LOTUS PETAL SENIOR SECONDARY SCHOOL
GRADE - 9
SUBJECT - SCIENCE

Month	Chapter	Learning objectives	Teaching Methods	Learning Outcomes	Subject Enrichment Activity	Art Integration /Multi-Disciplinary
April 18	Chapter 1: Matter in Our Surroundings	Understand the difference between **pure substances and mixtures**. Classify mixtures into **homogeneous and heterogeneous mixtures** with examples. Learn different **separation techniques** for mixtures (filtration, distillation, chromatography, etc.). Differentiate between **elements, compounds, and mixtures**. Explore **real-life applications** of separation techniques in industries and daily life.	**Lecture & Discussion:** Explain **pure substances, mixtures, and separation techniques**. **Hands-on Demonstrations:** • Separate **salt from water through evaporation**. • Show **chromatography using ink separation on filter paper**. • Use a **magnet to separate iron filings from sand**. **Experiments & Practical Activities:** • Perform **filtration using sand and water**. • Demonstrate **distillation using**	- Define **pure substances and mixtures** and classify them correctly. Differentiate between **homogeneous and heterogeneous mixtures**. Understand and apply **various separation techniques**. Explain the importance of **mixtures and compounds in daily life**. Identify **real-life applications of separation processes** in medicine, food, and environmental science.	**Mixture Identification Activity:** Bring everyday items (milk, saltwater, soil) and classify them as **pure substances or mixtures**. **Separation Challenge:** Give students a mixture of sand, salt, and iron filings and let them **figure out how to separate each component**. **Poster & Infographic Making:** Create a **visual representation of different separation techniques and their applications**. **Field Visit:** Visit a **water purification plant or a food processing industry** to	- Create a 3D model of particles in solids, liquids, and gases. - Draw and label a poster showing the interconversion of states of matter. **Collage Making:** Show different states of matter (solid, liquid, gas) using real-life examples. - **Clay Modeling:** Create 3D models of molecular arrangements in solids, liquids, and gases. - **Poster Making:** Design an artistic infographic on the **kinetic theory of matter**.

			simple lab apparatus. **Multimedia & Digital Tools:** Use **videos and animations** to show how **separation techniques work in industries** (e.g., oil refining, water purification).		see separation techniques in action.	
	Chapter 7: Motion	Understand the concept of **motion** and differentiate between **uniform and non-uniform motion**. Learn the differences between **distance and displacement**, **speed and velocity**, and **acceleration**. Interpret and analyze **graphical representations of motion** (distance-time and velocity-time graphs). Derive and apply **equations of motion** to solve numerical problems. Understand the concept of **circular motion** and its applications in daily life.	**Lecture & Discussion:** Explain **types of motion, equations of motion, and graphical analysis**. **Demonstrations & Experiments:** ● **Rolling ball experiment:** Show how objects move on different surfaces to explain **speed and acceleration**. ● **Toy car experiment:** Use a toy car on an inclined plane to demonstrate **acceleration and velocity changes**. **Graphical Representation:** ● Let students **plot distance-time and velocity-time graphs** using real-life examples. **Multimedia & Simulations:** Use **animated videos** to illustrate **motion, acceleration,**	Define and differentiate **types of motion** and related concepts. Interpret **distance-time and velocity-time graphs**. Apply **equations of motion** to solve real-world problems. Explain **circular motion and its significance** in planetary motion and artificial satellites. Develop **graphing and analytical skills** through numerical problem-solving.	● **Motion Graph Activity:** Give students a dataset of **a moving vehicle's speed and time** and let them plot the motion graph. ● **Human Motion Experiment:** Record students walking or running different distances and analyze their **speed, velocity, and acceleration**. ● **Numerical Problem Solving:** Assign **real-life motion problems** involving **equations of**	- Create a graph showing different types of motion. - Make a storyboard explaining motion concepts. - **Sketching & Perspective Drawing:** Illustrate types of motion (uniform, non-uniform, circular, etc.). - **Theatrical Representation:** Act out **real-life scenarios** (e.g., a bus accelerating, a ball in free fall) to demonstrate motion. - **Animation & Digital Art:** Create **simple animations** showing distance-time and velocity-time graphs.

