

ANNUAL CURRICULUM PLAN 2020 - 21
SUBJECT: SCIENCE
CLASS IX

OVERALL VISION: To develop the student competency of applying scientific knowledge to the solutions of problem, to develop the student curiosity to learn science, to build knowledge base for professional scope of higher science courses.

APRIL TO SEPTEMBER

Chapter	Transaction strategies / Innovative pedagogy	Learning outcome	Core Skills/ Art Integration/ Interdisciplinary Linkages
<p>2. <i>Is matter around us pure</i></p> <ul style="list-style-type: none"> • Mixtures and pure substances • True solution, colloids and suspensions • Separating the components of a mixture • Physical and chemical changes 	<ul style="list-style-type: none"> • The students will <u>relate</u> to the properties of mixtures and pure substances through an <u>activity</u> of homogeneous and heterogeneous substances. • The OLAB activities are shared which include <u>laboratory experiments</u> illustrating the difference in properties of true solution, colloid and suspensions. • The students will be shown <u>audio-visual aids</u> demonstrating the various separation techniques of a mixture. • The OLAB activities are shared which includes a <u>laboratory experiment</u> for understanding the difference in physical and chemical changes. Also they will <u>discuss</u> and tabulate different properties of metals, non-metals and metalloids as learnt in earlier classes. 	<ul style="list-style-type: none"> • To associate the properties of pure substances and mixtures with their use in daily lives. • To compare the properties of true solution, colloids and suspensions. • To analyze the various separation techniques of a mixture depending upon their physical properties. • To build a contrast between physical and chemical changes along with revising about metals, non-metals and metalloids. 	<ul style="list-style-type: none"> • Core skills: Observational skills, Drawing skill, Inquiry skill, Thinking skills Problem solving • Art integration: Identify the properties of dilute, concentrated and saturated solutions by preparing the solutions. • Interdisciplinary linkage: Mathematics Physics
<p>5. <i>The fundamental unit of life</i></p> <ul style="list-style-type: none"> • Cell as structural and functional unit of life • Components of a cell 	<ul style="list-style-type: none"> • The students will <u>explore</u> the topic of cell by <u>describing</u> importance and functions of various cells in multicellular organisms. • The students will be shown OLAB activities including <u>laboratory experiments</u> visualizing onion to observe certain parts of plant and animal cell. Also they will be <u>shown audio-visual aids</u> which showcase the composition and functions of other parts of cell. 	<ul style="list-style-type: none"> • To describe the importance of cell in a living organism from a structural and functional point of view. • To comprehend the various components of cell and their functions. 	<ul style="list-style-type: none"> • Core skills: Observational skills, , Analytical skills, Drawing skills Application • Art integration: Draw the well-labelled diagrams of plant cell and animal cell. • Interdisciplinary linkage: Art Health sciences

<p>6. <i>Tissues</i></p> <ul style="list-style-type: none"> • Presence of tissues in plants and animals • Plant tissues • Animal tissues 	<ul style="list-style-type: none"> • The students will be <u>introduced</u> to the topic of tissues and their growth pattern in plants and animals. • The students will be shown <u>theory-based laboratory experiment</u> using OLABS animated activities, on observing different types of plant tissues under the microscope. Meristematic and permanent tissues will be <u>discussed</u> along with their types and functions. Diagrams will be <u>drawn</u> and practiced for the same. • The OLAB activities will be shared with students on <u>laboratory experiment</u> for observing cheek cells as a part of animal tissues (squamous epithelial tissues) and other animal tissue slides. 	<ul style="list-style-type: none"> • To classify growth pattern of tissues in plants and animals. • To analyze the different types of plant tissue and their structure. • To discover the different animal tissues and their structure. • To cherish God’s creation of plants and animals as simple yet complex organisms on Earth. 	<ul style="list-style-type: none"> • Core skills: Observation, Analytical, Classification skill, Thinking skill • Art integration: Make the models of different animal and plant tissues using clay. Correlate the shapes with their function. • Interdisciplinary linkage: Medical science
<p>8. <i>Motion</i></p> <ul style="list-style-type: none"> • Motion and its types • Rate of change of motion and velocity • Graphical derivation of equations of motion • Uniform circular motion 	<ul style="list-style-type: none"> • The students will be asked to <u>recollect</u> the earlier knowledge base as a part of quiz and <u>classify</u> motion into uniform and non-uniform. • The students will <u>discuss</u> concepts of average speed and average velocity, distance and displacement along with scalar and vector quantities. • The students will <u>plot graphs</u> for deriving equations of motion representing physical quantities like acceleration and distance. • The students will <u>correlate</u> the physical concept of uniform circular motion will daily life examples and <u>illustrations</u> in class. 	<ul style="list-style-type: none"> • To recapitulate the concept of motion from earlier classes. • To anticipate the quantities of change in motion and velocity with respect to time. • To derive the equations of motion by graphical method. • To demonstrate uniform circular motion in real-life situations. 	<ul style="list-style-type: none"> • Core Skills: Observation skills, Awareness, Analytical skills, Problem solving • Art Integration: Prepare a project on the topic “Graphical Representation of Motion”. Draw 10 graphs of different situations and interpret them. Include various types of graphs like distance-time graph, displacement-time graph, speed-time graph, velocity-time graph in your project. • Interdisciplinary linkage: Mathematics
<p>9. <i>Force and laws of motion</i></p> <ul style="list-style-type: none"> • Balanced and unbalanced forces • The three laws of motion • Conservation of momentum 	<ul style="list-style-type: none"> • The students will be <u>recollecting</u> concepts of force and its two major types through a <u>hands-on activity</u>. • The <u>OLAB activities</u> will be shared with students to explain the three laws of motion, inertia and mass. • The students will <u>discuss and mathematically derive</u> the law of conservation of momentum. Also 	<ul style="list-style-type: none"> • To recapitulate concept of force and its types. • To be able to derive the three laws of motion mathematically and explain them using real-life examples. • To be able to solve questions numerically based on the laws of 	<ul style="list-style-type: none"> • Core Skills: Observation skills, Awareness Analytical skills, Problem solving • Art Integration: The students will perform activities to show inertia of rest and motion. • Interdisciplinary linkage: Mathematics

