital, Mussoorie | - | Uttarakhand |
| Darjeeling | - | West Bengal |
| Gulmarg | - | Jammu & Kashmir |
| Shillong | - | Meghalaya |
| Shimla, Manali | - | Himachal pradesh |
| Munnar | - | Kerala |
| Gangtok | - | Sikkim |



7th Social Science_Term_II_Geography_ Unit_2.indd 149 27/06/2023 12:50:42






7th Social Science_Term_II_Geography_ Unit_2.indd 150 27/06/2023 12:50:43

DO YOU KNOW?

| | | |
|---|---|---|
| ITC | – | Inclusive Tour Charter |
| IATA | – | International Air Transport Association |
| IATO | – | Indian Association of Tour Operators |
| TAAI | - | Travel Agents Association of India |
| TTTHA | - | Tamil Nadu Tour Travel and Hospitality Association |
| TTDC | – | Tamil Nadu Tourism Development Corporation |

## Water falls in India

In India there are many spectacular and wonderful waterfalls covered by dense forest, huge walls of rock and lush green trees. Among these waterfalls, some are seasonal, while some are perennial. Few of the amazing waterfalls are in swing during the monsoon season. This season brings lot of tourists to these bubbling waterfall sites. Notable waterfalls of India are given below:



Jog Falls

| S.No. | Water falls | Geographical location |
|---|---|---|
| 1. | Thalaiyar waterfalls | Horse tail type located in Dindugul district of Tamil Nadu |
| 2. | Jog water falls | Segmented waterfall (Raja, Rani and thunder) located in Shimogo district of Karnataka. |
| 3. | Nohkalikai waterfalls | Tallest plunge type of waterfall situated in the East khasi hill district of Meghalaya. |
| 4. | Talakona waterfalls | It is the highest waterfall in Andhra Pradesh. A lot of medicinal herbs are seen around the region. |
| 5. | Aathirappally waterfalls | The Niagara of India, is located in Thrissur district of Kerala. |

## Wild life and Bird Sanctuaries

India possesses a wide range of forests and grasslands. Diversity of these lands makes it one of the hotspot for flora and fauna. The dense and dark forest of Indian States provides suitable habitat for a wide and an unique variety of animals and birds. Royal Bengal Tigers, Indian Lions, Elephants, Rhinoceros, Indian leopard and Reptiles are the major tourist attractions. Bird sanctuaries attract



7th Social Science_Term_II_Geography_ Unit_2.indd 151 27/06/2023 12:50:45

attention for their exclusive variety of birds. Diverse range of climate of India invite birds from remote places to feed, breed and to nurture their young ones in the Indian bird sanctuaries.



Kaziranga National Park

DO YOU KNOW?

Push factors in Tourism are Prestige

Pull factors in Tourism are Amenities.

0IU3A

## Wildlife Sanctuaries in India

| S.No. | Wildlife sanctuary | State | Animals |
|---|---|---|---|
| 1. | Mudumalai wildlife sanctuary | Tamil Nadu | Tiger, Elephant , Bison, Deer |
| 2. | Kaziranga National Park | Assam | Tiger, Deer, Buffalo |
| 3. | Ranthambor National Park | Rajasthan | Tiger |
| 4. | Kanha National Park | Madhya Pradesh | Swamp Deer |
| 5. | Sundarbans National Park | West Bengal | Bengal Tiger |
| 6. | Gir National Park | Gujarat | Lions |
| 7. | Bhadra Wildlife Sanctuary | Karnataka | Bison, Leopard, Gaur |
| 8. | Periyar National Park | Kerala | Elephant, Deer |
| 9. | Corbett National Park | Uttarakhand | Tiger |

## Bird Sanctuaries in India

| S.No. | Bird Sanctuary | State |
|---|---|---|
| 1. | Koonthankulam bird sanctuary | Tamil Nadu |
| 2. | Kumarakom bird sanctuary | Kerala |
| 3. | Bharatpur bird sanctuary | Rajasthan |
| 4. | Mayani bird sanctuary | Maharashtra |
| 5. | Uppalapadu bird sanctuary | Andhra pradesh |
| 6. | Nal Sarovar bird sanctuary | Gujarat |
| 7. | Nawabganj bird sanctuary | Uttar Pradesh |



7th Social Science_Term_II_Geography_ Unit_2.indd 152 27/06/2023 12:50:45

## Beaches

India is a country with 7517 km long coastline comprising the most beautiful beaches bounded by Arabian sea and Bay of Bengal. Indian beaches are enriched with diverse coastal land forms filled with aquatic flora and fauna . Lush backwater in the lagoons of Kerala and picturesque beaches of Goa such as calangute, Aguda are the notable tourist destinations for water sports activities. The most charming and enchanting beaches of India are listed below.



Beach in Goa

| S.No. | Beaches | State | Geographical features |
|---|---|---|---|
| 1. | Dhanushkodi | Tamil Nadu | Turquoise blue sea water |
| 2. | Varkala Beach | Kerala | Sea Cliffs for wonderful sunset views |
| 3. | Tarkarli Beach | Maharashtia | Coral reefs and marine adventure |
| 4. | OM Beach | Karnataka | Two semi circular caves that join together forming the inverted symbol of OM |
| 5. | Aguda Beach | Goa | A huge hill dominates the southern side of the beach. |
| 6. | Marari Beach | Kerala | Saddle like rock(Hammock) Beach |

## Tourist Attraction in Tamil Nadu

Tamil Nadu has various tourist attractions like religious centres, spiritual retreat centres, beaches, hill stations, waterfalls, wildlife, art, culture, architecture, crafts, heritage monuments etc. The Government of Tamil Nadu has recognized the importance of tourism long ago and facilitated its development in desired directions. Exploring new avenues like medical tourism and adventure tourism in the past decades have helped Tamil Nadu tourism to achieve more than twenty percent annual growth. Tamil Nadu earns the largest share of income from tourism in India.