			and graph interpretation.		**motion and acceleration**. • **Field Study:** Visit an **amusement park** or **traffic signals** to analyze examples of circular and uniform motion.	
May 11	Chapter 2: Is Matter Around Us Pure?	Understand the difference between **pure substances and mixtures**. Classify mixtures into **homogeneous and heterogeneous mixtures** with examples. Learn different **separation techniques** for mixtures (filtration, distillation, chromatography, etc.). Differentiate between **elements, compounds, and mixtures**. Explore **real-life applications** of separation techniques in industries and daily life.	**Lecture & Discussion:** Explain **pure substances, mixtures, and separation techniques**. **Hands-on Demonstrations:** • Separate **salt from water through evaporation**. • Show **chromatography using ink separation on filter paper**. • Use a **magnet to separate iron filings from sand**. **Experiments & Practical Activities:** • Perform **filtration using sand and water**. • Demonstrate **distillation using simple lab apparatus**.	• Define **pure substances and mixtures** and classify them correctly. • Differentiate between **homogeneous and heterogeneous mixtures**. • Understand and apply **various separation techniques**. • Explain the importance of **mixtures and compounds in daily life**. • Identify **real-life applications of separation processes** in medicine, food, and environmental science.	**Mixture Identification Activity:** Bring everyday items (milk, saltwater, soil) and classify them as **pure substances or mixtures**. **Separation Challenge:** Give students a mixture of sand, salt, and iron filings and let them **figure out how to separate each component**. **Poster & Infographic Making:** Create a **visual representation of different separation techniques and their applications**. **Field Visit:** Visit a **water purification plant or a food processing industry** to see separation	- Create a diagram explaining the separation of mixtures. **- Tie-Dye & Fabric Art:** Show the concept of **mixtures and separation** by making tie-dye patterns. **- Collage Work:** Display **pure substances vs. mixtures** using magazine cutouts. **- Clay Modeling:** Make **3D representations** of heterogeneous and homogeneous mixtures.

			Multimedia & Digital Tools: Use **videos and animations** to show how **separation techniques work in industries** (e.g., oil refining, water purification).		techniques in action.	
May	Chapter 5: The Fundamental Unit of Life	Understand the **cell as the structural and functional unit of life**. Learn about the **structure and functions of cell organelles** (nucleus, mitochondria, ribosomes, etc.). Explain the concepts of **osmosis, diffusion, and active transport** in cells. Differentiate between **plant and animal cells** based on structure. Understand the **importance of cell division (mitosis and meiosis)** in growth and reproduction. .	**Lecture & Discussion:** Explain the **cell theory, functions of cell organelles, and cell division**. **Microscopic Observation:** Observe **onion peel and cheek cells under a microscope** to understand **cell structure**. **3D Model Making:** Use **clay, thermocol, or 3D printing** to create **plant and animal cell models**. **Experiments & Demonstrations:** ● Perform an **osmosis experiment using raisins or potatoes in different solutions**. ● Show **diffusion using colored water and ink**. **Multimedia & Digital Tools:** Use **videos and animations** to illustrate **cell structure, organelle functions, and mitosis/meiosis**.	Define **cells and their significance** in living organisms. Identify and describe the **structure and functions of different cell organelles**. Differentiate between **plant and animal cells**. Explain the processes of **diffusion, osmosis, and active transport**. Understand the importance of **cell division in growth and reproduction**.	**Cell Model Making:** Create **3D models of plant and animal cells** using household materials. **Microscopic Sketching:** Draw **plant and animal cells** after observing them under a microscope. **Poster & Infographic Creation:** Design **an artistic representation of a cell and its organelles**. **Quiz & Crossword Puzzle:** Conduct a **cell-based quiz or crossword** to reinforce learning.	- Make a model of a plant or animal cell. **- Diagram & Poster Making:** Create **detailed artistic diagrams** of plant and animal cells. **- Clay Modeling:** Construct **3D cell models** using colored clay or beads. **- Theatrical Play:** Enact the **story of a cell**, explaining organelles' roles.
July 16	Chapter 8: Force and Laws of	Understand the concept of **force and its effects** on objects.	**Lecture & Discussion:** Explain **Newton's Laws with real-world examples**.	● Define **force and its effects** on objects.	**Momentum Conservation Experiment:**	- Draw and label diagrams showing the three laws of motion.

