Tamil Nadu Curriculum Framework 2025
Proposed Draft Syllabus, Pedagogical Approaches and Assessment Strategies
Classes 6- 8 - Science

Introduction:

The Tamil Nadu State Education Policy 2025 envisions Science education at the middle school level as a transition from experiential exploration to structured conceptual understanding and scientific reasoning. The Science curriculum for Classes 6 to 8 is designed to strengthen students' abilities in observation, questioning, experimentation, data analysis and logical explanation. It enables learners to understand physical, chemical, biological and earth science phenomena through systematic inquiry and real-life applications. The curriculum emphasises the development of scientific temper, critical thinking, problem-solving and evidence-based reasoning, preparing students to interpret data, evaluate claims and construct logical arguments. By integrating laboratory investigations, field-based learning and contextual problem-solving, students connect scientific concepts with everyday life, environmental issues, technological developments and societal needs. The syllabus also fosters ethical awareness, safety consciousness, environmental responsibility and collaborative learning. Through interdisciplinary linkages and progressive conceptual scaffolding, learners develop deep understanding, curiosity and independent thinking. The curriculum encourages students to question, analyse and logically interpret natural and social phenomena using scientific reasoning. This stage lays a strong foundation for advanced scientific learning while equipping students with essential cognitive, analytical and life skills required for informed decision-making and lifelong engagement with science.

This curriculum emphasises the interconnectedness of knowledge, linking scientific concepts with ideas across other subjects. Students engage directly in scientific inquiry, learning not only to understand principles but also to apply them in everyday life, fostering responsible decision-making and ethical action. Through hands-on exploration, collaborative work and reflective thinking, students develop cognitive and problem-solving skills, an appreciation for the natural world and an understanding that science and technology can enhance quality of life. This approach nurtures self-directed learners who are curious, informed and capable of connecting science with the broader world around them.

This draft syllabus is open for review and further refinement.

COMPETENCY	CLASS 6	CLASS 7	CLASS 8
CG 1: Understands the scientific concepts and laws of the physical world through observation, experimentation and logical analysis.			
C 1.1: Develops the ability to observe, question, experiment, collect and analyse evidence, follows safety practices and applies scientific reasoning to understand the natural world.	**Can we also think like a Scientist?** Ubiquity of Science, evidence-based knowledge of system built by several people, Cumulative Scientific Understanding, Scientific Processes, Purpose and Relevance of Learning Science, Laboratory and Field Safety Practices, Development of Scientific Temper, Attitude, Skills; Experimentation and Inference, Data Collection and Analysis, Drawing Conclusions, Rational Inquiry and Logical Interpretation of Natural and Social Phenomena		
C 1.2: Applies appropriate standard and non-standard units to accurately measure physical quantities (length, mass, time, area, volume and density), estimate values and report results with correct units, accuracy and rounding.		**Measurement and Units** Introduction, Standard and Non-Standard Units, SI Units, Fundamental Quantities: Length, Mass, Time, Area, Volume, Density; Measuring Instruments: Ruler, Vernier Calipers, Measuring Jar, Weighing Balance; Accuracy, Estimation and Rounding off	
C 1.3: Develops the ability to observe and analyse types of motion, the effects of forces and	**Motion:** Rest and Motion, Types of Motion, Distance, Time, Speed, Simple	**Force and Motion:** Force as a Push or Pull, Need for Force to Start, Stop, Change Speed, or Change	**Force and Pressure:** Pressure, Atmospheric Pressure, Liquid Pressure, Buoyant force and Archimedes'

