YEAR EIGHT

PHYSICS AND CHEMISTRY

Unit	Syllabus	Standards of learning
1st Term		
Unit 1. **Physical Magnitudes and scientific activity II. [6h]**	Laboratory reports. Revision of physical magnitudes, fundamental and derived units. International System of units. Converting units. Scientific notation and significant figures.	**Recall** how to produce a lab report. **Recall** physical magnitudes: fundamental and derived units. **Define** a unit as either fundamental (m, kg, s, K(ºC), or derived (N, l , cm^3). **Define** a meter and a kilogram, and be aware of other definitions. **Calculate** and convert units using conversion factors. **Apply** the use of scientific notation and significant figures.
Unit 2. **Materials and their properties. [9h]**	General Properties of matter: volume, mass, density, melting and boiling points. States of matter. Changes of state. The kinetic particle model of matter. Ideal gases: definition and gas laws. Vapour pressure.	**Define** matter. **Describe** properties using words like qualitative, quantitative, intensive and extensive correctly. **Describe** the general properties of matter: volume, mass, density, melting and boiling point. **State** values for boiling point, freezing point and density of water. **Describe** the physical states of matter using the kinetic particle model. **Explain** the processes that change the states of matter, with reference to particles. **Define** what an ideal gas is. **Describe and apply** the gases laws (Boyle-Mariotte, Charles, Gay-Lussac and perfect gases law). **Describe** the evaporation rate of liquids.
Unit 3. **Pure substances and mixtures. [9h]**	Mixtures and solutions: differences and methods of separation. Pure substances: elements and compounds. Elements	**Define** mixtures and solutions. **Define** homogenous and heterogenous. **Describe** differences between and

	and compounds of special interest with industrial, technological and biomedical applications. Concentration and units. (g/L, % mass). Solubility.	separation techniques of mixtures and solutions. **Define** pure substances. **Outline** the differences between elements and compounds. **Summarise** the use of elements and compounds for industrial, technological and biomedical applications. **Define** concentration and **recall** the appropriate units for g/L and mass %. **Calculate** concentration for g/L and mass %. **Define** solubility.
Unit 4. **The structure of matter I. [8h]**	Atomic structure: atomic models of Dalton and Rutherford. Isotopes. Atomic number and Mass number.	**Recall** the properties of the subatomic particles. **Describe and draw** the atomic structure according to the Rutherford's model. **Define** an ion, cation and anion. **Define** isotopes. **Define** atomic number and mass number. **Calculate** the atomic composition of an atom or an ion.
2nd Term		
Unit 4 (continued). **The structure of matter I [20h]**	The Periodic Table of Elements (distribution of groups and families of elements). Atomic mass and molecular mass. The Mole. Formulae and naming of inorganic chemistry following the IUPAC rules.	**Describe** the periodic table and **identify** patterns and trends in the properties of the elements. **Recall** the symbols and valencies of the chemical elements of the principal groups (1 to 17) and the more important transition elements (Cr, Mn, Fe, Co, Ni, Cu, Zn, Pd, Ag, Cd, Pt, Au, Hg). **Calculate** atomic mass and molecular mass. **Define** the mole. **State** Avagadro´s number. **Calculate** the number of moles in a sample using the appropriate equation. **Calculate** the number of particles in a

		sample using the appropriate equation. **Calculate** balanced inorganic compounds using chemical formulation. **Apply** knowledge of the nomenclature of inorganic chemistry following the IUPAC rules.
Unit 5. **Chemical Reactions I [12h]**	Physical and chemical changes of matter. Types of reactions. The Law of Conservation of Mass: balancing chemical reactions. Rates of reactions: factors that affect the rate of reaction. Simple stoichiometric calculations. Chemistry in society and the environment.	**Define** physical changes of matter. **Define** chemical changes of matter. **Describe** different types of reactions. **Define** the Law of the Conservation of Mass. **Calculate** balanced equations for chemical reactions. **Discuss** the rate of a reaction and **describe** factors which may affect it. **Solve** simple stoichiometric calculations. **Outline** the use of Chemistry in society and the environment.
3rd Term		
Unit 6. **Force and Mass [10h]**	Forces and their effects. Newtons Laws Simple machines. Friction. Force of gravity. Law of Universal Gravitation. The weight of bodies. Magnetism and types of magnets. Fundamental forces of nature. Pressure. Principles of hydrostatics.	**Define** a force. **Describe** the effects of forces. **Explain** how forces can cause changes in the motion of an object. **Recall** Newton´s 3 Laws of motion. **Define** simple machines and **outline** their uses. **Define** friction. **Define** the force of gravity. **Calculate** the rate of a moving body in freefall **Solve** problems using Newton' Laws. **State** the Law of Universal Gravitation. **Define** weight of a body. **Define** magnetism and **describe** different types of magnets.

		Describe forces of nature. **Apply** Hooke's Law. **Define** pressure. **Solve** given situations using the equation of pressure. **Describe** the fundamental principle of hydrostatic (P = dgh). **Solve** given situations using the fundamental principle of hydrostatic. **Describe** Pascal's Principle and some of its applications, such as the hydraulic system (brakes and jack). **Solve** given situations using Pascal's Principle. **Describe** Archimedes' Principle.
Unit 7. **Movement. [12h]**	Basic terminology (trajectory, position, speed and acceleration). Uniform Rectilinear Motion (URM). Strategies to solve problems and represent motion in graphs. Role of forces in causing changes of shape and motion. Average velocity, instantaneous velocity and acceleration. Uniformly Accelerated Rectilinear Motion (UARM). Problem solving strategies and creating distance/time and velocity /time graphs Calculating acceleration from data on graphs.	**Recall** the meaning of URM. **Define** trajectory, position, speed and acceleration. **State** the equations of motion. **Solve** given situations using the equations of motion. **Comment** on and **draw** graphs of motion. **Outline** how forces can change the shape of an object. **Recall** the meaning of UARM. **Comment** on and **draw** displacement/time and velocity/time graphs. **Calculate** acceleration from data represented on graphs of motion.
Unit 8. **Energy and its transformations. [10h]**	Definitions and units of work, energy and power. Types of energy transformations, conservation of energy.	**Define** work, energy and power and **state** the correct unit for each concept. **Differentiate** between mechanic, kinetic and potential energy.

	Thermal energy. Heat and temperature. Sources of energy. Responsible use of energy.	**State** the equations to **calculate** work, energy and power. **Describe** energy transformations, referring to its conservation. **Define** thermal energy, heat and temperature. **Describe** sources of energy. **Explain** the need to use energy wisely.