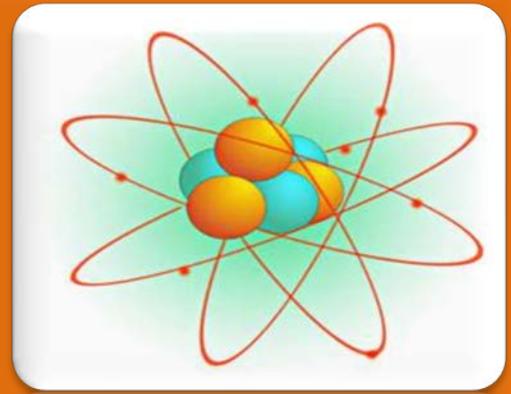


# *Science*

- *Physics*
- *Chemistry*
- *Biology*

# Physics



**The Core concepts of Physics for Class VII are as follows:**

## Class VII

**Physical Quantities and Measurement**

**Force and Pressure: Motion**

**Energy**

**Light Energy**

**Heat**

**Sound**

**Electricity and Magnetism**

## Theme 1: Physical Quantities and Measurement

In the earlier classes teaching- learning emphasised on the measurement of length, mass, and time using devices made for such measurements and how a particular unit and symbol are used to express the result of measurement of each physical quantity. In continuity this theme aims at enabling children to develop the ability to measure volume and determine the density of a regular solid. They will be introduced to and understand the concept of speed, that contains simple problems to get an idea of the speed of objects around them and also to know how fast or slow an object is moving. The concept of speed has been introduced that contains simple problems to get an idea of speed of objects around us.

### Learning outcomes:

Children will be able to:

- define volume;
- express volume of an object in a proper unit with proper symbols;
- measure volume of a liquid using a graduated cylinder and a graduated beaker;
- estimate the area of an object of a regular shape using formula;
- define density and write its formula;
- express density in a proper unit and symbol;
- measure density of a regular;
- express result of measurement in a proper unit with proper symbol;
- define speed and write its formula;
- express speed in proper units with proper symbol.

Physical Quantities and Measurement		
Key Concepts	Suggested Transactional Processes	Suggested Learning resources
<ul style="list-style-type: none"> <li>➤ Measurement of Volume (3D concept):                             <ul style="list-style-type: none"> <li>☛ Concept of unit volume</li> </ul> </li> <li>➤ Measurement of area of a regular shaped body using formula</li> <li>➤ Measurement of Density of Regular Solids:                             <ul style="list-style-type: none"> <li>☛ Basic concept</li> <li>☛ Formula</li> </ul> </li> <li>➤ Calculation of Speed:                             <ul style="list-style-type: none"> <li>☛ Basic Concept</li> <li>☛ Formula</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Explanation of process of measurement of volume</li> <li>➤ Explanation of concept of speed with examples from daily life</li> </ul>	<ul style="list-style-type: none"> <li>➤ Graduated cylinder</li> <li>➤ Graduated beaker in activities</li> <li>➤ A regular object</li> <li>➤ Objects of irregular shape</li> <li>➤ Video on volume measuring devices</li> </ul>

**Integration:** Chemistry, Technology in daily life

**Life Skills:** Creative thinking, Problem-solving

## Theme 2: Force and Pressure: Motion

An object is said to be in motion if its position changes with time. When walking, running or cycling or when a bird is flying there is motion involved. Various objects have different types of motion. They can be classified into translatory motion, circular motion and oscillatory motion. Motion of an object can also be classified as periodic and non-periodic. If an object travels equal distance in equal time, its motion is said to be uniform, if not, the motion is said to be non-uniform. A physical quantity used to distinguish between uniform and non-uniform motion is average speed.

### Learning outcomes:

Children will be able to:

- define motion;
- identify objects in motion and at rest;
- describe different types of motion, with examples from daily life;
- define uniform and non-uniform motion with examples from daily life;
- define weight;
- relate weight of an object with its mass.