	Motion	Learn about **balanced and unbalanced forces** and their real-life applications. Explain **Newton's Three Laws of Motion** with examples. Understand the concepts of **inertia, momentum, and conservation of momentum**. Apply Newton's laws to **solve numerical problems** related to force and motion.	**Demonstrations & Experiments:** ● **Inertia Experiment:** Place a card on a glass with a coin on top, then flick the card to show inertia. ● **Action-Reaction Demonstration:** Inflate a balloon and release it to show Newton's Third Law. **Hands-on Learning:** ● Use a **spring balance to measure force** applied on objects. **Multimedia & Simulations:** Show **videos or animations of car crashes, rockets, and sports** where Newton's Laws apply.	● Differentiate between **balanced and unbalanced forces**. ● Explain **Newton's Three Laws of Motion with real-life applications**. ● Apply the concept of **momentum and its conservation in real-world situations**. ● Solve **numerical problems** based on force, acceleration, and momentum.	● Use **marbles or toy cars on a track** to demonstrate conservation of momentum. **Newton's Third Law Practical:** ● Build a **balloon-powered rocket** to demonstrate **action and reaction forces**. **Sports & Motion Analysis:** ● Analyze how Newton's Laws apply in **sports like football, cricket, and car racing**. **Poster Making:** ● Design an **infographic on Newton's Laws and their applications in daily life**.	**- Sketching & Infographics:** Draw **examples of Newton's three laws** in daily life. **- Collage Work:** Create a **photo collage of real-world applications** of force and motion. **- Drama & Role Play:** Perform a **skit on inertia, momentum, and action-reaction forces** (e.g., a football game, a rocket launch).
August	Chapter 6:	Understand the **structure and**	**Lecture & Discussion:**	Differentiate between **plant**	**Tissue Model Making:**	- Create a

14	Tissues	**function of plant and animal tissues**. Learn the classification of **plant tissues (meristematic and permanent tissues)**. Identify different **types of animal tissues (epithelial, connective, muscular, nervous)**. Analyze the role of **specialized cells in tissue formation and organ function**. Explore the **importance of tissues in multicellular organisms**.	Explain **types of tissues with examples**. **Microscopic Observation:** Observe **plant and animal tissues under a microscope**. **Hands-on Learning:** Use **onion peel and cheek cell experiments** to study tissue structure. **Case Studies:** Discuss real-life examples of **tissue specialization in plants and animals**.	**and animal tissues**. Identify and describe **different types of tissues and their functions**. Explain the role of **tissues in the organization of organs and systems**. Analyze the **specialization of tissues in different organisms**. Relate tissue functions to **daily life applications (e.g., muscle movement, wound healing, plant growth)**.	Create **3D models of different tissues using clay or paper**. **Microscopic Drawing:** Sketch **plant and animal tissues as observed under the microscope**. **Poster & Diagram Making:** Illustrate **various tissues with their functions**. **Research & Presentation:** Study **tissue engineering and its medical applications**.	comparative chart of plant and animal tissues. **Clay Modeling & 3D Art:** Make **models of plant and animal tissues** using different textures. - **Photography & Digital Art:** Capture **microscopic images of tissue samples** and analyze their structures. - **Poster Making:** Design an **artistic infographic** on the importance of tissues in multicellular organisms.
September 8	Chapter 3: Atoms and Molecules	Understand the **laws of chemical combination** (Law of Conservation of Mass & Law of Constant Proportions). Learn about **Dalton's Atomic Theory** and its postulates. Explain the concept of **atoms, molecules, and their formation**. Understand **molecular mass, atomic mass, and the mole concept**. Apply the concept of **chemical formulas** to write and interpret compounds.	**Lecture & Discussion:** Explain **atomic theory, laws of chemical combination, and chemical formula writing**. **Hands-on Demonstration:** Show **mass conservation** through a simple chemical reaction in a closed container. **Problem-Solving Sessions:** Solve **numerical problems on molecular mass, atomic mass, and mole concept**. **Multimedia & Digital Tools:** Use **animated videos to demonstrate molecular structures and atomic interactions**.	Define **atoms and molecules** and their role in chemical combinations. Explain **Dalton's Atomic Theory and its limitations**. Apply the **Law of Conservation of Mass and Law of Constant Proportions**. Calculate **molecular and atomic masses** and understand the **mole concept**. Write and interpret **chemical formulas of compounds**	**Mass Conservation Experiment:** Conduct a simple **chemical reaction in a closed system** to verify the law of conservation of mass. **Molecular Model Making:** Build **3D models of molecules like H_2O, CO_2, CH_4 using clay, beads, or balls**. **Chemical Formula Puzzle:** Create a **matching game for chemical symbols and their corresponding molecules**.	- Create flashcards of common chemical formulae. - **Sculpting & Model Making:** Build **3D molecular models** using beads or clay. - **Calligraphy & Typography:** Write chemical formulas in **artistic calligraphy**. - **Collage Work:** Make a **visual representation of molecular compounds and their real-life**