	they will <u>solve</u> questions numerically based on the laws.	motion and law of conservation of momentum.	
10. <i>Gravitation</i> <ul style="list-style-type: none"> Universal law of gravitation and its importance What is free fall? 	<ul style="list-style-type: none"> The students will <u>derive</u> the universal law of gravitation <u>mathematically</u>. Also they will <u>understand</u> importance of the law using examples. The <u>video link</u> showing free fall will be shared in class group. 	<ul style="list-style-type: none"> To help students determine the value of force exerted on an object under the influence of another object. To analyze the motion of an object under the influence of gravitational force of Earth. 	<ul style="list-style-type: none"> Core Skills: Observation skills, Awareness Analytical skills, Problem solving, Critical thinking Art Integration: Collect newspaper articles on mission Chandrayan-2 and the problems faced by ISRO. Interdisciplinary linkage: Mathematics Space science
15. <i>Improvement in food resources</i> <ul style="list-style-type: none"> Steps for improvement in crop yield Animal husbandry 	<ul style="list-style-type: none"> The students will be <u>shown audio-visual aids</u> illustrating steps taken for managing various farming practices without use of synthetic fertilizers as done in state of Sikkim. 	<ul style="list-style-type: none"> To associate the concept of crop management with students. To sensitize the students about efforts put in the agricultural sector by farmers and the value of food grains reared by them. To introduce the process of animal husbandry and fish breeding for commercial purposes and consumption. 	<ul style="list-style-type: none"> Core Skills: Logical thinking, Observation skills, Awareness Analytical skills Art Integration: Prepare a chart on modern agricultural methods adopted in Sikkim in which farming is carried out without the use of synthetic fertilizers and pesticides. Interdisciplinary linkage: Agricultural science

OCTOBER TO MARCH

Chapter	Transaction strategies / Innovative pedagogy	Learning outcome	Core Skills/ Art Integration/ Interdisciplinary Linkages
3. <i>Atoms and molecules</i> <ul style="list-style-type: none"> Laws of chemical combination Atoms, molecules and their existence Writing chemical formulae 	<ul style="list-style-type: none"> The OLAB activities will be shared with students to observe the laws of chemical combination. The students will <u>discuss</u> about the atomic size, symbol system suggested by Dalton, Berzillus system of symbolic letters followed by IUPAC rules and existence of atoms and molecules. The students will <u>practice writing chemical formulae</u> of compounds as per IUPAC rules and vice-versa. 	<ul style="list-style-type: none"> To introduce the laws of chemical combination. To discover the existence of atoms and molecules of compounds along with their symbolic representation. To develop the skill of writing chemical formulae in symbolic and word representation. 	<ul style="list-style-type: none"> Core Skills: Observation skills, Analytical skills, Critical thinking, Problem solving Art Integration: Find out the evolution of symbols for representation of elements. Interdisciplinary linkage: History, Mathematics