Force and Pressure: Motion		
Key Concepts	Suggested Transactional Processes	Suggested Learning resources
<ul style="list-style-type: none"> <li>➤ Motion as a change in position of an object with respect to time.</li> <li>➤ Types of motion:                             <ul style="list-style-type: none"> <li>☛ Translatory</li> <li>☛ Circulatory</li> <li>☛ Oscillatory</li> <li>☛ Repetitive (Periodic and Non Periodic)</li> <li>☛ Random</li> </ul> </li> <li>➤ Uniform and Non Uniform Motion</li> <li>➤ Weight:                             <ul style="list-style-type: none"> <li>☛ Concept</li> <li>☛ Differences between Mass and Weight.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Demonstrating objects at rest and in motion.</li> <li>➤ Explaining uniform and non-uniform motion by citing examples from daily life</li> <li>➤ Explaining the concept of weight.</li> <li>➤ Explaining the difference between mass and weight.</li> </ul>	<ul style="list-style-type: none"> <li>➤ A ball.</li> <li>➤ A stopwatch.</li> <li>➤ A bob with hook.</li> <li>➤ Thread.</li> <li>➤ Laboratory stand.</li> <li>➤ Video on motion and types of motion.</li> <li>➤ Video on uniform and non-uniform motion.</li> </ul>

**Integration:** Mathematics, Chemistry, Geography, Technology in daily life.

**Life Skills:** Problem-solving, Cooperation and working together.

## Theme 3: Energy

This theme aims at enabling children to know about energy and the different forms namely, kinetic energy, potential energy, heat energy, electrical energy. They will also understand that one form of energy can be converted into another form and that this is known as transformation of energy. Energy is conserved during transformation. This is known as the law of conservation of energy.

### Learning outcomes:

Children will be able to:

- ☑ define energy;
- ☑ express energy in proper units;
- ☑ discuss about different forms of energy;
- ☑ describe conversion of energy from one form to another in different situations;
- ☑ state the Law of Conservation of Energy, with examples.

Energy		
Key Concepts	Suggested Transactional Processes	Suggested Learning resources
<ul style="list-style-type: none"> <li>➤ Energy:                             <ul style="list-style-type: none"> <li>☛ Energy as capacity to do work.</li> <li>☛ Units of energy (joule and calorie).</li> <li>☛ Different forms of energy.</li> <li>☛ Inter-conversion of energy</li> </ul> </li> <li>➤ Law of Conservation of Energy:                             <ul style="list-style-type: none"> <li>☛ Real world examples.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Explanation of the term energy.</li> <li>➤ Explanation of relation between work and energy.</li> <li>➤ Discussion with children about the different forms of energy, with examples.</li> <li>➤ Providing examples of different applications of conservation of energy (Roller coaster, Production of hydroelectricity etc.) and encouraging children to carefully make energy conversion diagrams and deduce that energy is conserved.</li> </ul>	<ul style="list-style-type: none"> <li>➤ A simple pendulum.</li> <li>➤ Charts showing different forms of energy.</li> <li>➤ Video/s showing interconversion of different forms of energy.</li> </ul>

**Integration:** Chemistry, Biology, Technology in daily life.

**Life Skills:** Cooperation and working together, problem-solving.

## Theme 4: Light Energy

Light travels in a straight line. Light from an object can move through space and reach the human eye that enables one to see this page, or a face in a mirror. This process is known as reflection. It obeys a law known as law of reflection. Light travels in air at a constant speed of  $3 \times 10^8$  m/s or 3 lakh kilometre per second. In other mediums, like glass or water, it slows down. Light from sun is composed of seven colours. The colours of objects fascinate everybody.

### Learning outcomes:

Children will be able to:

- ☑ explain the phenomenon of reflection;
- ☑ define the terms plane, normal to the plane, point of incidence, angle of incidence and angle of reflection;
- ☑ state the laws of reflection;
- ☑ describe reflection of light from a plane mirror;
- ☑ define the terms virtual image, real image and lateral inversion;
- ☑ state the value of speed of light.

Light Energy		
Key Concepts	Suggested Transactional Processes	Suggested Learning resources
<ul style="list-style-type: none"> <li>➤ Reflection:                             <ul style="list-style-type: none"> <li>☛ Definition and Examples.</li> <li>☛ Terms related to reflection - Normal, plane, point of incidence, angle of incidence, angle of reflection.</li> </ul> </li> <li>➤ Laws of Reflection.</li> <li>➤ Plane mirror:                             <ul style="list-style-type: none"> <li>☛ Virtual and real image</li> <li>☛ Lateral inversion</li> <li>☛ Uses.</li> </ul> </li> <li>➤ Speed of light (<math>3 \times 10^8</math> m/s).</li> </ul>	<ul style="list-style-type: none"> <li>➤ Demonstrating reflection of light on a plane mirror. Explaining the point of incidence, normal, angle of incidence and angle of reflection.</li> </ul>	<ul style="list-style-type: none"> <li>➤ A plane mirror.</li> <li>➤ Reflecting surfaces.</li> <li>➤ A laser pencil pointer.</li> <li>➤ Pencil, scale, eraser, marker.</li> <li>➤ White paper sheet.</li> </ul>

