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| **TRANSITION YEAR UNITS** | |
| 1. **Title of Transition Unit** | |
| World of Science | |
| 1. **Area of Study** | |
| Academic Core Subject | |
| 1. **Overview** | |
| This TY Unit incorporates many topics such as genetics, food science, the History of Chemistry, organic chemistry, light, electricity and magnetism alongside some topics that are relevant to their everyday lives such as the cosmetics, food/health science and how the use of em waves effect today's society. The students will also get to a taste of forensic science, geology, microbiology and the electromagnetic spectrum. | |
| 1. **Links** | |
| This TU builds on topics they have studied in Junior Certificate Science – genetics, ecology, elements and the periodic table.  It links up with all three L.C. Science subjects – genetics crosses, DNA structure, fingerprinting and ecology in Biology; light and electricity in Physics; flame tests in Chemistry.  Ethical issues in genetics link with unit 3 L.C. RE (Religion and Science).  Geology link in with geography.  Food science links to home economics   1. **Numeracy and Literacy-**  * Key words, diagrams and symbols are emphasized and displayed using the boards and posters. * Access to the library resources and books. * Use of Crosswords. * D.E.A.R. current Science related media articles. * Time Line used to highlight certain topics e.g. formation of the planets * Quantitative measuring involving reactants for Organic Chemistry and Cosmetics * Weekly science fact poster made by students on the wall * Percentages and ratios in genetics monohybrid crosses * Table of dominant and recessive traits within the classroom in genetics * Using a formula to calculate wavelength, frequency and speed of a wave * Calculating voltage * Calculating the tensile strength of hair | |
| 1. **Summary Outline of the Unit** | |
| A selection of topics from the following units will be covered  **Unit 1: Biology**:  **Genetics**:   * + Genetic crosses, monohybrid crosses   + Genetic disorders   + Karyotypes   + Genetic Modification   **Food science**:   * Food and health * Ted talk on sugar * Project on food and health   **Unit 2 : Chemistry**  **History of the Elements**:   * 1/3History of the discovery of the elements * 2/3History of the development of the Periodic Table * 3/3Using the Elements and making more elements. * Researching Scientists involved in the History of Chemistry. * Experiments on  1. Production of Hydrogen 2. Flame test to show unique line spectra 3. Alkali metals   **Organic Chemistry**:   * Introduction to different families * Nomenclature(naming system) * Making models * Making aspirin * Distillation of red wine   **Unit 3 : Physics**:  **Waves**:   * Wave properties * Waves characteristics * Investigating the relationship between wavelength, frequency and speed of a wave * Properties of light * Pin Hole Cameras * Investigate the factors affecting light travelling through a medium * Electromagnetic spectrum * Research project-how have the use of EM waves affected today’s society?   **Electricity and Magnetism**:   * What is electricity? * Which materials allow passage of electrical charges? * Investigate how are current and voltage related? * Research project- Can magnetism produce electricity which can power any urban City?   **Unit 4 : 2 of the following**:  **Forensic science**:   * Fingerprints * Model of DNA * DNA fingerprinting * Microscope work with hairs and fibers * Chromatography   **Cosmetics**:   * Nail varnish * Lip balm * Cold cream * Cosmetics industry * Hair science and hair tensile strength (links with physics)   **Microbiology**:   * Introduction to virus and disease using the film “Outbreak” * Growth of bacteria and fungi using agar plates * Investigation into the spread of Diseases   **Geology:**   * Plate tectonics * Rock types * Minerology * Formation of the planet. | |
| 1. **Breakdown of the Unit** | |
| * Unit 1 : 7 weeks ---1 double, 1 single class per week * Unit 2 : 7 weeks--- 1double, 1 single class per week * Unit 3 : 7 weeks ---1 double, 1 single class per week * Unit 4 : 6 weeks ---1 double, 1 single class per week | |
| 1. **Aims** | |
| *This Transition Unit aims to:* | |
| * Provide opportunities for observing and evaluating phenomena and processes and for drawing valid deductions and conclusions * Enable students to acquire a body of scientific knowledge appropriate to their age, and an understanding of the relevance and applications of Science in their personal and social lives (This is achieved by consolidating Junior Cert Science and introducing some concepts from Leaving Cert Science in conjunction with other areas outside of the curriculum) * Foster an appreciation of and respect for life and the environment, while at the same time developing awareness of the potential use, misuse and limitations of Science, and of health and safety issues relating to Science. | |
