| **TRANSITION YEAR UNITS (2023 – 2024)** | |
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| 1. **Title of Transition Unit** | |
| Science - biology, chemistry, and physics | |
| 1. **Area of Study** | |
| Biology: - Ecology  -Systems (muscular-skeletal, digestive, nervous, defence)  -Food  -Genetics  Chemistry- chemical bonding, balancing equations, careers in chemistry, introduction to naming organic compounds  Physics: - Einstein and Relativity, Medical Physics and Modern Physics, Mechanics, Electricity, Waves | |
| 1. **Overview** | |
| Biology: In this module, students will get a taste of Ecology on a deeper level, our Systems and experimenting in the lab. They will also undertake a research project on a topic of their choice & present to their peers, delving into the Biological world.  Chemistry - In this module students will be introduced to some topics of Leaving Cert chemistry and also get the chance to explore some interesting aspects of chemistry that we use in everyday life, for example medicines and cosmetics.  Physics: In this module students will get a taster of some of the topics on the Leaving Cert course and discover how Physics shapes the world around them. | |
| 1. **Links** | |
| Biology:   * Geography in the sea and shores * Chemistry with comparing the various elements in seawater * Maths with measuring sea levels * English literacy in project making and class discussions * Research skills in project research   Chemistry:   * Medicine and Biology in studying medical physics * Problem solving skills   Physics:   * Medicine and Biology in studying medical physics * Link theory with Mathematics and problem solving * Linking with Chemistry in structure of the atom * Business and Engineering in costing bridge design | |
| 1. **Summary Outline of the Unit** | |
| Biology: Students are understanding various Leaving Cert topics on a basic level and delving into Ecology, Our Systems and Food and Nutrition on a deeper level. Students will use a broad range of skills such as communication, investigation, management, showcasing, researching, working together and collaborating.  Chemistry: In this module students will be introduced to some topics of Leaving Cert chemistry and also get the chance to explore some interesting aspects of chemistry that we use in everyday life, for example medicines and cosmetics. We will also complete a project on careers related to chemistry that will highlight the importance of chemistry in industry.  Physics: Students will get a taster of some of the topics on the Leaving Cert. They will practice problem solving and critical thinking skills in applying Physics to the world around them. Students will work in teams and conduct research and applications of Physics. They will gain an insight into the types of careers available to those who study Physics. | |
| 1. **Breakdown of the Unit** | |
| Biology:   * Muscular-Skeletal System: Learning about fast/slow twitch muscle fibres, researching about differences in speed and stamina, making a project * Reaction Time: Understanding our nervous system and how we react instinctively to our environment. Defining a reflex action. Carrying our various reaction tests. * Marine Science: Understanding the different zones, adaptation, competition and predation on the rocky seashore. Making a map of the seashore and undertake a trip to the seashore to find specimen, measure abiotic factors and discover plants and animals present. Doing the flame test for the elements present in seawater. Looking at specimens under the microscope. Learning about the various careers in marine science. * Genetics, Food & research: Students will be introduced to Leaving Certificate topics and complete exam questions. They will study a document on viruses and create a podcast on the topic. Students will then select an area of interest to them in Biology and complete a research project on the topic. They will then present this topic to their peers.   Chemistry   * Bonding - bridging the gap between Junior Cycle science and Leaving Certificate chemistry. Students will explore ionic and covalent bonding as well as trends in the periodic table. * Experiments - Students will look at lab safety and also complete an experiment from the Leaving certificate syllabus to practice a write up. * Balancing equations - Students will use their problem solving skills and maths skills to show how to balance an equation. * Introduction to organic chemistry - practice naming compounds and a look at functional groups   Physics: -   * Einstein and Relativity: Students will discover how Einstein came to his conclusions on the Theory of Relativity. Students will learn how curiosity is the basis of studying Physics and that in Physics we aim to discover how the world around us works. * Medical Physics: The different careers available to Physicists will be highlighted. The Physics behind the machines used in hospitals will be explored, including how Particle Physics is used in Machines. CERN and the amazing investigations being conducted there will be highlighted. * Mechanics: Students will discover how Physics is used to design everything around us. Problem solving and design work will be completed. The link between Physics and Engineering will be highlighted. * Electricity: Students will explore the effects of static electricity. They will learn about circuits and complete circuit calculations. * Waves: Students will learn how waves transmit energy and the different waves we encounter daily. | |