**Integration:** Art, Mathematics, Technology in daily life.

**Life Skills:** Cooperation and working together, problem-solving.

## Theme 5: Heat

Heat is a form of energy. Sunlight carries heat that gives warmth when exposed to it. When water is heated, its energy in the form of heat increases and becomes hot. When heat energy of an object increases, it can result in (i) change of temperature, (ii) change in size and/or (iii) change in state of an object. Some materials like aluminium are good conductors of heat and some, like wood are bad conductors of heat. Heat from a hot object is transferred to a cold object in three different ways- conduction, convection and radiation. Previous learning included topics on temperature and its measurement in degree Celsius. Further two other frequently used temperature scales, Fahrenheit scale and Kelvin scale have been introduced for a better understanding of concepts related to temperature.

### Learning outcomes:

Children will be able to:

- define heat as energy;
- define units of heat;
- describe temperature scales: degree Celsius, Fahrenheit and Kelvin;
- describe different effects of heat;
- explain different modes of heat transfer;
- decide about conductor and insulator of heat in different applications;

<b>Heat</b>		
Key Concepts	Suggested Transactional Processes	Suggested Learning resources
<ul style="list-style-type: none"> <li>➤ Heat as a form of energy and its units, joule(J) and calorie (cal).</li> <li>➤ Different units of Temperature (°C, °F, K). (No numerical to be done)</li> <li>➤ Effects of Heat:                             <ul style="list-style-type: none"> <li>☛ Change in Temperature.</li> <li>☛ Change in Size (Expansion and contraction).</li> <li>☛ Change in State.</li> <li>☛ Good Conductors and Bad Conductors of Heat and their examples.</li> <li>☛ Choice of conductors and insulators in day to day life (Pan handles, metal cooking utensils etc.)</li> </ul> </li> <li>➤ Methods of Heat Transfer:                             <ul style="list-style-type: none"> <li>☛ Conduction</li> <li>☛ Convection</li> <li>☛ Radiation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Explanation of use of thermometer marked in (°C and °F).</li> <li>➤ Explanation of different effects of heat.</li> <li>➤ Children have to deduce where conduction, convection and radiation is taking place in some real-world applications.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Thermometer graduated in °C and °F.</li> <li>➤ Water in beaker.</li> <li>➤ A tripod with mesh screen.</li> <li>➤ A burner for heating.</li> <li>➤ A set up to show heat transfer by conduction.</li> <li>➤ A round flask.</li> <li>➤ Potassium Permanganate Crystals.</li> <li>➤ Test tube.</li> <li>➤ Test tube holder.</li> </ul>

**Integration:** Geography, Biology, Technology in daily life.

**Life Skills:** Cooperation and working together, problem-solving.

## Theme 6: Sound

Sound is produced by the vibration of objects and different types of instruments are used to produce sound. In Humans sound is produced by the voice box or larynx. Sound needs a medium to propagate hence in space it is not possible to hear one another. Sound wave is a longitudinal wave. A wave is characterised by an amplitude and a frequency. Like light, sound is also reflected from a surface. Sound is also absorbed by a medium. Therefore, walls of a theatre are lined with layers of materials that absorb sound. Sound travels with different speeds in different medium and travels fastest in solids. This theme will enable children to know and understand sound, different sources of sound and how it travels.

### Learning outcomes:

Children will be able to:

- identify different sources of sound;
- describe sound as a longitudinal wave;
- define amplitude and frequency of sound;
- demonstrate that sound requires a medium to transmit;
- list examples of Reflection and Absorption of sound;
- analyse the Relative speed of Sound in different mediums.