## Religious Tourism

Tamil Nadu is a state popularly known as land of Temples and has been the greatest source for spiritual rejunuvation for travellers all over the world. The state is home to around 33,000 ancient temples that mainly belongs to Dravidian style of architecture. Some of the world renowned religious destinations are as follows:



7th Social Science_Term_II_Geography_ Unit_2.indd 153 27/06/2023 12:50:46

- ❖ Thanjavur Big temple
- ❖ Madurai Meenakshi temple
- ❖ Rameswaram Ramanathaswami temple
- ❖ Temples of Kancheepuram
- ❖ Velankanni Madha church
- ❖ Nagore Dargah



Madurai Meenakshi Temple

## Hill Stations in Tamil Nadu

Tamil Nadu being situated in the Southern end of the Western and Eastern Ghats, is the home for several hill stations. Popular among them are Udagamandalam (Ooty), Kodaikanal, Yercaud, Coonoor, Valparai, Yelagiri, Sirumalai, Kalrayan Hills and Palani Hills, Shevroy hills and Cardamom Hills. They are also abodes of thick forest and wild life.

| | | |
|---|---|---|
| Ooty | - | Queen of Hills |
| Yercaud | - | Lake forest (Poor Man's Ooty) |
| Yelagiri | - | 14 hairpin bends |
| Kodaikanal | - | Princess of Hill Stations |
| Kotagiri | - | Green Hills |
| Velliangiri Hills | - | Kailash of the South |
| Kolli Hills | - | motor able terrain with 70 hairpin bends |
| Anaimalai Hills | - | Top slip |
| Meghamalai | - | High wavy mountains |
| Javadi | - | Nature's Heaven |

PKDVZ

## Waterfalls in Tamil Nadu

Mountains and rivers of Tamil Nadu combined together created many endearing waterfalls. Waterfalls in Tamil Nadu with its inspiring natural wonders attracts many tourists. A trek amidst thick green trees, steep hills and a bath in the gushing water is most rejuvenating. Here is the list of famous water falls of Tamil Nadu.

| S.No. | Waterfalls | Geographical location |
|---|---|---|
| 1. | Hogenakal falls | It is a beautiful waterfall located in Dharmapuri district. |
| 2. | Kumbakkarai falls | River Pambar cascades to form this fall at the foot hills of Kodaikanal in Theni district. |
| 3. | Monkey falls | This waterfall lies on Anaimalai hills range in Coimbatore surrounded by Evergreen forests. |
| 4. | Killiyur falls | Situated in the shervarayon hill ranges of the Eastern Ghats. |



7th Social Science_Term_II_Geography_ Unit_2.indd 154 27/06/2023 12:50:49

| | | |
|---|---|---|
| 5. | Courtallam | Courtallam is located in Tenkasi district. It is known for medical spa. |
| 6. | Agaya Gangai | It is a waterfall in Puliacholai on Kolli Hills in Eatern Ghats of Namakkal district. |
| 7. | Suruli Falls | This falls is also called as Cloud Land falls (or) Meghamalai falls. It is located in Theni district. |

## Wildlife and Bird Sanctuaries in Tamil Nadu

Wildlife sanctuary in Tamil Nadu includes Bird sanctuaries and National Parks. Tamil Nadu is also well known for the diverse natural heritage that it possesses. Hence tourists are highly excited about the wildlife tour across the state. The total area of Tamil Nadu is approximately 130,058 sq.km. 17.6% of the land area comprises of thick forests. Visitors will get to watch a smooth blend of wet evergreen forest, dry and wet deciduous forests, grasslands, sholas, mangroves and thorny scrubs. Besides varied natural vegetation, another prized possession of Tamil Nadu is wildlife Sanctuaries including Tiger, Elephant, Deer, Monkey, Bison etc., for protecting the entire flora and fauna. Wildlife Sanctuaries of the state are enlisted below:



Mudumalai Wildlife Sanctuary

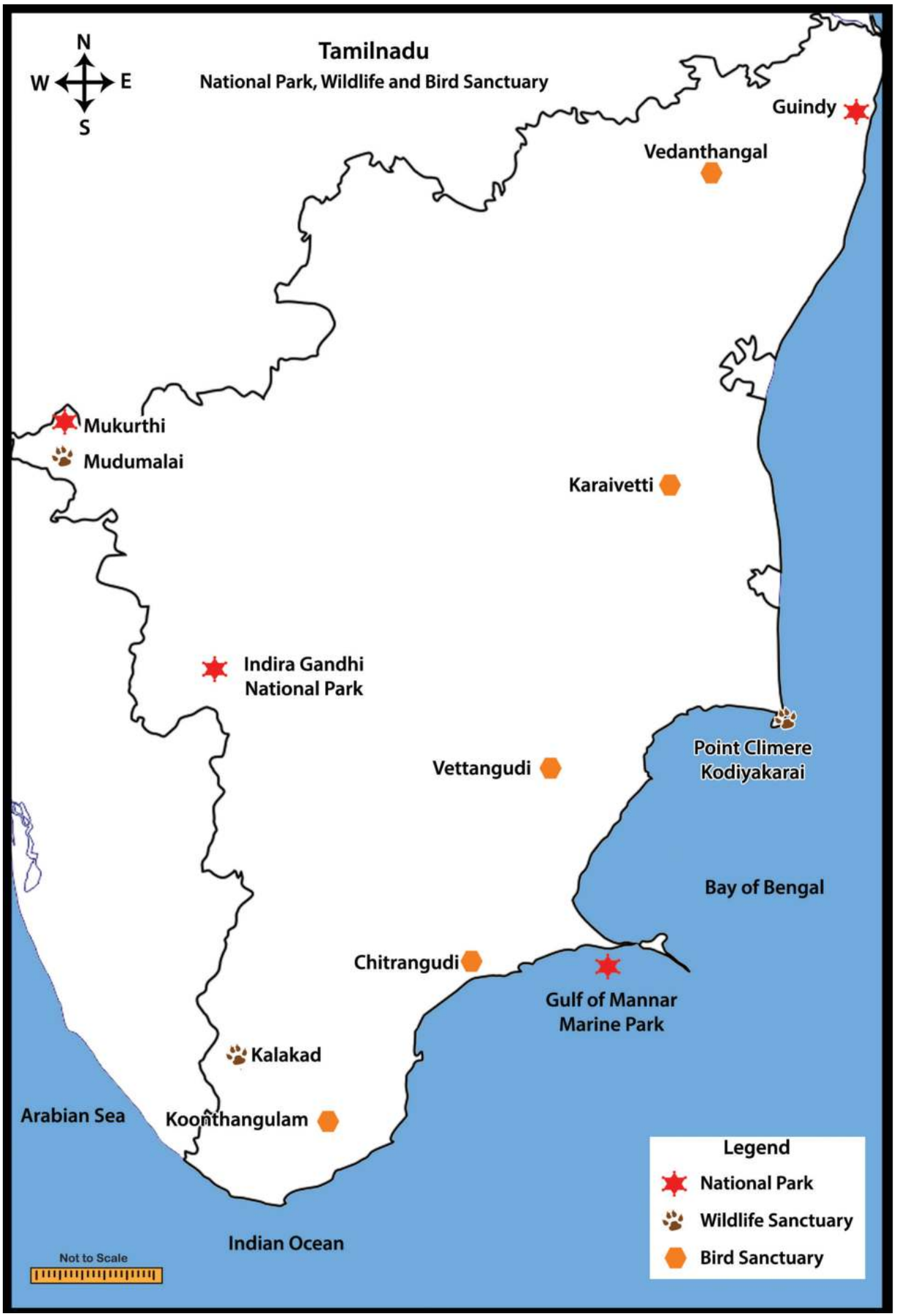
## Wildlife Sanctuaries

| S.No. | Name of Wildlife Sanctuary | District |
|---|---|---|
| 1. | Mudumalai Wildlife Sanctuary | Nilgiris |
| 2. | Mundanthurai Wildlife Sanctuary | Tirunelveli |
| 3. | Point Calimere Wildlife Sanctuary | Nagapattinam |
| 4. | Indira Gandhi Wildlife Sanctuary | Coimbatore |
| 5. | Kalakad Wildlife Sanctuary | Tirunelveli |

## Bird Sanctuaries in Tamil Nadu

| S.No. | Name of Birds Sanctuary | District |
|---|---|---|
| 1. | Vettangudi birds Sanctuary | Sivagangai |
| 2. | Karaivetti birds Sanctuary | Ariyalur |
| 3. | Vellode birds Sanctuary | Erode |
| 4. | Vedanthangal birds Sanctuary | Kancheepuram |


Vedanthangal birds Sanctuary






7th Social Science_Term_II_Geography_ Unit_2.indd 156 27/06/2023 12:50:50

## National Parks in Tamil Nadu

| S.No. | Name of National Parks | District |
|---|---|---|
| 1. | Guindy National Park | Chennai |
| 2. | Gulf of Mannar Marine Park | Ramanathapuram |
| 3. | Indira Gandhi National Park | Coimbatore |
| 4. | Mukurthi National Park | Nilgiris |
| 5. | Mudumalai National Park | Nilgiris |

## Beaches in Tamil Nadu

Tamil Nadu being a Coastal state in India which consists of several beaches. Some of them are world famous tourist spots. Beach is a lovely place to hang around with friends, families and kids. All these are ideal destinations for sun bath relaxation and water sports activities.

| S.No. | Beaches | Geographical features |
|---|---|---|
| 1. | Kovalam Beach Kanchipuram | Small fishing village |
| 2. | Marina Beach Chennai | Second longest urban beach |
| 3. | Kanyakumari Beach | Multi-coloured sand |
| 4. | Rameshwaram Beach | Waveless beach |
| 5. | Elliot Beach Chennai | Beautiful beach active in day & night |
| 6. | Mahabalipuram Beach Kanchipuram | Architectural and Archeological beach |
| 7. | Silver Beach Cuddalore | Water sports is the entertainment |
| 8. | Muttukadu Beach Kanchipuram | Calm and Shallow |



Marina Beach in Chennai

## Environmental Impact of Tourism

The quality of the environment is essential for tourism. The tourism industry created several positive and negative impacts on the environment.

**Positive Impacts**

- Direct financial Contributions
- Contributions to government revenues
- Improved environmental management and planning
- Increasing environmental awareness
- Protection and reservation of environment

**Negative Impacts**

**1. Depletion of Natural Resources**

- Water resources
- Local resources
- Land degradation

**2. Pollution**

- Air and Noise Pollution
- Solid Waste and Litering
- Sewage

**3. Destruction and Alteration of Eco system**

- Air
- Water
- Soil



7th Social Science_Term_II_Geography_ Unit_2.indd 157 27/06/2023 12:50:52

## Wrap up

- The word tourist was derived from an old English word "tourian."
- The basic components of tourism are Attraction, Accessibility and Ameneities.
- Tourism can be divided on the basis of nature, utility, time and distance.
- Geographical component of Tourism are location, climate, settlement and culture.
- Industrialization and urbanization had created great pressure on modern living.
- India is a country known for its gentle (or) hospitality to all visitors.
- The Indian sub-continent has seven principal mountains ranges.
- Scenery consisting of Mountains, Lakes, Waterfalls, Glaciers, Forests, and Deserts.
- The dense and dark forest of Indian states provide home to wild life.
- Tamil Nadu is also well known for the diverse natural heritage that it possesses.