| 1. **Learning Outcomes** | |
| *On completion of this unit students should be able to:* | |
| * Appreciate and be familiar with their unique local environment * Observe as part of the scientific method * Manipulate laboratory equipment and chemicals with due regard to safety procedures * Record and interpret results * Use a microscope properly * Carry out simple genetic crosses * Link their scientific knowledge with its possible ethical and social implications * Develop a deeper understanding of elements and atomic structure * Understand some of the science behind the chemicals they wear every day * Have a basic knowledge of the composition of the earth * Be familiar with Science in everyday life through print media. | |
| 1. **Key Skills** | **How evidenced** |
| **Information Processing** | Recording, analysing and evaluating results from investigations  Note making/Key word/Concept  Using information gained from multimedia resources to support arguments in debate on ethical issues |
| **Critical and Creative Thinking** | Critical analysis of ethical issues  Brainstorming  Read and explain pairs  Think pair share |
| **Communicating** | Presentation of results of experiments in tables or charts  Visual communication by poster presentation  Presenting using a variety of media |
| **Working with Others** | Organising and delegating work within a group  Taking responsibility for sharing the work  Completing to an agreed time frame |
| **Being Personally Effective** | Students will have to undertake research outside of class time and take responsibility for their learning both individually and in groups  Self assessment |
| 1. **Methodologies** | |
| Activity based learning  group work  project work  Think pair share  Use of ICT  Use of DVDs  discussion,  problem solving | |
| 1. **Assessment Methods** | |
| **Ongoing**  **Biology**:   * **2 Experiment write ups completed (flame tests and DNA extraction)** * **Short practical exam on microscope work** * **Short test on simple crosses and genetic engineering** * **Short written piece on genetic engineering** * **Short project on disease/health condition** * **Sample agar plates**   **Chemistry**:   * **Questionaires on DVD’s** * **Identify prepared molecular models** * **Project work on Scientists** * **Evaluating Cosmetics produced** * **One sample each of**    + **Nail varnish**   + **Lip balm**   + **Cold cream** * **2 experiment write-ups (anion tests and chromatography)** * **Display of finger prints** * **Completed model of section of DNA** * **1 chromatogram**   **Physics:**   * **New vocabulary introduced through video, direct instruction and LAB activity using series and parallel circuit** * **Task sheet using the relation between voltage, current, power and resistances.** * **group work about different types of materials (defining as conductors and insulators)** * **Lab activity and write up; series and parallel circuit** * **Analyze the circuit connections and make decisions and report results** * **magnetic properties and magnetic lines and ask student to draw magnetic field lines of the magnet using magnetic compass and conclude the results** * **Questionaires post viewing DVD’s** * **debate on on positive and negative aspects of using EM waves in society** * **Research and presentation activity where each group researches a type of EM waves, their properties, applications and implication in society** * **Worksheet with related numericals and fill the box type questions (related to properties of EM wave ie finding wavelength, frequency, speed and energy** * **Lab and write up How does light travel through a medium, what are the properties that affect the angle of refraction and refractive index of a material.** * **snell’s law to calculate the refractive index of a material** * **Lab (demonstration) to differentiate emission and absorption spectrum.** | **Cumulative**  End of term reports are based on continuous assessment. Credits are awarded for work in class, assignments handed up, tests, attendance and conduct. |
| 1. **Resources** | |
| **Biology**:   * + - DVD on rocky seashore     - LC Chemistry Declan Kennedy     - “Animal Farm” Documentary on genetic modification     - DVD on genetic engineering re cystic fibrosis     - DVD on GM foods     - Handouts and work sheets on pedigree studies and Karyotypes   **Chemistry**:   * + - BBC 4 series of DVDs on “Chemistry a Volatile History”     - Molecular models and kits     - Minilab( lab in a suitcase)     - Cosmetics in industry DVD     - Chemicals required     - Hand held spectroscopes   **Physics**:   * Computers, internet, word processor, * computer generated modelling software * Online virtual laboratory, simulations * Use of lab for practical experiments * PowerPoint presentations to assist with visual learning * Books * Teacher generated TASK SHEETS * Student reflection sheets Inquiry task sheets | |