

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"> ➤ Definition of matter. ➤ Matter has mass and occupies space - Explanation. ➤ Composition of matter – brief introduction 	<ul style="list-style-type: none"> ➤ Demonstrating that air in a balloon occupies space. It can be shown that any matter like a solid or liquid has mass. ➤ 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). ➤ Asking children to draw the above in the notebook. 	<ul style="list-style-type: none"> ➤ Samples of solids, liquids and examples of gases (virtual / video).

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"> ➤ Physical and chemical changes. ➤ Chemical change - formation of a new product with new properties. ➤ Differentiating between physical and chemical change. ➤ Classification as physical & chemical change. ➤ Types of change involved when there is a change of state of matter. ➤ Types of change involved when there is a change of energy. 	<ul style="list-style-type: none"> ➤ Asking children to classify the following changes as: (i) Desirable and Undesirable (ii) Physical and Chemical change: <ul style="list-style-type: none"> - drying of clothes; melting of ice; evaporation of water as physical changes; rusting of iron; burning of fuels & 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. ➤ 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. ➤ 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. ➤ 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. 	<ul style="list-style-type: none"> ➤ Virtual laboratory or videos ➤ Home activity for students- freezing of water and sublimation of camphor.

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>Atoms, Molecules and Radicals</p> <ul style="list-style-type: none"> ➤ An atom is the smallest particle of an element. ➤ It is not capable of independent existence. ➤ The properties of an element depend upon the atoms constituting it. ➤ 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. ➤ 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. ➤ Atomicity (no. of atoms in an entity) of elements and compounds – mono atomic, di atomic, tri atomic, polyatomic. ➤ Associate the first 20 elements in the periodic table with their names and symbols ➤ Valency is the combining capacity of an element or the number of hydrogen atoms with which it combines or replaces. 	<ul style="list-style-type: none"> ➤ Discussing about atoms, molecules and radicals and explain the difference between them. ➤ Discussing different examples of elements having mono, di, tri and poly atomicity. ➤ Preparing a list of some elements and radicals which have valency of 1, 2, 3 and 4. ➤ Conducting a quiz on valency. ➤ Explaining the meaning of valency and correlating the valency with the group number of the periodic table. ➤ Discussing that development of the periodic table is a classification of the element and is based on their physical and chemical properties. 	<ul style="list-style-type: none"> ➤ Periodic table. ➤ Quiz.

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"> ➤ A chemical reaction may take place when two or more reactants come in contact with one another and transfer of energy takes place. ➤ Characteristics of occurrence of a chemical reaction: Change of: <ul style="list-style-type: none"> ☛ Colour ☛ State ☛ Smell ☛ Evolution of gas ☛ Precipitate formed ☛ Heat evolved / released ➤ Chemical Equations: <ul style="list-style-type: none"> ☛ Writing word equations for chemical reactions and emphasize on the observational skills and the names of products formed ☛ Some examples of word equations for practice. 	<ul style="list-style-type: none"> ➤ 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. ➤ Sharing of videos by the teacher of these changes through activities: <ul style="list-style-type: none"> ☛ Colour: KI + Lead acetate reaction. Yellow colour formed. Precipitate is also formed. ☛ Heat NH₄Cl. NH₃ gas is evolved. ☛ HCl+ NaOH; heat is evolved. ➤ 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. ➤ Involving each child to write word equations of some simple reactions. 	<ul style="list-style-type: none"> ➤ PPT/Video

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

Integration: Physics, Geography