

Espalier-The Heritage School										
Annual Academic Planning (2021-22)										
Grade: IX			Subject : Science							
Sr no	Lesson name	Learning objectives/Subtopics	Methodology	Teaching Aid	Location	Learning Outcome	Reff books with pg. no.	No. of lectures required	Activities/ Diagram/ Map work	Art Integration
1	Matter in our surroundings	Physical nature of matter, Characteristics of particles of matter, particles of matter attract each other, States of matter, can matter change its state?, Evaporation	1) Kinesthetic method 2) Lecture cum Demonstration 3) Technology based	PPT , Videos , Flow chart	Google Classroom	Matter is made up of small particles, the Matter around us exists in three states-solids, liquids and gas , the forces of attraction between the particles are maximum in solids, intermediate in liquids and minimum in gases, the states of Matter are inter-convertible, sublimation is the change of solid state directly to gaseous state without going through liquid state, boiling is a bulk phenomenon, evaporation is a surface phenomenon, evaporation causes cooling.	1) NCERT textbook	10	Activity- 1.1, 1.3 , 1.7, 1.8, 1.10, 1.11	Take 5ml of water in a test tube and keep it near a window or under a fan. Take 5ml of water in a dish keep it near window or under a fan, take 5ml of water in dish and keep it inside or on a shelf in your room. What do you infer about the effect of temperature , surface area and wind velocity on evaporation.
2	Is matter around us pure?	What is a mixture?, What is a solution?, What is a suspension?, Physical and chemical changes, Pure substances,	1) Kinesthetic method 2) Lecture cum Demonstration 3) Technology based	Flowchart, videos, PPT	Google Classroom	A mixture contains more than one substance mixed in any proportion, mixtures can be separated into pure substances using appropriate separation techniques, a suspension is a heterogeneous mixture, colloids are heterogeneous, Colloids are useful in industries and daily life, pure substances can be elements or compounds.	1) NCERT textbook	12	Make a flow chart of matter in detail, observe churning of milk, collect colloidal substances that you use in your house.	Take an earthen pot , some pebbles and sand. Design a small scale filtration plant that you could use to clean muddy water
3	Atoms and Molecules	Laws of chemical combination, What is an atom, symbols of elements, what is a molecule?, what is an ion?, writing chemical formulae, molecular mass and mole concept,	1) Inquiry based 2) Lecture cum demonstration based 4) Technology based	PPT, videos, images, charts.	Google Classroom	An atom is the smallest particle of the element, during a chemical reaction, the sum of the masses of the reactants and products remains unchanged, valency, the Avogadro constant, mass of 1 mole of a substance is called its molar mass.	1) NCERT textbook	12	Make chart-Name and symbols of some elements, Atomic masses of important elements.	
4	Structure of the atom	Charged particles in Matter, The structure of an atom, Thomson's model of an atom, Rutherford's model of an atom, Bohr's model of an atom, neutrons, electronic distribution, valency, Atomic number and mass number, isotopes, Isobars.	1) Inquiry based 2) Lecture cum demonstration based 4) Technology based	PPT, videos, quiz, images.	Google Classroom	J.J Thomson proposed that electrons are embedded in a positive sphere, Rutherford's alpha particle scattering experiment led to the discovery of the atomic nucleus, Bohr's model of atom was more successful, he proposed that electrons are distributed in different shells, J. Chadwick discovered presence of neutrons in the nucleus of an atom, Shells of an atom are designated as K, L, M, N , valency is combining capacity of an atom, the atomic number of an element is same as the number of protons in an atom, mass number of an atom is equal to total number of neutrons and protons in an atom, isotopes are the atoms of same element having different mass number and elements are defined by the number of protons they possess.	1) NCERT textbook	8	Activity- comb dry hair and then see if the comb attracts small pieces of paper..Make a chart - compare the properties of electrons, protons and neutrons( notebook)	make a chart- schematic atomic structure of the first eighteen elements.