## Glossary

| | | | |
|---|---|---|---|
| 1. | Geyser | a natural hot spring | வெந்நீர் ஊற்று |
| 2. | Accessibility | the quality of being easily to obtain or use | அணுகுமுறை |
| 3. | Amenities | attractiveness of a place | வசதிகள் |
| 4. | Recreation | the feeling of being relaxed | பொழுதுபோக்கு |
| 5. | Amusement park | a large outdoor area with fairground rides, shows and other entertainments | பொழுதுபோக்கு பூங்கா |
| 6. | Bird sanctuary | an area of land in which birds are protected and encouraged to breed | பறவைகள் சரணாலயம் |
| 7. | Wildlife sanctuary | an area which provides protection and favourable living conditions to the wildlife | விலங்குகள் சரணாலயம் |
| 8. | Land degradation | Loss of natural fertility of soil because of loss of nutrients | நில வளம் குறைதல் |



7th Social Science_Term_II_Geography_ Unit_2.indd 158 27/06/2023 12:50:52

## Evaluation

### I. Choose the correct answer

1. The oldest type of tourism is _____
   a) Religious
   b) Historical
   c) Adventure
   d) Recreational

2. In which state is the Kaziranga national park located.
   a) Rajasthan b) West Bengal
   c) Assam d) Gujarat

3. Which one of the following is not a beach of India?
   a) Goa b) cochin
   c) Kovalam d) Miami

4. Which of the following is not a bird sanctuary in India?
   a) Nal sarovor in Gujarat
   b) Koonthakulam in Tamil Nadu
   c) Bharatpur in Rajasthan
   d) Kanha in Madhya pradesh

5. In which district courtallam waterfalls is located?
   a) Dharmapuri b) Tirunelveli
   c) Namakkal d) Theni

### II. Fill in the blanks

1. The three main components of tourism together known as _____.
2. Gastronomy refers to an aspect of _____ tourism.
3. Suruli falls is also called as _____.
4. The second largest urban beach is _____ .
5. Expansion of TAAI _____ .

### III. Circle the Odd one

1. Transport, Attraction, Accommodation, Amenities
2. Nainital, Shillong, Munnar, Digha
3. Corbett, Sunbarbans, periyar,Mayani
4. Hogenakal, Kumbakkari, Suruli, Kalakad
5. Rishikesh, ladakh, Gulmarg, Kotagiri

### IV. Match the following

| | | |
|---|---|---|
| 1. | Anamalai hills | West Bengal |
| 2. | Monkey falls | Goa |
| 3. | Darjeeling | Coimbatore |
| 4. | Nature's Haven | Top slip |
| 5. | Aguda Beach | Javadi |

### V. Consider the following statement and tick (✓) the appropriate answer

**1. Asseration (A) :** Tourism is an essential activity for the life of the society.

**Reason (R) :** Its direct impact on social cultural, education and economic sector of the nation.

a. A and R are correct and A explains R
b. A and R are correct but A does not explain R
c. A is in correct but R is correct
d. Both A and R are in Correct

**2. Assertion (A) :** One of the most popular beaches in Goa Calangute is a treat for the adventure sports activities.

**Reason (R) :** Foreigners throng the beaches

a. A and R are correct and A explain R
b. A and R are correct but A does not explain R



7th Social Science_Term_II_Geography_ Unit_2.indd 159 27/06/2023 12:50:52

c. A is incorrect but R is correct d) Both A and d. R are incorrect

### VI. Answer the following briefly

1. Define Tourism?
2. Write short note on ECO Tourism?
3. What are the basic elements of Tourism?
4. Name any five hill stations in India?
5. Name any five beaches in Tamil Nadu?

### VII. Distinguish between

1. International Tourism and Historical Tourism
2. Religious Tourism and Adventure Tourism
3. Attraction and Accessibility

### VIII. Answer the following questions in detail

1. Explain the Geographical components of Tourism?
2. Write briefly about the waterfalls in Tamil Nadu?
3. Describe the Environment Impact of Tourism?

### IX. Hots

1. Why do we like sightseeing so much?
2. What are the ways to protect the sanctuaries?
3. List any five reasons for travelling?

### X. Activity

- This activity should be done by students under the supervision of the subject teacher.
- The students are grouped with six members in a group.
- Each student will discuss in the group about their last tour. Each group will collect photographs and information.
- The information will be shared in the class as well as displayed on the notice board of the class room.

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7th Social Science_Term_II_Geography_ Unit_2.indd 160 27/06/2023 12:50:52

## ICT CORNER

# Tourism

**Let's go for a tour**




**PROCEDURE :**

**Step 1:** Type the following URL https://www.incredibleindia.org/content/incredibleindia/en.html in the address bar or scan the QR code given in the right side.

**Step 2:** In this site you can experience the Heritage ,spiritual , Adventure,Yoga and wellness, Art ans culture, Food and cuisine, Nature and wildlife and Luxury..

**Step 3:** You can get the list of Popular destinations, Spiritual destinations, Heritage destinations, World Heritage , Buddhism in India and Museums here..

Scan the QR code Given below to download the mobile app of this site…



**Step 1**



**Step 2**



**Step 3**



**Step 4**

**Tourism - Attraction URL:**

URL https://www.incredibleindia.org/content/incredibleindia/en.

*Pictures are indicative only

*If browser requires, allow Flash Player or Java Script to load the page.