Sound		
Key Concepts	Suggested Transactional Processes	Suggested Learning resources
<ul style="list-style-type: none"> <li>➤ Sources of sound.</li> <li>➤ Sound as a longitudinal wave.</li> <li>➤ Characteristics of a sound wave: Amplitude (Relate amplitude with loudness) and Frequency.</li> <li>➤ Sound needs a medium to propagate.</li> <li>➤ Reflection and Absorption of sound.</li> <li>➤ Relative speed of sound in different mediums.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Demonstration of production of sound using simple objects within the classroom followed by discussion</li> <li>➤ Children place their hand on their throats and when they speak they feel vibration.</li> <li>➤ Explanation of the characteristics of sound.</li> <li>➤ Explanation of relative speed of sound in solid, liquid and gas.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Different sources of sound.</li> <li>➤ A set up to show that sound need a medium to propagate.</li> <li>➤ Materials for reflecting sound.</li> <li>➤ Materials for absorbing sound.</li> <li>➤ Videos on sound, sources, need of a medium, characteristic, reflection, absorption.</li> </ul>

**Life Skills:** Cooperation and working together, Problem solving, Critical thinking.

**Integration:** Music, Mathematics, Technology in daily life.

## Theme 7: Electricity and Magnetism

The basic law of magnetism states that “Like poles of magnets repel one another and unlike poles attract”. A cell is a source of electricity and are used in torches, watches, calculators, etc. When connected to a device like bulb, it sends current through the bulb and the bulb lights up. Flow of charges constitute current. Materials that allow current to flow through them are called conductors whereas materials that do not allow passage of current through them are called insulators. Children will learn how electric components are arranged in simple series and simple parallel arrangements.

### Learning outcomes:

Children will be able to:

- state law of magnetism;
- describe test for a magnet;
- relate current to flow of charge;
- recognize electric cell as a source of electricity;
- define resistors as the component that opposes the flow of current;
- represent different components like cell, battery, key, bulb, connecting wire, resistor by standard symbols;
- recognize battery as series combination of cells;
- define conductors and insulators of electricity.

Electricity and Magnetism		
Key Concepts	Suggested Transactional Processes	Suggested Learning resources
<ul style="list-style-type: none"> <li>➤ Laws of magnetism</li> <li>➤ Test for a magnet (by repulsion)</li> <li>➤ Electric current as a flow of charges</li> <li>➤ Resistors as components that oppose the flow of current.</li> <li>➤ Symbolic representation of electrical components (key, battery, bulb, conducting wire, resistor)</li> <li>➤ Battery as a collection of cells connected in series.</li> <li>➤ Good and Bad conductors of electricity</li> </ul>	<ul style="list-style-type: none"> <li>➤ Revisiting previous concepts.</li> <li>➤ Building on children’s previous learning.</li> <li>➤ Familiarizing children with symbols for electric components.</li> <li>➤ Explaining the role of key in electric circuits.</li> <li>➤ Explaining the precautions to be taken before an electric circuit is switched-on.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Two bar magnets</li> <li>➤ Laboratory stand</li> <li>➤ Thread and hook for magnet</li> <li>➤ An iron nail</li> <li>➤ A cell</li> <li>➤ A coil of wires</li> <li>➤ A compass</li> <li>➤ Dry cell</li> <li>➤ Key</li> <li>➤ Connecting wires</li> <li>➤ Three bulbs</li> <li>➤ Banana clips</li> </ul>

**Integration:** Chemistry, Geography, Technology in daily life.

**Life Skills:** Problem-solving, Critical thinking, Cooperation and working together.

# Chemistry



**The Core concepts of Chemistry for Class VII are as follows:**

## **Class VII**

**Matter and Composition**

**Physical and Chemical Changes**

**Atomic Structure**

**Language of Chemistry**

**Metals and Non-Metals**

## Theme 1: Matter and its Composition

This theme focuses on informing and making children aware of the different types of matter/objects found in their surroundings such as stones, water, soil, oil, sugar, air. Some of them have common characteristics in terms of states, some are solids, liquids and some are gases. These states vary in their shape, volume and texture. All these are made up of some materials which have mass and occupy space. Children will also realize that the study of their composition is of great importance in their daily lives.

### Learning Outcomes:

Children will be able to:

- describe matter;
- discuss the constituents (atoms/molecules) of matter;
- explain the forces which keep atoms/molecules in matter together.