5	The Fundamental Unit of Life	Introduction to cell, structural organization of cell- Prokaryotic and eukaryotic cells, cell structure in eukaryotes, cell membrane (diffusion, osmosis, isotonic, hypotonic, hypertonic solutions), cell wall in plants, nucleus (chromosomes, chromatin), cytoplasm, organelles ( ER, RER, SER, Golgi Apparatus, Lysosomes, Mitochondria, Plastids, Vacuoles), Cell division	1) Kinesthetic method 2) Lecture cum Demonstration 3) Technology based	PPT, Videos, Images	Google Classroom	Cells are the basic structural and functional unit of life, Identification and differentiation of Prokaryotic and Eukaryotic cell, Structural organisation of cell, Distinguish between plant cell and animal cell, Explain the function of cell wall in plants, nucleus, cytoplasm, Cell organelles, Draw labelled diagram of prokaryotic cell, animal cell, plant cell	NCERT textbook	12	Put dried raisins or apricots in plain water and leave them for some time. Then place them into a concentrated solution of sugar or salt, Draw labelled diagram of prokaryotic cell, animal cell, plant cell	

6	Tissues	Introduction to tissues, Plant tissues- Meristematic tissue, Permanent Tissue ( Simple permanent tissue, complex permanent tissue), Animal tissues- Epithelial tissue, Connective tissue, Muscular tissue, Nervous tissue	1) Inquiry based 2) Lecture cum demonstration based 4) Technology based	PPT, Videos, Images, Flowcharts	Google Classroom	Tissue is a group of cells similar in structure and function, Plant tissues are of two main types – meristematic and permanent, Permanent tissues are classified as simple and complex tissues, Parenchyma, collenchyma and sclerenchyma are three types of simple tissues, Xylem and phloem are types of complex tissues, Animal tissues can be epithelial, connective, muscular and nervous tissue, Depending on shape and function, epithelial tissue is classified as squamous, cuboidal, columnar, ciliated and glandular, The different types of connective tissues in our body include areolar tissue, adipose tissue, bone, tendon, ligament, cartilage and blood, Striated, unstriated and cardiac are three types of muscle tissues, Nervous tissue is made of neurons, Draw labelled diagram of section of stem, various types of simple tissues, complex tissues, epithelial tissues, connective tissues and muscle fibres, neuron	NCERT textbook		10	Activity- 6.1, 6.5, Draw labelled diagram of section of stem, various types of simple tissues, complex tissues, epithelial tissues, connective tissues and muscle fibres, neuron, Flowchart of permanent tissues	Prepare a model on any one type of epithelial tissue
7	Diversity In Living Organisms	Basis of classification, Classification and Evolution, Hierarchy of Classification, Groups- Monera, Protista, Fungi, Plantae, Animalia, Kingdom Plantae- Thallophyta, Brtophyta, Pteridophyta, Gymnosperms, Angiosperms, Kingdom Animalia- Porifera, Coelenterata, Platyhelminthes, Nematoda, Annelida, Arthropoda, Mollusca, Echinodermata, Protochordata, Vertebrata (Cyclostomata, Pisces, Amphibia, Reptilia, Aves, Mammalia), Nomenclature	1) Inquiry based 2) Lecture cum demonstration based 4) Technology based		Google Classroom	Classification helps us in exploring the diversity of life forms, All living organisms are divided into five kingdoms, namely Monera, Protista, Fungi, Plantae and Animalia, The classification of life forms is related to their evolution, Plantae and Animalia are further divided into subdivisions on the basis of increasing complexity of body organisation, Plants are divided into five groups: Thallophytes, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms, Animals are divided into ten groups: Porifera, Coelenterata, Platyhelminthes, Nematoda, Annelida, Arthropoda, Mollusca, Echinodermata, Protochordata and Vertebrata, The binomial nomenclature makes for a uniform way of identification of the vast diversity of life around us, The binomial nomenclature is made up of two words – a generic name and a specific name, Draw labelled diagram / flowchart of five kingdom classification, classification of plants and animals	NCERT textbook		15	Activity- 7.2, 7.3, 7.4, Draw labelled diagram / flowchart of five kingdom classification, classification of plants and animals	
8	Motion	* Definition of motion and rest * Different types of motion * Difference between distance and displacement, speed and velocity * Scalar and vector quantities * Acceleration * Representation of various types of motion in distance time and velocity time graphs * Derivation of the equations of motion graphically * Uniform circular motion	1) Inquiry based 2) Lecture cum demonstration based 3) Technology based	PPT, Videos	Google Classroom	Students will be able to Define motion and rest List different types of motion Differentiate between distance and displacement, speed and velocity Explain scalar and vector quantities Define acceleration Represent various types of motion in distance time and velocity time graphs Derive the equations of motion graphically Explain uniform circular motion	1) Activities 8.3, 8.7, 8.10	NCERT Text book, CBSE Exemplar	9		