7th Social Science_Term_II_Geography_ Unit_2.indd 161 27/06/2023 12:50:53

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# CIVICS



7th Social Science_ Civics_Term II English Unit_1.indd 162 27/06/2023 13:13:23

# Unit -I

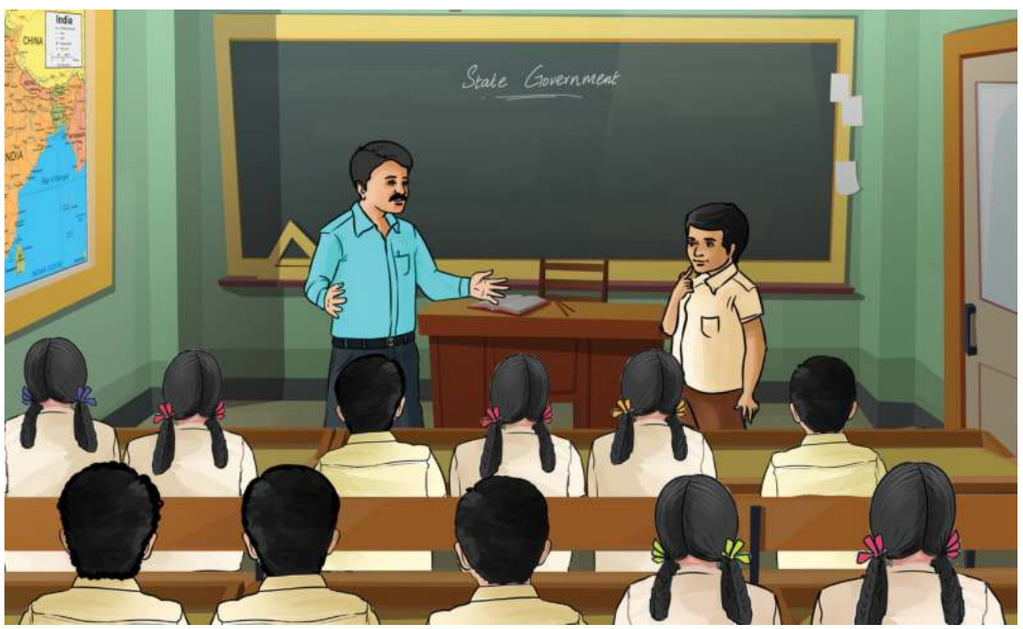
# State Government



## Learning Objectives

- Recognise the difference between Parliament and State Legislature
- Understand the election procedures
- Know the powers and functions of Governor and Chief Minister
- Wonder how the Government works
- Identify the three main organs of the government – the legislative, executive, and judiciary

PZDJR




**Teacher:** Good Morning my dear students.

**Students:** Good morning teacher / sir.

**Teacher:** (after taking attendance) All are present today. Very good. Coming Monday we have a function in our school. All Should be present on that day without fail.



7th Social Science_ Civics_Term II English Unit_1.indd 163 27/06/2023 13:13:23

**Yogitha:** Do we have any cultural programme?

**Teacher:** Yes. We are going to open the new building of our school.

**Students:** Yeah! We are going to a new class room!

**Muthu:** Who will be the Chief guest?

**Teacher:** We have invited our MLA as the chief guest for the opening ceremony.

**Rahim:** MLA. I have heard. But I don't know who is he?

**Teacher:** MLAs are representatives of the people. He is one among us. He is the Member of Legislative Assembly.

**Saran:** What is Legislative Assembly? Will you explain in detail?



**Teacher:** Sure. (showing pictures of fort St. George, Assembly session, Chief Minister and other ministers)

**Meena:** What is that building? Where is it? It looks like a fort.

**Teacher:** Yes. You are correct. It is a fort in Chennai. First English fortress in India. The fort currently houses the Tamil Nadu legislative assembly and Secretariat of Tamilnadu.

Legislative Assembly has the lower house where all the MLAs meet to discuss various matters related to the welfare of the state.

**Kayal:** Who will be there in that Legislative Assembly?

**Teacher:** Listen! India has separate system of administration for the Union, States and Union territories. Do you know how many states and union territories are there in India?

**Ravi:** Shall I tell? 28 states and 8 union territories including our capital territory Delhi? Am I right teacher?

**Teacher:** Exactly. As I said already power is divided between two sets of governments one at the central in Delhi and separate governments for all the states. This is called as federal system.



India is a Parliamentary democratic republic where the President of India is the Head of Indian Union and the Prime Minister and all the Ministers are responsible for smooth running of the government. This is called central government.



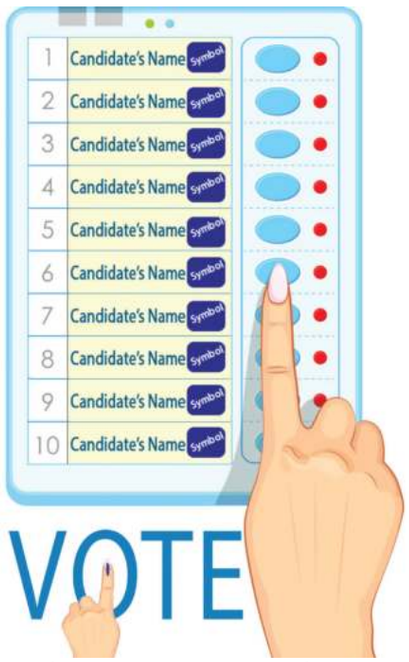
7th Social Science_ Civics_Term II English Unit_1.indd 164 27/06/2023 13:13:23

**Nila:** Do we have a separate government for states?

**Teacher:** Yes. All the states and union territories have separate governments to run its own administration. Governor, Chief Minister and all the ministers constitute the Government. The member of the Parliament is called MP whereas the member of the Legislative Assembly is called MLA. Both the Central and State Governments work according to our constitution.

**John:** Oh! Is MLA going to inaugurate the function? Who appoints him?

**Teacher:** No my child. MLAs are not appointed. They are elected by the people through general election. In the previous lesson we have studied about the political parties. Do you remember? These political parties play a vital role in election. For election, the entire state is divided into several constituencies on the basis of the population. Political parties nominate their candidates to each constituency. All the people residing in that constituency who has completed 18 years of age cast their vote. The candidate who gets the more number of votes is declared as elected and becomes MLA. The Election Commission of India conducts and monitors the elections. After the election the party which gets the more number of MLAs is declared as the majority party. The Governor calls the leader of the majority party to form the state government. In simple words a party whose MLAs has won more than half the number of constituencies in the state are called ruling party and forms the government. And the party which gets the total number of seats next to the majority party, acts as an opposition party in the legislature. But all the MLAs of other political parties who do not belong to the ruling party are called opposition party.



Electronic Voting Machine

**Shanmi:** It's very interesting to hear. Who are all included in the State Government?

**Teacher:** The Governor, the Chief Minister, Council of Ministers. The Governor is appointed by the president of India for the term of five years. The leader of the majority party is appointed as the Chief Minister by the Governor. The Chief minister in consultation with the Governor, constitutes a cabinet which includes members of his party as ministers. The term of the office is five years.

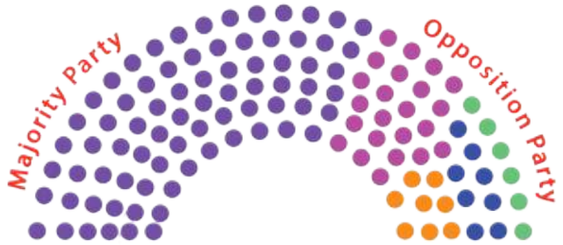
**Laya:** Teacher! Shall I become the Governor? Or Chief Minister?