<ul style="list-style-type: none"> • Molecular mass and mole concept 	<ul style="list-style-type: none"> • The students will <u>determine</u> the molecular mass, formula unit mass and molar quantities by <u>solving</u> numerical mathematically. 	<ul style="list-style-type: none"> • To acquaint students with problem solving skill to determine mass of various terms related to a molecule. 	
<p>4. <i>Structure of the atom</i></p> <ul style="list-style-type: none"> • Charged particles of matter • The structure of atom • Electronic distribution and valency • Isotopes and isobars 	<ul style="list-style-type: none"> • The students will be <u>shown audio-visual aids</u> of an experiment showcasing evolution of electrons and protons. • The students will be introduced models of atom proposed by chemists through <u>activity and audio-visual aids</u>. Students will be taken through the path of evolution of models of atom as a part of <u>story-telling</u>. Also they will be shown how these <u>renowned scientists learnt and got encouraged by each other's drawbacks</u>. • The students will <u>discover</u> the rules of showing electronic distribution for an element by <u>abacus method</u> and <u>practice</u> it. Also they will determine its valency using basic mathematics. • The students will cite existence of isotopes and isobars by using the difference and similarity in atomic mass, respectively. They will also learn about their uses through <u>animations</u>. 	<ul style="list-style-type: none"> • To acquaint the concept of electrons and protons. • To explore the different models of atom. • To sensitize students about learning from each other's mistakes instead of giving negative feedback. • To determine the electronic distribution and valency of an element. • To define isotopes and isobars along with stating their uses. 	<ul style="list-style-type: none"> • Core Skills: Observation skills, Analytical skills, Critical thinking, Problem solving, Drawing skill • Art Integration: Make a clay model of an atom (with Atomic no. between 10 - 20) showcasing their electronic representation. • Interdisciplinary linkage: History, Mathematics, Physics
<p>11. <i>Work and energy</i></p> <ul style="list-style-type: none"> • Work • Energy • Power 	<ul style="list-style-type: none"> • The students will understand the <u>mathematical concept</u> of work, its derivation and application to real life situations by <u>discussion</u>. • The students will be <u>demonstrated</u> various forms of energy using <u>hands-on activity</u> on virtual platform. This will be supported by <u>mathematical derivation of their formulae</u>. • The students will be able to <u>perform</u> conversion of power units <u>mathematically</u>, derive the magnitude and carry forward the importance of conservation of electrical power consumption. 	<ul style="list-style-type: none"> • To acquaint students will physical concept of work and its mathematical application. • To substitute hard work with smart work for better results. • To introduce the phenomenon of energy to students. This can be applied to other topics as and when required. • To administer conversion of power units and other derivation required in daily life. • To sensitize students about prohibiting power wastage. 	<ul style="list-style-type: none"> • Core Skills: Observation skills, Analytical skills, Critical thinking, Problem solving • Art Integration: Observe different activities around you and list out the actual work done in the sense of Physics. • Interdisciplinary linkage: Mathematics

<p>13. <i>Why do we fall ill</i></p> <ul style="list-style-type: none"> • Health and its failure • Disease and its cause • Infectious diseases 	<ul style="list-style-type: none"> • The students will <u>discuss</u> the definition of health as per each individual and the causes for their declining health if any. • By recollecting their memory over the previous year the students will <u>state</u> any two or three diseases and its cause according to them. • The students will be shown <u>audio-visual aids</u> of methods of spread in infectious diseases. Also they will be educated about the causative organism and proposed treatment through <u>discussion</u>. • The students will be shown <u>videos</u> of correct steps to be taken during contacting a person suffering from an infectious disease. 	<ul style="list-style-type: none"> • To explore the topic of health in students' mind. • To enable students to differentiate between acute and chronic diseases along with their causes. • To indicate the cause of an infectious disease. • To encourage correct principle of prevention and treatment against superstitious methods to cure an infection. • To remove the social taboo against a HIV infected person. 	<ul style="list-style-type: none"> • Core Skills: Observation skills, Analytical skills, Critical thinking, Logical thinking, Application • Art Integration: Conduct a survey to check awareness of various diseases. It can be supported with a video-interview with specialists. • Interdisciplinary linkage: Health Sciences, Psychology
<p>14. <i>Natural resources</i></p> <ul style="list-style-type: none"> • Air • Water • Mineral riches in the soil • Biogeochemical cycles • Ozone layer 	<ul style="list-style-type: none"> • The students will observe <u>audio-visual aids</u> showcasing the availability of natural resources on Earth's surface. Also they will hold a <u>group discussion</u> about the ways they are exploited, polluted and the steps which should be taken to reduce their wastage. • The students will be shown <u>audio-visual aids</u> to discuss the regulation of water, nitrogen, carbon and oxygen in the atmosphere. Also greenhouse effect will be <u>discussed</u>. • The students will be presented with <u>newspaper clips and interviews</u> expressing concern over importance of ozone layer and its damage. 	<ul style="list-style-type: none"> • To sensitize students about the percentage of breathing air around them and how human activities are harming them around the world. • To illustrate regulation of water, nitrogen, carbon and oxygen in the atmosphere using well-labelled diagrams. • To sensitize students with role of ozone layer in atmosphere and prohibition of human activities which damage the ozone layer. 	<ul style="list-style-type: none"> • Core Skills: Observation skills, Analytical skills, Critical thinking, Problem solving, Application • Art Integration: Prepare a brief write up on any one concept of Air / Water / Soil pollution as a part of your subject Portfolio. You can support your report with a concept-related case study. • Interdisciplinary linkage: Geology