9	Force and laws of Motion	Force and its effects with examples Balanced and unbalanced force Newton's first law of motion with examples Relation between mass and inertia Newton's second law of motion with examples Newton's second law of motion mathematically Newton's Third law of motion with examples Law of conservation of momentum and its expression	1) Inquiry based 2) Lecture cum demonstration based 3) Technology based	PPT, Videos	Google Classroom	Students will be able to Define force and its effects with examples Explain balanced and unbalanced force State Newton's first law of motion and explain it with examples Establish the relation between mass and inertia State Newton's second law of motion and explain it with examples Derive Newton's second law of motion mathematically State Newton's Third law of motion and explain it with examples Explain the law of conservation of momentum and derive its expression SKILLS AND COMPETENCIES- Students would be able to Critically analyse the effects of force Communicate the three laws of motion with examples' Derive expressions mathematically	1) Activities 9.1, 9.2, 9.3 2) Take a big rubber balloon and inflate it fully. Tie its neck using a thread. Also using adhesive tape, fix a straw on the surface of this balloon. • Pass a thread through the straw and hold one end of the thread in your hand or fix it on the wall. • Ask your friend to hold the other end of the thread or fix it on a wall at some distance. This arrangement is shown in Fig. 9.15 (in text book) • Now remove the thread tied on the neck of balloon. Let the air escape from the mouth of the balloon. • Observe the direction in which the straw moves.	NCERT Text book, CBSE Exemplar	8		

10	Gravitation	Universal law of gravitation - Gravitational force, meaning of gravity Gravitational force of earth Centripetal force, Unit and value of G, Applications of universal law of gravitation Free fall, acceleration due to gravity, unit and value of g Mass and weight, derive the relation $W_m = 1/6 W_e$ , Thrust and pressure, define 1 Pascal, buoyancy, Archimedes' principle, applications of Archimedes' principle Relative density	1) Inquiry based 2) Lecture cum demonstration based 3) Technology based	PPT, Videos	Google Classroom	Students will be able to • Discuss the importance of gravitation in our daily life • Define universal law of gravitation and appreciate its importance • Understand why things sink or float • Understand Archimedes' principle and its applications SKILLS AND COMPETENCIES- Students would be able to • Critically analyse gravitation and its importance around us • Appreciate the importance of universal law of gravitation • Perform activities creatively to understand various • Answer knowledge, understanding, application and diagrammatic skill based questions based on the topic.	1) Activities 10.2, 10.3, 10.4 2) Archimedes' principle - Take a piece of stone and tie it to one end of a rubber string or a spring balance. • Suspend the stone by holding the balance or the string • Note the elongation of the string or the reading on the spring balance due to the weight of the stone. • Now, slowly dip the stone in the water in a container	NCERT Text book, CBSE Exemplar	9	
11	Work and Energy	Work and its formula. Positive, zero, negative work. Kinetic energy Potential energy Potential energy of an object at a height Conservation of energy Rate of doing work-Power Commercial unit of energy	1) Inquiry based 2) Lecture cum demonstration based 3) Technology based	PPT, Videos	Google Classroom	Students will be able to Discuss positive, negative and zero work with the help of examples Appreciate the need of electric power Aware of the importance of sources of energy SKILLS AND COMPETENCIES- Students would be able to Critically analyse how work is done Appreciate the importance of energy collaboratively Classify energy as kinetic, potential Answer knowledge, understanding, application and diagrammatic skill based questions based on the topic	1) Activities 11.6, 11.7, 11.8, 11.9 2) Take a close look at the electric meter installed in your house. Observe its features closely. • Take the readings of the meter each day at 6.30 am and 6.30 pm. • Do this activity for about a week. • How many 'units' are consumed during day time? How many 'units' are used during night? • Tabulate your observations. • Draw inferences from the data. • Compare your observations with the details given in the monthly electricity bill (One can also estimate the electricity to be consumed by specific appliances by tabulating their known wattages and hours of operation).	NCERT Text book, CBSE Exemplar	8	