Matter and its Composition		
Key Concepts / Concerns	Pedagogy/ Transactional Strategies*	Suggested Learning Resources
<ul style="list-style-type: none"> <li>➤ Definition of matter.</li> <li>➤ Matter has mass and occupies space - Explanation.</li> <li>➤ Composition of matter – brief introduction</li> </ul>	<ul style="list-style-type: none"> <li>➤ Demonstrating that air in a balloon occupies space. It can be shown that any matter like a solid or liquid has mass.</li> <li>➤ Discussing that matter is made up of tiny particles. They are tightly packed in solids, loosely packed in liquids and have random motion in gases. The intermolecular attraction between the particles keeps them together (reference: solids, liquids and gases).</li> <li>➤ Asking children to draw the above in the notebook.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Samples of solids, liquids and examples of gases (virtual / video).</li> </ul>

**Integration:** Physics

**Life skills:** Cooperation and working together, drawing conclusion.

## Theme 2: Physical and Chemical Changes

The theme focuses on informing children and making them aware about the different types of changes physical and chemical that are regularly observed occurring in the environment. Some occur on their own and some are caused due to human activities to meet their requirements. Keeping in view the unending role of these changes, it becomes worthwhile that children learn about them.

### Learning Outcomes:

Children will be able to:

- ✔ differentiate between physical and chemical changes;
- ✔ observe activities related to physical and chemical changes;
- ✔ classify changes such as respiration, preparation of solution of sugar, burning of paper, ripening of fruit, spoiling of food materials as physical and chemical changes;
- ✔ discuss that in a chemical change, a new substance with different properties is formed.

Physical and Chemical Changes		
Key Concepts / Concerns	Pedagogy/ Transactional Strategies*	Suggested Learning Resources
<ul style="list-style-type: none"> <li>➤ Physical and chemical changes.</li> <li>➤ Chemical change - formation of a new product with new properties.</li> <li>➤ Differentiating between physical and chemical change.</li> <li>➤ Classification as physical &amp; chemical change.</li> <li>➤ Types of change involved when there is a change of state of matter.</li> <li>➤ Types of change involved when there is a change of energy.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Asking children to classify the following changes as: (i) Desirable and Undesirable (ii) Physical and Chemical change:                             <ul style="list-style-type: none"> <li>- drying of clothes; melting of ice; evaporation of water as physical changes; rusting of iron; burning of fuels &amp; fireworks; curd from milk; reaction of iron powder with sulphur powder as chemical changes. Discussing about the formation of a new compound in a chemical change.</li> </ul> </li> <li>➤ Sharing videos of demonstrations/ experiments and discussing with children to classify changes: respiration, burning, dissolution of sugar, boiling an egg, other daily life examples into physical and chemical changes.</li> <li>➤ Sharing videos of simple experiments with children and asking them to observe and study the interchange of state of water, sublimation of ammonium chloride or iodine.</li> <li>➤ Sharing videos and discussing the processes of: melting, boiling, reversible, irreversible, dissolution of quick lime in water, ammonium chloride in water, burning of match stick, etc.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Virtual laboratory or videos</li> <li>➤ Home activity for students- freezing of water and sublimation of camphor.</li> </ul>

**Integration:** Physics, Geography, Biology

**Life skills:** Problem solving, critical thinking

## Theme 3: Atomic Structure

This theme will enable children to understand that every matter is made up of tiny particles known as atoms and molecules. Molecules are also constituted by the atoms. Hence atoms are the building blocks of matter. The physical and chemical properties of matter are governed by atoms. Therefore, the knowledge of the concepts of atoms and molecules of elements, compounds and radicals of compounds is necessary to understand different processes and principles of Chemistry.

### Learning Outcomes:

Children will be able to:

- define atom, molecule and radical;
- discuss the significance of valency of elements and radicals;
- define valency in terms of number of hydrogen atoms combined or replaced by one atom of the element;
- apply the definition based on hydrogen atom to find out the valency of other elements and radicals;
- correlate the valency of the elements with group number of periodic table.