pressure through inquiry and experimentation **C 1.4:** Represents the relation between distance-time using graphs, interprets data and graphs, applies scientific idea of Archimedes principle to understand laws of floatation	numerical problems, Distance–Time Graphical representation, Interpretation of simple graphs, Real life examples - Movement of vehicles and people, Map reading and distance estimation, Travel time comparison between places	Direction of Motion; Effects of Force on Objects, Balanced and Unbalanced Forces, Resultant Effect on Motion, Simple numerical problems, Real-life examples, Normal Force; Contact Force between Surfaces, Types of Forces, Contact and Non-contact Forces, Forces in natural phenomena – wind, flowing water, landslides	principle and laws of floatation, simple numerical problems, applications in biological and engineering fields
C 1.5: Develops the ability to observe and explain the characteristics of light using ray diagrams and reflection principles; analyse image formation in plane mirrors; interpret real life applications of mirrors **C 1.6:** Formulates questions using scientific terminology to explain characteristics of images, identify causes of distorted images; explain with examples of how light-based technology improves everyday life		**Light:** Sources of light, Rectilinear propagation, Formation of shadows, Ray model, Plane mirror, Laws of reflection, Verify laws of reflection, Simple numerical problems, Characteristics of images, Application of mirrors – Kaleidoscope, Periscope	**Light:** Regular reflection, Diffused reflection, distorted reflection, concave and convex mirrors, Simple numerical problems, characteristics of images, applications of spherical mirrors
C 1.7: Understands and analyses heat, temperature, heat capacity, specific heat, thermal equilibrium and latent heat to explain thermal phenomena		**Heat:** Heat and temperature, movement of particles, Temperature Scales - Celsius and Fahrenheit, least count, fixed points (freezing and boiling), conversion of C to F & F to C. Simple numerical problems,	**Heat:** Heat Capacity & Specific Heat, Thermal Equilibrium, Calorimetry, Latent Heat, Simple numerical problems, Good conductors and their uses, Insulation, the working of thermos flask and the logic of

C 1.8: Applies scientific principles to analyse insulation devices, follows safety norms and applies scientific ideas of thermal principles in identifying natural and man-made adaptations to withstand heat		Measurement Tools: Differences between clinical and laboratory thermometers. Changes of State - Complete Cycle. Modes of Transfer of heat: Conduction, Convection, Radiation; Choosing the right materials, heat waves and safety	thermostats, Effects of unequal heating of the Earth's surface (weather, land and sea breeze, existence of wind, rainfall), natural and man-made adaptations to withstand heat, mitigation of heat waves
C 1.9: Describes electric circuits, distinguishes between conductors and insulators, follows electrical safety rules, understands the relationship between current, voltage and resistance, compares series and parallel circuits **C 1.10:** Explores magnetic properties and magnetic fields, applies magnetism concepts to ease everyday life.	**Electricity and Magnetism:** **Electricity:** Electrostatics, Simple Electric Circuit, Components of an Electric Circuit, Circuit Construction and Symbolic Representation: Circuit Diagrams and Symbols, Open and Closed Circuits, Conductors and Insulators, Testing Materials for Conductivity, Everyday Applications, Electrical Safety **Magnetism:** Properties of Magnets, Directional Property, Magnetic Poles, Attraction and Repulsion, Magnetic Field – Simple experiments, Magnetic Field Lines using Iron fillings - Pattern Observation and Interpretation, making of a Magnet, Applications of Magnets		**Electricity and Magnetism:** **Current Electricity:** Electric Current, Potential Difference (Voltage), Electric Resistance, Error / Precision in resistance measurement, Ohm's Law (V = IR), Simple Numerical Problems, Combination of Resistors, Resistors in Series, Resistors in Parallel, Comparison of Series and Parallel Circuits, Household Wiring Logic **Magnetic Effects of Electric Current:** Magnetic Field Due to Electric Current, Magnetic Field Around a Current-Carrying Conductor, Simple Experiments - Direction of Magnetic Field, Right-Hand Thumb (Grip) Rule, Concept and Application
C 1.11: Understands and calculates work, power and energy, identifies different forms and sources of energy, observes and understands energy changes in real-life situations **C 1.12:** Applies scientific knowledge and uses appropriate scientific vocabulary to		**Work, Power and Energy:** **Work:** Concept and definition of work in science - quantification of work done by a steady force, Simple numerical problems, SI Unit of Work (Joule) **Power:** Concept and definition of power, comparison of work vs power, SI units.	