**Teacher:** Why not? My child! That is very simple. To become a Governor, you



7th Social Science_ Civics_Term II English Unit_1.indd 165 27/06/2023 13:13:25

should be the citizen of India and should have completed 35 years of age and should have sound mind. And should not hold any public office of profit.




To become a Chief Minister, you should have completed 25 years of age and should be an MLA or in case of an MLC should have completed 30 years of age.

**Arya:** Who is an MLC? I never heard.

**Teacher:** Usually a state Legislature has two houses. Upper House and Lower House. This is called Bi-cameral Legislature. Upper House is called Legislative Council. The members are called MLCs and they are not elected directly by the people. The Lower House is called Legislative Assembly. The members are called MLAs. As I said earlier they are directly elected by the people.

In India some of the states have two houses in their state legislature. But in Tamil Nadu we have Lower House only. This is called unicameral Legislature.

**Ammar:** Oh! Now can you please tell me the powers and functions of Governor and Chief Minister?

**Teacher:** Sure. The Governor is an integral part of the State Legislature. Governor is the head of the state executive and he has enormous powers. All the administration is carried on in his name. He is the chancellor of Government universities in the state. All bills become law only after his assent. He appoints important officials of the state government such as advocate General, Chairman and members of State Public Service Commission, State Election Commissioner, Vice chancellors of state universities etc.

The Chief Minister is the real executive head of the state administration. He allocates the portfolios among the ministers. The Council of Ministers are collectively responsible to the State Legislature. All the ministers work as a team under the Chief Minister. The Chief Minister formulates programmes and policies for the welfare of the people of the state. The council of Ministers is collectively responsible to the Legislative Assembly of the state.

The three main organs of government are the legislative, executive and judiciary. The legislative branch makes laws, the executive branch enforces the laws, and the judiciary interprets the laws.

**Nandhu:** Judiciary. Are you saying about the courts teacher?

**Teacher:** Yes. The High courts are the highest judicial organ at the State level. It is an independent



7th Social Science_ Civics_Term II English Unit_1.indd 166 27/06/2023 13:13:25



body. As per the constitution there shall be a High Court in each state. The state high court consists of a Chief Justice and other judges. The number of Judges in the high court is not uniform and fixed. President appoints the Chief Justice and can hold the office until he completes the age of 62 years. Apart from High court there are district courts and tribunals. They ensure justice to the people without any bias. Apart from this, Family Courts are established to settle the disputes relating to marriages and family affairs.

Lok Adalat (people's court) also have been established by the Government of India to settle dispute through conciliation and compromise.

**Children:** This topic is very interesting to hear. Thank you very much teacher.

**Teacher:** Thank you children. A cultural programme is being allotted to our class for the inaugural function. So let us think. We have to practice and perform well.

## Summary

- India is divided into 28 states and 8 Union territories. Each state has a legislative assembly.
- State executive comprises the Governor and the Chief Minister with his Council of Ministers.
- The head of the state is the Governor. And he is appointed by the President for a period of five years. He is an integral part of the State Legislature.
- The real executive power in a state in India vests with the Chief Minister. The leader of the majority party is appointed as Chief Minister.
- The Chief Minister and the Council of Ministers are collectively responsible to the State Legislature.
- The High courts are the highest judicial organ at the state level. State High courts have jurisdiction over the whole state.

| Glossary | | | |
|---|---|---|---|
| 1. | Legislative | law making body | சட்டமன்றம் |
| 2. | Cabinet | the committee of senior ministers | மந்திரிசபை |
| 3. | Executive | administrative | நிர்வாகம் சார்ந்த |
| 4. | Judiciary | a system of courts of law | நீதித்துறை |



7th Social Science_ Civics_Term II English Unit_1.indd 167 27/06/2023 13:13:25

## Evaluation

40ICQE

### I Choose the correct answer

1.What is the minimum age for becoming a member of the State Legislative Council?

a.18 years b. 21 years
c. 25 years d.30 years

2. How many states does India have?

a. 26 b.27 c.28 d.29

3. The word State government refers to

a. Government departments in the states
b. Legislative Assembly
c. both a and b
d. none of the above

4. The overall head of the government in the state is the_____.

a. President b. Prime Minister
c. Governor d. Chief Minister

5. Who appoints the Chief Minister and other Ministers?

a. President b. Prime Minister
c. Governor d. Election Commissioner

6. who becomes the Chief Minister?

a. Leader of the Majority party
b. Leader of the opposition party
c. Both
d. None

7. what are the three branches of the state government?

a. Mayor governor, MLA
b. Panchayat, municipality, corporation
c. Village, City, State
d. Legislative, executive and judiciary

### II Fill in the blanks

1. The Governor is appointed by the _____.
2. The leader of the majority party is appointed as _____in the state assembly.
3. _____is the highest judicial organ of the state.
4. MLA stands for _____.
5. _____ is a particular area form where all the voters living there choose their representatives.
6. The elected representatives who are not the member of ruling party are called_____.

### III. Match the following

| | | |
|---|---|---|
| MLAs | - | Secretariat |
| Governor | - | 8 |
| Chief Minister | - | Head of the state |
| Union territories | - | Legislative Assembly |
| Fort St. George | - | leader of the Majority party |

### IV. Consider the following statements: Tick the appropriate answer

1. Which of the following statement is/are not correct?

To become a governor, one
a. should be the citizen of India
b. should have completed 25 years of age
c. should have sound mind
d. should not hold any office of profit.

i. a&b ii. c&d iii. a iv. b

2. Consider the following statements and state true or false.

a. MLAs are together responsible for the working of the government.



7th Social Science_ Civics_Term II English Unit_1.indd 168 27/06/2023 13:13:25

b. All the MLAs of other political party who do not belong to the ruling party are called opposition.

c. MLAs are not the representatives of people.