Atomic Structure		
Key Concepts / Concerns	Pedagogy/ Transactional Strategies*	Suggested Learning Resources
<p><b>Atoms, Molecules and Radicals</b></p> <ul style="list-style-type: none"> <li>➤ An atom is the smallest particle of an element.</li> <li>➤ It is not capable of independent existence.</li> <li>➤ The properties of an element depend upon the atoms constituting it.</li> <li>➤ A molecule is the smallest particle of an element or compound, capable of independent existence. It consists of one or more than one atom of the same or different elements.</li> <li>➤ A radical is a single atom of an element or a group of atoms of different elements behaving as single unit and with a charge on group.</li> <li>➤ Atomicity (no. of atoms in an entity) of elements and compounds – mono atomic, di atomic, tri atomic, polyatomic.</li> <li>➤ Associate the first 20 elements in the periodic table with their names and symbols</li> <li>➤ Valency is the combining capacity of an element or the number of hydrogen atoms with which it combines or replaces.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Discussing about atoms, molecules and radicals and explain the difference between them.</li> <li>➤ Discussing different examples of elements having mono, di, tri and poly atomicity.</li> <li>➤ Preparing a list of some elements and radicals which have valency of 1, 2, 3 and 4.</li> <li>➤ Conducting a quiz on valency.</li> <li>➤ Explaining the meaning of valency and correlating the valency with the group number of the periodic table.</li> <li>➤ Discussing that development of the periodic table is a classification of the element and is based on their physical and chemical properties.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Periodic table.</li> <li>➤ Quiz.</li> </ul>

**Integration:** Physics

## Theme 4: Language of Chemistry

Chemistry involves the study of a large number of elements and compounds that also have been learnt earlier with their representation by their short hand notations i.e. symbols and formulae. This theme will enable children to understand that it is not convenient to write the full names of the elements and compounds, and the use of symbols has made the job of the chemists much easier. In addition, they will further realize that Chemistry also involves the occurrence of a large number of chemical reactions that are written in the form of equations known as chemical equations. The writing of chemical equations involves writing of reactants and products as their symbols and formulae. Thus symbols and formulae have also made writing of chemical equations in Chemistry very convenient.

### Learning Outcomes:

Children will be able to:

- ☑ identify the names of reactants and products of different chemical reactions;
- ☑ write a chemical reaction in the form of a chemical word equation;
- ☑ recognize the usefulness of a word equation.

Language of Chemistry		
Key Concepts / Concerns	Pedagogy/ Transactional Strategies*	Suggested Learning Resources
<p>Chemical reactions</p> <ul style="list-style-type: none"> <li>➤ A chemical reaction may take place when two or more reactants come in contact with one another and transfer of energy takes place.</li> <li>➤ Characteristics of occurrence of a chemical reaction: Change of:               <ul style="list-style-type: none"> <li>☛ Colour</li> <li>☛ State</li> <li>☛ Smell</li> <li>☛ Evolution of gas</li> <li>☛ Precipitate formed</li> <li>☛ Heat evolved / released</li> </ul> </li> <li>➤ Chemical Equations:               <ul style="list-style-type: none"> <li>☛ Writing word equations for chemical reactions and emphasize on the observational skills and the names of products formed</li> <li>☛ Some examples of word equations for practice.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Sharing of videos by the teacher: Adding dilute HCl to solid sodium carbonate taken in a test tube. A reaction takes place with the evolution of gas.</li> <li>➤ Sharing of videos by the teacher of these changes through activities:               <ul style="list-style-type: none"> <li>☛ Colour: KI + Lead acetate reaction. Yellow colour formed. Precipitate is also formed.</li> <li>☛ Heat NH<sub>4</sub>Cl. NH<sub>3</sub> gas is evolved.</li> <li>☛ HCl+ NaOH; heat is evolved.</li> </ul> </li> <li>➤ Guiding children to identify the reactants and products of the reaction, put an arrow in between the reactants and products with the arrow pointing towards the products side.</li> <li>➤ Involving each child to write word equations of some simple reactions.</li> </ul>	<ul style="list-style-type: none"> <li>➤ PPT/Video</li> </ul>

**Integration:** Physics

## Theme 5: Metals and Non-Metals

In day-to-day life many elements are commonly found such as iron, aluminium, zinc, lead, chlorine, carbon, sulphur etc. and their compounds. The elements have been classified in two classes, namely metals and non-metals. In this theme children will learn to differentiate between metals and non-metals on the basis of their physical properties.

### Learning Outcomes:

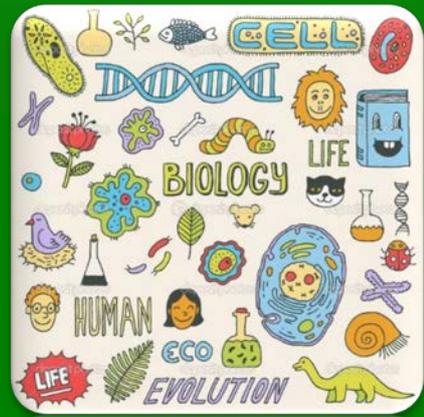
Children will be able to:

- ✔ differentiate between metals and non-metals on the basis of their physical properties such as lustre, conduction of electricity and heat, malleability, ductility, sonority, melting point, boiling point, density and strength.