					Collage Work: Make a **visual representation of atomic structures and common molecules in daily life**.	**applications**.
October 10	Chapter 4: Structure of the Atom	Understand the **historical models of the atom** (Dalton, Thomson, Rutherford, Bohr). Learn about **subatomic particles (protons, neutrons, electrons) and their properties**. Define and calculate **atomic number, mass number, and valency**. Explain the concept of **isotopes and isobars** and their real-life applications. Understand **electronic configuration and distribution of electrons in shells**.	**Lecture & Discussion:** Explain **atomic models and subatomic particles with historical context**. **3D Modeling & Visualization:** Create **models of atoms using beads, clay, or digital tools**. **Multimedia & Simulations:** Use **animated videos to show the structure of atoms and electron distribution**. **Problem-Solving Sessions:** Solve **numerical problems related to atomic number, mass number, and electronic configuration**.	Describe the **evolution of atomic models and their significance**. Identify the **subatomic particles and their properties**. Determine the **electronic configuration and valency of elements**. Explain the **concept of isotopes and isobars with real-life applications**. Analyze **Bohr's atomic model and energy levels of electrons**.	**Clay Modeling:** Create **3D models of atoms** with different elements. **Periodic Table Art:** Design an **artistic representation of atomic structures**. **Collage Work:** Make a **visual representation of isotopes used in medicine and industry**. **Group Debate:** Discuss the **importance of atomic structure in modern chemistry and technology**.	- Draw atomic structures of common elements. **- Creative Digital Art:** Design an **infographic showing atomic structure** with electrons, protons, and neutrons. **- Clay Modeling:** Make **Bohr's atomic models** of different elements. **- Theatrical Role Play:** Act as **subatomic particles** and demonstrate their interactions.
October	Chapter 10: Work and Energy	Understand the concept of **work** and how it depends on **force and displacement**. Learn the scientific definition of **positive, negative, and zero work**. Understand the concept of **energy** and its different forms (kinetic and potential). Explain the **work-energy theorem** and the **law of conservation of energy**. Explore real-life applications of **energy transformation** in machines and nature.	**Lecture & Discussion:** Explain **work, energy, and their mathematical derivations**. **Experiments & Demonstrations:** • Use a **ball rolling on an inclined plane** to demonstrate the conversion of **potential energy to kinetic energy**. • Lift different weights and discuss **when**	Define **work** and **calculate it using force and displacement**. Differentiate between **kinetic and potential energy** and explain their mathematical relationships. Apply the **law of conservation of energy** in real-life scenarios. Understand how **energy is converted and utilized in various systems**. Identify **renewable and non-renewable energy sources**	**Pendulum Experiment:** Observe how energy transforms between **kinetic and potential forms**. **Spring Compression Activity:** Use a **spring-loaded toy or rubber band** to study potential energy. **Real-Life Energy Survey:** Research and present on **household appliances and their energy consumption**.	- Draw diagrams showing different forms of energy. **- Photography & Infographics:** Capture images of **real-life work and energy transformations** (e.g., hydroelectric dams, running, lifting objects). **- Poster Making:** Create **illustrations of renewable and**

			work is done and when it isn't. **Multimedia & Simulations:** Show **animations on energy conservation in roller coasters, hydroelectric plants, and pendulums**. **Problem-Solving Sessions:** Solve numerical problems related to **work, power, and energy transformation**.	and their importance.	**Collage Making:** Create a **visual representation of energy conversion** in different machines.	**non-renewable energy sources**. **- Drama & Storytelling:** Enact **stories on energy conservation and sustainability**.
November 12	Chapter 9: Gravitation	Understand the concept of **gravity** and **Newton's Universal Law of Gravitation**. Learn how gravitational force affects **planets, satellites, and free-falling objects**. Explain the difference between **mass and weight** and their variation with altitude. Understand the concepts of **buoyancy and Archimedes' principle**. Explore the real-life applications of **gravitation in astronomy, tides, and space travel**.	• **Lecture & Discussion:** Explain **Newton's Law of Gravitation and its applications**. • **Demonstrations & Experiments:** ○ Drop objects of **different masses from the same height** to show they fall at the same rate in a vacuum. ○ Show **buoyancy** by immersing objects in water to compare floating and sinking. • **Hands-on Learning:** ○ Conduct a **spring balance**	Explain the **Universal Law of Gravitation** and its significance. Differentiate between **mass and weight** and calculate weight on different planets. Describe the effect of **gravitational force on tides and satellite motion**. Apply **Archimedes' principle** to real-life situations (e.g., submarines, hot air balloons). Understand how **gravitational potential energy** is related to height and mass.	• **Pendulum Experiment:** Use a **simple pendulum to calculate acceleration due to gravity (g)**. • **Floating & Sinking Activity:** Test different objects in water to observe **buoyancy and Archimedes' principle**. • **Astronomy Research Project:** Research and present on **how gravity affects planets, black holes, and space travel**.	- Draw diagrams explaining buoyancy and gravity. **- Clay Modeling & 3D Art:** Make a **model of the solar system** and explain planetary motion. **- Photography & Collage:** Create a **photo collage of gravity in action** (falling objects, tides, satellite orbits). **- Drama & Role Play:** Perform a **skit explaining Newton's discovery of gravity**..