3. Find out the correct meaning of bicameral legislature.

a. It means that there are cameras in the legislature.

b. It means that the legislature has men and women members.

c. It means that there are two houses like upper house and lower house.

d. It means that the governor is the leader over the members of the legislature.

4. **Assertion:** India has a federal system of government.

**Reason:** According to our constitution the power is divided between central and state governments.

a. A is correct and R explains A

b. A is correct and R does not explain A

c. A is correct and R is wrong

d. Both are wrong

## V. Answer in one or two sentences

1. What are the qualifications to become the Governor of a state?
2. Who are called oppositions?
3. Write a note on Lok Adalat.
4. What is a constituency?
5. Who appoints the chief minister and other ministers?

## VI. Answer the following in detail

1. Describe the powers of the Governor.
2. Who is an MLA?
3. What is the role of Chief Minister and other Council of Ministers at the state level?

## VII. HOTs

1. Name some departments of the government.
2. Tabulate: qualification, appointment and any two powers of governor, Chief Minister and MLAs.

## VIII. Activity

1. Make a list of the name of the Governor, Chief Minister and other Ministers with their departments.
2. Write an essay on 'If you were the Chief Minister of the state'.
3. Make a student Legislative body in your class. (allocate the departments and do periodical review).



7th Social Science_ Civics_Term II English Unit_1.indd 169 27/06/2023 13:13:25

ICT CORNER

# State Government

**Let's know about our state government departments**




**PROCEDURE :**

**Step 1:** Type the following URL http://www.tn.gov.in or scan the QR code given below to view the home page of the Government of Tamilnadu website.

**Step 2:** Click 'Departments' which is listed below the title 'Government'.

**Step 3:** You can see the list and link of various departments of our Government.

**Step 4:** Click on a particular department to know about its Minister's name with image, Secretary to.

Government, their contact numbers, department profile..etc…



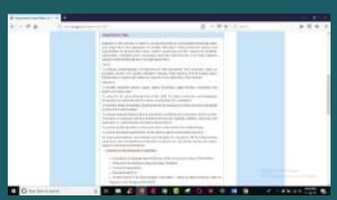

Step 1




Step 2




Step 3



Step 4

**State Government URL:**

http://www.tn.gov.in or scan the QR

*Pictures are indicative only

*If browser requires, allow Flash Player or Java Script to load the page.



7th Social Science_ Civics_Term II English Unit_1.indd 170 27/06/2023 13:13:26

# Unit -II

# Media and Democracy




## Learning Objectives

- Understand media and its classification
- Analyse the role of media in facilitating interaction between the government and citizen
- Know the ethic and responsibility of media
- Gain a critical sense of the impact of media on people's lives and choices.

JLYW1

*"Let noble thoughts come to us from every side"*

## Introduction:

Traditionally, India has many folk form of communicating with people in rural areas. Harikatha, and koothu are originally a religious media from in which the stories were propagated. It is a collective form of music, dance, speech, storytelling with comic interludes. It has tremendous effect in communicating the messages straight into the hearts of the people. Then socially relevant messages were passed through this medium. Modern methods to address small and medium gatherings include seminars, dramas, public meetings and workshops etc. Print media has been referred to as Peoples University because they perform the role of public informer, educate and custodian of public interest. Let us discuss about Media and its role.

## What is Media?

Every individual person is a medium of expression. An individual interacts through the media to reach other individual and institutions. Media is generally the agency for inter-personal communication. Media includes every broadcasting and narrowcasting medium. Media is the plural of the word medium. Such a medium or media allows to communicate messages, thoughts, ideas, views, etc.



7th Social Science_ Civics_Term I English Unit_2.indd 171 09-07-2022 14:48:29

### Classification of Media

| | |
|---|---|
| Narrowcast Media | Cable Television, Direct mail, Seminar |
| Broadcast Media | Films, Television, Radio |
| Print Media | Newspapers, Magazine, Journals, Books, Posters, Reports |
| Web Media | Google website and Blogs |
| Social Media | Twitter, Facebook, whatsApp and Instagram |

This communication can be classified into:-

**Personal communication** – these are meant for personal use, like letters, telephone, cell phone, E-mail and fax.

**Mass communication** –these are used for communicating with the masses. Newspapers, Radio, TV, Collectively they are termed as media.

Printing press was invented by Johannes Gutenberg in 1453

## Fourth Pillar of Democracy




The four pillars of democracy are Legislature, Executive, Judiciary, and Media. Media ensures the transparency in the working of all the above three systems. This fourth pillar of democracy ensures that all people living in far off areas of country are aware of what's happening in rest of the country. In fact, mass media is the most important vehicle for information, knowledge and communication in a democratic polity.

## Importance of the Media

Media is very powerful entity on the earth. It is a mirror which shows various social, political and economic activities around us. People depend on the media for various needs including entertainment and information. Media keeps the people awakened and it has become one of the major instruments of social change. Media not only bring out the day to day happenings in the world, but also exposes the strength and weakness of the government. It also advertises the various products produced by the private companies. It creates the awareness. All the TV channels broadcasts national and international news. Social problems are portrayed in many cinemas. Media provide a balanced report on any matters. It fights against the socio-political evils and injustice in our society while bringing empowerment to the masses and facilitating development.



7th Social Science_ Civics_Term I English Unit_2.indd 172 09-07-2022 14:48:29

**All India Radio (AIR)**
Officially known as Akashvani since 1956 (voice from the sky) is the radio broadcaster of the Government of India launched in 1936.

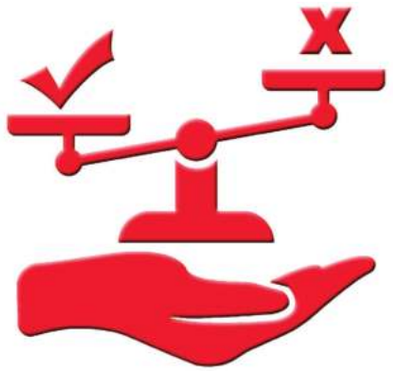
## Media and public opinion

The media plays a prominent role in the formation of public opinion (general opinion of the public on particular issue). It is the powerful tool in contemporary times. It has become a part of the everyday life of the people. They play a significant role in shaping a person's understanding and perception about the events occurred in our daily lives. The mass media play a significant role in providing honest, intelligent and usually unbiased accounts of events. The newspaper reflects the response of the people to the government policies. Thus print media and electronic media helps the people to express their opinion on important social issues.