Metals and Non-Metals		
Key Concepts / Concerns	Pedagogy/ Transactional Strategies*	Suggested Learning Resources
<p><b>Metals, non-metals</b></p> <ul style="list-style-type: none"> <li>➤ Properties</li> <li>➤ Distinguish between metals and non-metals with the general properties (lustre, conduction of electricity, heat, malleability, ductility, sonority, melting point, boiling point, density, strength.)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Asking children to name some metals that they know of/have seen being used in daily life.</li> <li>➤ Examining the properties of metals and non-metals through sharing videos of:                             <ul style="list-style-type: none"> <li>☛ Taking a small iron nail, a coal piece, aluminium wire, and pencil lead. Beating each separately with a hammer and recording the observations. (malleability).</li> <li>☛ Making separate electric circuits using a metal and a non-metal (Al wire, coal piece) - (conductivity).</li> <li>☛ Dropping the above samples one by one. Noting the sound produced –(sonority).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Pictures of some metals such as copper, iron nail, a coal piece, aluminium wire, and pencil lead.</li> </ul>

**Integration:** Physics, Geography

# Biology



**The core concepts of Biology for Class VII are as follows:**

## Class VII

**Tissue**

**Kingdom Classification**

**Plant Life**

**Human Body**



## Tissue

Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
<ul style="list-style-type: none"><li>☛ <i>striated (voluntary or skeletal muscle),</i></li><li>☛ <i>unstriated (involuntary/ smooth muscle),</i></li><li>☛ <i>cardiac (specialized muscle).</i></li></ul> <p>➤ Nerve tissue: parts of neuron (cell body, Dendron, axon).</p> <p><b>Note:</b> Only basic structure and basic functions of the above mentioned tissues to be done.</p>	<p>☛ diagram of nerve tissue.</p> <p>➤ Discussing functions of nervous system.</p>	

## Theme 2: Kingdom Classification

This theme gives an insight into the study of the types of Kingdoms in Plants and Animals. Living organisms are divided into two kingdoms - Kingdom Plantae and Kingdom Animalia. The kingdom Plantae includes plants, while the animals are included under kingdom Animalia. This two-kingdom classification was found inadequate in the light of disputed position of organisms like bacteria and fungi. In view of the objections to the two-kingdom system of classification, a Five-Kingdom Classification was proposed in 1969. The five Kingdoms are Monera, Protista, Fungi, Plantae and Animalia.

### Learning Outcomes:

Children will be able to:

- explain the purpose and advantages of classification;
- explain the basis of five - kingdom classification;
- differentiate between major groups of organisms;
- draw pictures of organisms representing each kingdom.

<b>Kingdom Classification</b>		
Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
<ul style="list-style-type: none"> <li>➤ Meaning and concept of classification.</li> <li>➤ Need and advantages of Classification.</li> <li>➤ Characteristics of each kingdom with suitable examples:                             <ul style="list-style-type: none"> <li>(i) Monera: bacteria - shape;</li> <li>(ii) Protista: <i>Amoeba</i> - basic structure;</li> <li>(iii) Fungi: basic structure of mould;</li> <li>(iv) Plantae: characteristics and examples (classification of plantae not to be discussed);</li> <li>(v) Animalia                                     <ul style="list-style-type: none"> <li>(a) Vertebrates.</li> <li>(b) Invertebrates: 9 major Phyla, Porifera, Cnidaria, Coelenterata, Platyhelminthes, nematoda, Annelida, Arthropoda, Mollusca, Echinodermata)</li> </ul> </li> </ul> </li> <li>(Two characteristics and two examples of each Phylum).</li> </ul>	<ul style="list-style-type: none"> <li>➤ Asking children to classify or group these plants and animals in their own way.</li> <li>➤ Learning about different organisms belonging to each kingdom and asking them to write about examples of each kingdom.</li> <li>➤ Drawing pictures of organisms belonging to each kingdom.</li> <li>➤ Encouraging children to collect more information on each phylum.</li> <li>➤ Assigning projects to make picture cards and writing their features on the other side.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Plants and animals in their natural habitats.</li> <li>➤ Photographs.</li> <li>➤ PPTs and Videos.</li> <li>➤ Picture cards.</li> </ul>

**Life Skill:** appreciate diversity of life

## Theme 3: Plant Life

The theme Plant Life aims at promoting children's understanding that all living organisms despite their great diversity in shapes and sizes, show similarity in their activities. They all need food, energy, grow, remove waste materials from their bodies, reproduce and respond to their environment. Growth, excretion, reproduction and response to stimuli are some of the basic life processes. This theme will particularly focus on enabling children to understand the two important processes in plants of Photosynthesis and Respiration, differences between the two and factors affecting them.