			experiment to measure weight differences in air and water. • **Multimedia & Simulations:** Use **videos and animations** to demonstrate how gravity acts in space and on planets.		• **Math & Physics Integration:** Solve **numerical problems related to gravitational force, weight, and free fall**.	
November	Chapter 11: Sound	Understand the **nature, production, and propagation** of sound. Explain the **characteristics of sound waves** (wavelength, frequency, amplitude). Learn about the **speed of sound in different media**. Explore the concepts of **reflection, reverberation, and echo**. Understand the applications of **ultrasound in medical and industrial fields**.	• **Lecture & Discussion:** Explain **sound waves, their properties, and their behavior in different media**. • **Demonstrations:** Show how **sound travels through air, water, and solids** using simple experiments. • **Experiments:** ○ Use a **tuning fork and water** to demonstrate sound wave propagation. ○ Show **vibrations using rubber bands, drums, and string instruments**. • **Multimedia & Digital Tools:** Use **animations**	• Explain the **production and propagation of sound**. • Differentiate between **longitudinal and transverse waves**. • Understand the **characteristics of sound waves** like pitch, loudness, and timbre. • Apply the concept of **reflection of sound** in real-life scenarios (echo, SONAR). • Analyze the **impact of noise pollution** and suggest control measures.	**Musical Instrument Experiment:** Create a simple instrument (e.g., a rubber band guitar) to study sound waves. **Sound Wave Visualization:** Use a **water-filled bowl and tuning fork** to see how sound waves create ripples. **Echo Measurement Activity:** Find the **minimum distance required for an echo to be heard** in an open space. **Noise Pollution Awareness Project:** Conduct a **survey on noise pollution levels in the school or neighborhood** and suggest control measures.	- Create wave diagrams showing pitch and frequency. - **Musical Art Integration:** Create **a simple musical instrument** (e.g., a rubber band guitar) to study sound waves. - **Sketching & Animation:** Draw and **animate sound wave propagation**. - **Theatrical Representation:** Act out **how sound travels in different mediums**.

			and videos to explain sound wave propagation and reflection. • **Interactive Activities:** Conduct **group discussions on sound pollution and its control measures**.			
December 13	Chapter 12: Improvement in Food Resources	Understand the importance of **food resources** and their management. Explain the methods of **crop production and improvement** (hybridization, GM crops). Identify different **types of nutrients** required by plants and animals. Learn about **animal husbandry and fisheries** as food sources. Recognize the impact of **sustainable agricultural practices** on food security.	**-Lecture & Discussion:** Explain **different agricultural practices, fertilizers, and irrigation techniques**. **Case Studies:** Study the impact of **organic vs. chemical farming** on food production. **Experiments:** Demonstrate the **effect of fertilizers and manure** on plant growth. **Field Visit:** Visit a **farm, dairy, or fishery** to observe modern agricultural practices. **Project-Based Learning:** Assign **group research projects** on sustainable farming.	Identify **different crop varieties and their nutritional needs**. Understand the role of **manure, fertilizers, and irrigation** in agriculture. Explain the importance of **animal husbandry, poultry, and fisheries**. Analyze the benefits and challenges of **organic and inorganic farming**. Suggest ways to improve **food production and sustainability**.	**Soil Testing Experiment:** Test different soil samples for **pH and nutrient content**. **Compost Making:** Students create a **small compost pit** to understand organic manure. **Debate & Discussion:** Discuss **organic vs. inorganic fertilizers** and their impact. **Collage Making:** Display images of **traditional vs. modern farming techniques**.	- Create posters promoting sustainable agriculture. **- Collage & Photography:** Make a **collage of modern and traditional farming techniques**. **- Poster Making:** Design an **infographic on sustainable agriculture**. **- Drama & Role Play:** Perform a **play on the importance of organic farming and GM crops**.