## Ethic and Responsibility

Ethics is a code of values which govern our lives. So they are very essential for moral and healthy life. In the context of media ethics may be described as a set of moral principles. The media is expected to follow a code of conduct which should be reflected in their reporting and writing. Sensational and distorted news should be avoided.



The fundamental objectives of media are to serve the people with news, views, comments and information on matters of public interest in a fair, accurate, unbiased and decent manner and language. An awakened and free media is very much essential for the function of the government.

It has right to collect information from any primary authentic sources which are important to the society and then report the same with the aim to inform not to create sensation. The media has a massive responsibility in providing factual coverage.

## Role of Media in Democracy

Media is the back bone of democracy. In our democratic society mass media is the driving force of public opinion. Media strengthens the democratic value. It enlightens and empowers the people. It can educate the voters and ensures that government is transparent and accountable. Media carry every report of action of administration of the government. Based on the information, the citizen can learn about the functioning of the government and day to day happenings taking place around them.



7th Social Science_ Civics_Term I English Unit_2.indd 173 09-07-2022 14:48:30

Theory of Democracy
Democracy means rule by the people. It combines two Greek words. Demos refers to citizen. Kratos means either power or rule.

It arranges the debate on current affairs so that we can get the different views for the same issue. Media reminds the government of its unfulfilled promises to the public. It educates masses in rural areas. Parliamentary democracy can flourish only under the watchful eyes of media. Media not only reports but acts as a bridge between the state and public. Thus the media acts as a watch day of the democratic government. A democracy without media is like vehicle without wheel.

## Local Media




Usualy the media reports the news which of national and global importance where as local media addresses public locality.

Name some local media of your locality.

## Conclusion

The media, in the contemporary world of information and technology plays a very significant role in educating masses. The media should always keep in mind, that it should not publish anything which corrupts the public mind and disturbs social peace. For healthy society sharing of views, free flow of information, free communication and expression plays a crucial role. Media, being powerful and important instruments of expression have got lot to contribute. Mass media have made the world smaller and closer.

## Summary

- A medium is a means or way of communication; media is the plural of medium.
- Modern media such as TV, radio, newspaper, and the internet reach millions of people all over the world. So the common term used for them is mass media.
- Changing technology helps media to reach more people.
- Media has brought the world closer to us. It brings the news and happenings from across the world to the public in a fair and realistic way.
- In a democracy, the media plays a very important role in providing news.
- It is working out to be an effective tool to create public opinion on issues by improving awareness among the masses.



7th Social Science_ Civics_Term I English Unit_2.indd 174 09-07-2022 14:48:30

| Glossary | | | |
|---|---|---|---|
| 1. | Broadcast | transmit by radio or television | ஒளிபரப்பு |
| 2. | Polity | system of government | ஆட்சி அமைப்பு |
| 3. | Contemporary | present –day | சமகாலத்தில் |
| 4. | Ethics | moral principles | நெறிமுறைகள் |
| 5. | Unbiased | impartial | நடுநிலையான |
| 6. | Authentic | genuine/original | உண்மையான |



## Evaluation

RDE3N

## I. Choose the correct answer

1. Which one of the following comes under print media?
   a. Radio b. Television
   c. Newspaper d. Internet
2. Which one of the following is the broadcast media?
   a. Magazines b. Journals
   c. Newspaper d. Radio
3. Which invention has brought the world closure?
   a. Typewriter b. Television
   c. Telex d. none of these
4. Which is mass media?
   a. Radio b. Television
   c. Both a & b d. None of these
5. why is it necessary for media to be independent?
   a. to earn money
   b. to encourage company
   c. to write balanced report
   d. none of these

## II Fill in the blanks

1. _____ have made the world smaller and closer.
2. Every individual person is a medium of _____.
3. Printing press was invented by _____.
4. _____ is a code of values which govern our lives.
5. _____is the radio broadcast of the Government of India.

## III. Match the following

| | | |
|---|---|---|
| Narrowcast media | - | films |
| Social media | - | posters |
| Print media | - | seminar |
| Web media | - | google web site |
| Broadcast media | - | facebook |

## IV. Consider the following statements: Tick the appropriate answer

1. **Assertion:** Print media has been referred to as peoples University

   **Reason:** They perform the role of public informer, educate, custodian of public interest.

   a. A is correct and R is the correct explanation of A



7th Social Science_ Civics_Term I English Unit_2.indd 175 09-07-2022 14:48:30

b. A is correct and R is not the correct explanation of A
c. A is wrong and R is Correct
d. Both are wrong

2. Find the odd one

a. newspapers b. magazine c. journals d. twitter e. posters

3. consider the following statements and choose the correct answer form the codes given below.

a. Media is generally the agency for inter-personal communication.
b. Media is very powerful entity on the earth.
c. Media plays a prominent role in the formation of public opinion.
d. Media does not have any responsibility

i. a,b and c are correct
ii. a,c and d are correct
iii. b,c and d are correct
iv. a,b and d are correct

## V. Answer in one or two sentences

1. What is media?
2. How does the public get the news about the decision that are taken in the Legislative Assembly?
3. What are the importance of local media?
4. Media is the fourth pillar of democracy. Justify
5. State any two responsibility of media.

## VI. Answer the following in detail

1. How can we classify media?
2. In what ways does the media play an important role in a democracy?
3. What are the advantages of media?

## VII. HOTs

1. Is Media necessary? Why?
2. What do you know about the term press conference?
3. In what ways media affects our daily lives?
4. Media is a boon or bane.

## VIII. Activity

1. Focus on a particular news. Collect information about that news from various media. Compare and write down the similarity and differences
2. Prepare an album – 'the growth of media' (from early period to till now).
3. Prepare a newspaper and circulate in your class.



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