### Learning Outcomes:

Children will be able to:

- discuss and demonstrate that leaves perform the function of photosynthesis;
- enlist the factors affecting photosynthesis;
- draw picture of stomata and chloroplast;
- identify the difference between respiration and photosynthesis and relate that respiration and photosynthesis help maintain the balance of CO<sub>2</sub> and O<sub>2</sub> in the atmosphere;
- reason out that the energy produced in respiration is used up by the body to perform life-sustaining activities;
- differentiate between the aerobic and anaerobic respiration;
- discuss the need for growing more and more plants.

<b>Plant Life</b>		
Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
<p><b>Photosynthesis</b></p> <ul style="list-style-type: none"> <li>➤ Definition, basic process, factors affecting photosynthesis: (light, carbon dioxide, water, chlorophyll), significance of photosynthesis, setup.</li> <li>➤ Photosynthesis process (demonstration).</li> </ul> <p><b>Respiration</b></p> <ul style="list-style-type: none"> <li>➤ Basic process, word equation; respiration as a process which releases energy; respiration in plants: two types (aerobic and anaerobic: basic concept, word equations for both, examples).</li> <li>➤ Respiration and photosynthesis in plants, difference in both processes.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Revisiting previous concepts.</li> <li>➤ Building on children's previous learning.</li> <li>➤ Asking children to observe the colour of leaves and also name plants that have yellow or red coloured leaves, discussing the reasons for such colours.</li> <li>➤ Observation of stomata and chloroplasts present in the leaves (using images).</li> <li>➤ Drawing picture of stomata and chloroplast and labelling their parts.</li> <li>➤ Summarizing the process of photosynthesis with the help of a word equation (No symbols)</li> <li>➤ Showing video of the hydrilla experiment to show evolution of oxygen during photosynthesis.</li> <li>➤ Discussing the difference between aerobic and anaerobic respiration and citing examples of both.</li> <li>➤ Discussing differences between the respiration and photosynthesis</li> </ul>	<ul style="list-style-type: none"> <li>➤ Images, PPTs, videos.</li> </ul>

## Plant Life

<b>Key Concepts</b>	<b>Suggested Transactional Processes</b>	<b>Suggested Learning Resources</b>
	process in plants and asking children to explain both the processes in their own words.	

## Theme 4: Human Body

In the previous classes, children were exposed to basic information regarding some of the organ systems in the human body (digestive, respiratory and circulatory systems). In this theme, children will study the excretory system in the human body.

### Learning Outcomes:

Children will be able to:

- ☑ define the term 'excretion' and its need/significance;
- ☑ draw the outline figure of the human body and mark the location of kidneys, skin, sweat glands and lungs;
- ☑ infer that the kidneys play an important role in excretion.

<b>Human Body</b>		
<b>Key Concepts</b>	<b>Suggested Transactional Processes</b>	<b>Suggested Learning Resources</b>
<p style="text-align: center;"><b>Excretory System</b></p> <ul style="list-style-type: none"> <li>➤ Excretion: Definition.</li> <li>➤ Organs and their excretory products (kidneys, sweat glands, lungs);</li> <li>➤ Renal Excretory System - kidneys, ureter, urinary bladder, urethra (location and functions to be explained along with diagram).</li> </ul>	<ul style="list-style-type: none"> <li>➤ Building on children's previous learning.</li> <li>➤ Explaining the various parts of excretory system with the help of PPTs and videos.</li> <li>➤ Explaining the difference between excretory and waste products.</li> <li>➤ Asking children to label diagram of the excretory system.</li> <li>➤ Providing children opportunities to share their personal experiences.</li> </ul>	<ul style="list-style-type: none"> <li>➤ PPTs and videos.</li> <li>➤ Children's drawings.</li> </ul>