communicate ideas and to promote responsible use of energy		**Energy:** Concept and definition of energy, different forms of energy, conversion of energy, energy flow in daily life systems, energy audit, efficiency comparison, useful and wasted forms of energy, law of conservation of energy, (sources of energy - renewable and non-renewable energy sources)	
C 1.13: Analyses the properties of sound waves, explains propagation of sound, interprets the functioning of the human ear, designs and build simple human ear model **C 1.14:** Uses scientific vocabulary to describe the effects of echo in sound applies its principles to technological and medical contexts			**Sound:** Properties of sound waves (Amplitude, frequency, wavelength), speed, Sound as longitudinal waves, speed of sound in different media, factors affecting speed of sound, Simple numerical problems, Reflection of sound – echo and its application, Structure and functioning of the human ear, Comparison of Hearing Range in Humans, Animals and Birds, Application of Sound: microphones, speakers, sonar, medical uses especially ultrasound, noise pollution, hearing loss
C 1.15: Understands the solar system and Earth's life supporting features, explains the phenomena of seasons and eclipses **C 1.16:** Uses scientific vocabulary to communicate astronomical concepts, formulates questions about space and Earth systems Designs and builds celestial events using	**Solar System:** The Sun, The Moon, Phases of the Moon, Lunar Surface Features, Motion of the Moon around the Earth, Planets and other objects around the Sun, Earth's Position in the Solar System, Causes of Seasons, Seasonal Changes in Earth's Hemispheres, Variation in Day Length, Eclipses: cause- effect model, safe observations.	**Our planet:** Unique feature of earth, Conditions Supporting Life on earth - air, water, temperature, comparison of earth with the Moon and other planets, distribution of water and land on Earth, various layers of atmosphere and its functions - biosphere, lithosphere, troposphere, stratosphere, ionosphere, mesosphere and thermosphere - simple introduction to global cycles (such as rock cycle, carbon	**Space exploration:** Exploring space beyond the Earth, Rockets, Satellites, Application of satellite data, Space probes and Rovers, Crewed space missions, Space Stations, Indian space achievements

models and diagrams, illustrates how ideas about solar system have evolved over time illustrates how scientific knowledge drives space exploration		cycle) & the greenhouse effect / global warming, mitigation of heat waves.	
CG-2: Understands and investigates matter, its properties, changes and uses through observation experimentation and real-life examples			
C 2.1: Understands matter, its particle nature, states and changes to explain everyday physical phenomena. **C2.2:** Understands elements, their classification and material properties using the periodic table and atomic structure.	**Nature of Matter** Matter, States of matter- Solid, Liquid and Gases, Three physical states of water, Spatial distribution of matter, Why ice floats on water? Water - medium of life, Movement of Particles, Size of Particles a comparison, Heat and Kinetic energy, Particle theory of Matter. Changes in the states of Matter due to heating and Cooling - Melting, Vaporisation, Sublimation - Common Misconceptions		**Introduction to Periodic Table** How to study the periodic table, Symbols of Common Elements – Periodic Table – Periodic table formation, atomic number and number of protons in the nucleus - Some properties of metals, Metalloids and non-metals, Activity – arrange using cards
C 2.3: Understands the transition from "Atomos" to "Atoms", Analyses the biological necessity of elements like Calcium, Phosphorus in human bones, Evaluates the relationship between kinetic energy and states of matter.	**Matter Around Us** **Introduction -** Pure and Impure Substances and Mixtures – Definition and Examples, Separation of Mixtures (brief outline with illustrations) – Filtering, Sieving, Churning, Threshing, Winnowing, Handpicking, Magnetic Separation, Properties of Materials – Transparency, Solubility, Heaviness	**Atoms** Graphic story of introduction to Matter (Different characters like Democrats to Dalton interaction) Atoms as fundamental constituent of matter - Elements in everyday life, its occurrence and uses (Gold, Iron, Copper, Oxygen, Carbon, Silicon, Calcium, Chlorine, Helium, Nitrogen, Sulphur, Phosphorous, Sodium, Potassium)	**Nature of Matter** Atoms – Sub-Atomic Particles, Atomic Number and Mass Number, Molecules and Compounds – Chemical formulae (e.g., O_2, N_2, H_2O, CO_2, NaCl, HCl, NH_3, $NaHCO_3$, $Mg(OH_2)$ Writing of Chemical Formulae
C 2.4: Explores how matter changes by studying particle movement and everyday	**Changes Around Us** Introduction, Physical Changes and Chemical Changes, Reversible and	**Changes Around Us** **Introduction -** Idea that matter is made of Particles (Atoms/Molecules –	