12	Sound	Production of sound Propagation of sound Sound needs a medium to travel Sound waves are longitudinal waves Characteristics of a sound wave Reflection of sound Echo Reverberation Uses of multiple reflection of sound Range of hearing Applications of ultrasound Sonar Structure of human ear	1) Inquiry based 2) Lecture cum demonstration based 3) Technology based	PPT, Videos	Google Classroom	Define the term sound. Understand and describe the propagation of sound waves in day to day life Define and understand wave motion. Define and give examples for types of waves. Understand and describe the types of wave motion. Define crest and trough in a transverse wave with displacement-distance graph. Define rarefaction and compression in a longitudinal wave with displacement-distance graph. Differentiate between transverse and longitudinal waves. Define amplitude and what is its SI unit? Define frequency, time period, amplitude and wavelength and what is their SI units? Comprehend and solve numerical based on the relation between frequency, wavelength and velocity of a wave. Compare the speed of sound with light. Compare speed of sound in different types of medium. Define and give examples for infrasonic and ultrasonic waves. Define a sonic boom. Define all the 3 characteristics of sound. Explain the various factors on which these characteristics individually depend. Define reflection of sound. State the two laws of reflection for sound waves Define echo. Define ultrasound and application of ultrasound waves.	Bell jar experiment showing sound cannot travel in vacuum	NCERT Text book, CBSE Exemplar	11	Draw a neat labeled diagram of human ear. Explain how the human ear works

13	Why do we fall ill?	Health and its failures, Distinctions between healthy and disease-free, Disease and its causes- Acute and chronic disease, Infectious causes, Infectious diseases- Infectious agents, Means of spread, Organ specific and tissue specific manifestations, Principles of treatment and prevention, Immunisation	1) Inquiry based 2) Lecture cum demonstration based 4) Technology based	PPT, Videos, Flowcharts	Google Classroom	The significance of health, difference between healthy and disease-free, What does disease look like?, Classification of diseases into- Acute and chronic diseases, Disease may be due to infectious or non-infectious causes, Infectious agents belong to different categories of organisms, The category to which a disease-causing organism belongs decides the type of treatment, Infectious agents are spread through air, water, physical contact or vectors, Infectious disease can be prevented by public health hygiene measures, Principles of treatment and prevention, Immunisation can also be used to prevent infectious diseases.	NCERT textbook	10	Make a chart on the five 'F's - What is to be done?, Activity- 13.4, 13.5, 13.6, 13.7	Design a poster to spread awareness on infectious diseases
14	Natural Resources	The breath of life: air, role of atmosphere in climate control, the movement of air: winds, rain, air pollution, water a wonder liquid, water pollution, minerals, biogeochemical cycles, the water cycle, the nitrogen cycle, carbon cycle, the green house effect, oxygen cycle, ozone layer..	probing , technology based	PPT, Videos, Images	Google Classroom	Life on earth depends on resources like soil, water and air, and energy from the sun, uneven heating of air over land and water bodies causes winds, evaporation of water, from water bodies and subsequent condensation give us rain, rainfall patterns depend on the prevailing wind patterns in an area, various nutrients are used again and again in a cyclic fashion, pollution of air, water and soil affect the quality of life and harm the biodiversity, we need to conserve our natural resources and use them in a sustainable manner.	NCERT textbook	9	Activity- 14.1, 14.2, 14.7, 14.10, 14.11, draw carbon cycle, nitrogen cycle, water cycle, oxygen cycle in notebook.	Make a rain gauge,
15	Improvement in food resources	Improvement in Crop Yields, Crop variety improvement, Crop production management- Nutrient management (Manure, Fertilizers), Irrigation, Cropping patterns, Cropping protection management, Storage of grains, Animal husbandry- Cattle farming, Poultry farming (Egg and Broiler production), Fish production- Marine fisheries, Inland fisheries, Bee-keeping	1) Inquiry based 2) Lecture cum demonstration based 4) Technology based	PPT, Videos, Images	Google Classroom	Nutrients essential for plants, How do biotic and abiotic factors affect the crop production?, Desirable agronomic characteristics for crop improvement, How do plants get nutrients?, Use of manure and fertilizers in maintaining soil fertility, Different cropping patterns include mixed cropping, inter-cropping and crop rotation, Factors responsible for loss of grains during storage, What is animal husbandry?, Commonly used methods to improve cattle breeds, Differentiate between broilers and layers and their management, How are fishes obtained ?, Advantages of composite fish culture, Desirable characters of bee varieties suitable for honey production	NCERT textbook	10	,	Design a poster on bee keeping