examples using observation and experiments. **C 2.5:** Explains the underlying mechanisms of changes around us, applies knowledge to clarify real-world changes, participates in discussions that specify human-induced chemical changes affecting the environment	Irreversible Changes, Types of Chemical Changes (Reactions) – Rusting, Combustion, Changes in Our Daily Life – Cooking, Digestion, Burning, Connection to Environmental Changes- Reducing carbon footprints	Conceptual) (Activity) Molecular level physical changes, Observation and Inference, What happens when water boils? What happens when ice melts? Dissolved gases in water, applications in daily life, beverages, dissolved oxygen for aquatic animals	
C 2.6: Understands pH of different substances used in everyday life, Organises personal diet to regulate body's health and hygiene, Follows the precautions required upon handling corrosive acids		**Acids, Bases** Introduction - Simple tests using household materials (Lemon Juice, Baking Soda, etc.) - Acids – Properties and Uses, Bases – Properties and Uses, Formation of Salts – Neutralisation Reaction, Neutralisation reactions in our daily life, pH concept and acidity/alkalinity in everyday applications.	
C 2.7: Understands the discovery of air as a mixture of gases, Knows about the earth's early atmosphere, Explores a chemical change practically, Analyses the oxidation of metals, Devises pollution control measures		**Gases** Air - Composition of air, Discovery of gases – early experiment H_2, O_2, N_2 (word equations) – Formation of earths early atmosphere – Comparison of atmosphere of other planets – graph Reaction of vinegar or lemon and baking soda forming carbon dioxide	**Chemical Reactions** Let's explore a type of chemical reaction – decomposition reaction, Mention types of Chemical changes (Reactions) – Law of Conservation of Mass (Activity-Based) Applications and Environmental Links – Corrosion, Combustion, Pollution and their Prevention Integration
CG-3: Applies scientific understanding of nutrition, health, hygiene, adolescence and substance awareness to make informed and responsible personal lifestyle choices			
C 3.1: Applies knowledge of food components, balanced diet,	**Health and Hygiene** Importance of food, Components of food – Carbohydrates, proteins, fats,	**Health and Hygiene** Testing for components (starch, fat, protein) Food spoilage, Food processing	

food testing, preservation methods and food labels to promote healthy dietary practices and prevent deficiency and lifestyle diseases.	vitamins, minerals and water; Balanced diet – What is it? Do we eat a balanced diet? Importance of balanced diet, Deficiency diseases, Lifestyle diseases and prevention, Non communicable diseases (NCD), Everyday microbes interaction and basic disease prevention.	and food preservation, Traditional vs modern food habits, Reading food labels and Food miles, distance between place of the food preparation and consumer location – seasonal and local vegetables and fruits.	
C 3.2: Applies understanding of physical and mental changes during adolescence, hygiene practices. **C 3.3:** Identifies and discusses challenges during adolescence and make informed, responsible decisions that promote positive body image, healthy relationships and a safe, drug-free lifestyle with support from family, school and society.		**Adolescence - Physical and Mental Growth** From Childhood to Adulthood – Physical and Mental Growth (Basic idea of puberty and adolescence; Fundamental role of Hormones and Endocrine System (Fundamental) and ways to deal with them	**Challenges of adolescence and coping mechanisms** Healthy habits – hygiene, nutrition, exercise; respecting body changes and developing positive body image and confidence. Influence of peers on choices Staying safe from harmful substances awareness about addictive substances (Common addictive substances – tobacco, alcohol (awareness only); how these substances harm the body; emotional and social impact; strategies to resist peer pressure; school as a support system – seeking help) Building a Drug-Free and Safe Environment (Understanding causes of substance abuse; role of society, family and school in prevention; developing coping skills and self-control; conducting awareness campaigns; promoting a safe, supportive and inclusive school environment) Role of Family and Teachers in Guiding Behaviour

CG.4. Analyse the diversity and characteristics of living organisms, their ecological interdependence and the environmental conditions necessary for sustaining life on Earth.			
C 4.1: Identifies and classifies living organisms (plants, animals and micro-organisms) across diverse environments based on structural and functional characteristics using appropriate scientific terminology. **C 4.2:** Differentiates the living organisms based on their interaction with its environment.	**Diversity of Organisms** Plants and animals in our surrounding - Classification based on their observable characteristic features – Roles of Plants, Animals, microorganisms in maintaining harmony of Nature.	**Diversity of Organisms** 1. Types of Habitats – Terrestrial, Aquatic and Aerial. 2. Adaptations of living things to their habitats	
C 4.3: Investigates and explains essential life processes in plants, animals and micro organisms through experimentation and systematic observation.			**Fundamental Processes of Life (Plants, Animals and micro-organisms)** 1. Nutrition 2. Growth and Development 3. Need for respiration 4. Response to stimuli 5. Reproduction 6. Excretion 7. Harmful and beneficial effects of micro-organisms based on their physiological functions.
C 4.4: Differentiates cells (plant vs animal cells, Prokaryotic vs Eukaryotic, unicellular vs multicellular) based on	**Cells – Unit of Life** Cell as the basic unit of life **Cellular Diversity** Types of cells based on size, shape, type (plant vs animal cell) Cell structure,		**Cellular Organisation** Organisation of Tissues - Functions of Plant Tissues, Epidermal Tissues, Ground Tissues, Vascular Tissues, Functions of Animal Tissue-Epithelial Tissue,

microscopic observation of cellular organisation. **C 4.5:** Explains organisation of tissues in plants and animals with reference to their function.	Prokaryotic vs Eukaryotic cells. Unicellular and multicellular organisms.		Connective Tissue, Muscular Tissue and Nervous Tissue, Organ and organ system.
C 4.6: Evaluates the impact of pollution and resource depletion and proposes sustainable solutions including waste management, water purification, recycling and conservation practices. **C 4.7:** Analyses the structure and functioning of ecosystems, the types and importance of natural resources and the essential environmental conditions that sustain life on Earth using scientific inquiry and represents them through diagrams and models.	**Environmental science – Pollution** Solid waste Soil pollution Air pollution Water pollution Solutions to the problem (including waste management) Water purification Zero waste management Recycling and biodegradable plastics	**Environmental Science – Natural resources** Ecology Types of Ecosystem, Components of ecosystem – producer, consumer, decomposer, Food chain, food web and energy pyramid, Biogeo chemical cycle, What are natural resources, Types of natural resources, Air, water and soil as resources, Importance of natural resources – The uniqueness of earth, Essential conditions for life, Importance of air, water, light and temperature	**Environmental Science - Conservation of Natural resources** Overuse and depletion of resources, Conservation of plants Conservation of animals, Soil and water, Forest conservation, Community and Government efforts – role of people, Species extinction and endangered species (Very little details – general introduction)

Pedagogical Approaches

The pedagogical strategies for Science in Classes 6 to 8 are grounded in inquiry-based, experiential and application-oriented learning. Instruction is driven by "big questions" that stimulate curiosity and promote hypothesis formation, observation, experimentation and logical inference. Students engage in hands-on investigations using simple, locally available, low-cost or no-cost materials, ensuring contextual relevance and learning by-doing. Project-based learning connects scientific concepts to real-life challenges such as waste management, water conservation, energy use and environmental sustainability. DIY activities in science promote experiential learning by enabling students to actively explore concepts through hands-on investigation, problem-solving and reflective practice. Predict–Observe–Explain cycles are used systematically to surface misconceptions and strengthen conceptual clarity. Field-based explorations, including nature walks, garden studies and local industry visits, support ecological awareness and experiential understanding. ICT tools, simulations, gamification and virtual laboratories extend learning where physical experimentation is limited. Collaborative investigations, science journaling, structured data tabulation, evaluation and gamification enhance engagement, analytical thinking, reflection and meaningful integration of science with everyday life. The relationship between science, technology, engineering, arts and mathematics will be introduced to nurture STEAM perspective.

Assessment Strategies

Assessment in Science shall be continuous, competency-based and aligned with experiential and inquiry-driven learning. It shall evaluate not only conceptual understanding, but also scientific skills, attitudes, values and the ability to apply knowledge in real-life contexts. The assessment framework integrates theory, experimentation, field engagement, reflective practice and authentic tasks to ensure holistic development of scientific literacy. At the Upper Primary level for Classes 6–8, assessment shall focus on developing foundational scientific understanding, observation skills, classification abilities and awareness of the interrelationships among living organisms and their interactions with the abiotic environment. Evaluation shall include written assessments comprising structured questions, diagrammatic tasks, concept-based and application-oriented items, along with oral questioning and classroom discussions. Equal importance shall be given to experiential assessment through maintenance of a Science Logbook documenting observations, experiments, reflections and conclusions. Students shall also maintain a Science Logbook or field journal to record local biodiversity, classification of organisms, seasonal variations and environmental observations. Project work involving simple investigations, model construction, environmental studies and collaborative tasks shall form an integral component of assessment. Practical work shall assess procedural skills, accuracy of observation, safe laboratory practices and logical interpretation of results. A student portfolio compiling of worksheets, project reports, reflective notes and teacher feedback shall serve as cumulative evidence of learning progress.