| 1. **Aims** | |
| *This Transition Unit aims to:* | |
| Biology:  ● To contribute to students' general education through scientific investigation to acquire biological knowledge and understanding.  ● To encourage scientific enquiry through individual study, teamwork & class directed work.  ● To understand biological facts and principles.  ● To enhance interest and appreciation of nature and diversity of organisms.  ● To create awareness of the application of Biology in modern society.  ● To develop students’ ability to make informed evaluations about contemporary biological issues.  Chemistry   * To bridge the gap between Junior cycle science and leaving certificate chemistry * To promote team work and problem solving skills * To make students aware of the importance of chemistry in our everyday lives   Physics:   * To encourage curiosity in the students through scientific investigation and thinking of the big questions which Physics is trying to answer. * To promote teamwork and problem solving skills. * To show the real world applications of Physics. * To promote the study of Physics and highlight the range of career opportunities available to those who study it. | |
| 1. **Learning Outcomes** | |
| *On completion of this unit students should be able to:* | |
| Biology:   * To understand the structure of DNA and how it determines the genetic code and the development of characteristic * To explain the process of genetic engineering and define term such as diploid, haploid, somatic etc   ● To describe applications of genetic engineering including GM foods   * To explain how both the muscular skeletal and the nervous systems works in our everyday world * To carry out research on individuals with fast twitch and slow twitch fibres * Carry out Reaction Tests and how reaction is vital to responding to our environment (Pilots) * Exploring the seashore: Plants and Animals, tides, moon, abiotic factors * Students will carry out a survey of the area of the Rocky seashore and collect specimens to investigate and observe * Produce a portfolio on their rocky seashore investigation   Chemistry   * Observe patterns and trends in the periodic table * Describe both ionic and covalent bonding * Balance chemical equations * Name organic compounds * Conduct an experiment in a safe manner * COnduct various experiments   Physics:   * Describe the Theory of Relativity. * Understand the conservation of energy and Mass-energy and complete relevant calculations. * Research the role of Physics in medical imaging. * Understand the composition of the Atom. * Describe the significance of CERN. * Consider forces and calculate net force. * Design a bridge as a team, considering the relevant forces. * Describe Boyle’s Law and give examples of everyday applications. * Understand circuit diagrams and draw circuit diagrams. * Complete circuit calculations. | |
| 1. **Key Skills** | **How evidenced** |
| **Information Processing** | Biology:   * Carrying our quizzes and processing the information learned in class * Undertaking reflections * Using keys to understand what plant or animal they are discovering   Chemistry   * Draw Bohr diagrmams * Represent bonding with the use of diagrams * Balance chemical equations using mathematical skills   Physics:   * Completing calculations * Conducting research |
| **Critical and Creative Thinking** | Biology:   * Taking photographs of the Rocky seashore and creating a portfolio of work * Making a project on the research from Farah and Bolt * Research skills and thinking in creating their research project on a topic of their choice   Chemistry   * Problem solving by observing trends * Show the importance of chemistry in everyday life through presentation   Physics:   * Design work * Problem solving |
| **Communicating** | Biology:   * Working in pairs for think, pair, share * Project making * Group work for their field work   Chemistry   * Group presentations * Peer teaching   Physics:   * Group discussion * Writing information leaflets |
| **Working with Others** | Biology:   * Collaborating with their reaction tests * Putting all their ideas together for their muscular skeletal project   Chemistry   * Group presentations * Peer teaching   Physics:   * Working as a group to build a bridge * Group discussion * Project work |
| **Being Personally Effective** | Biology:   * Utilizing their skills when on their field trip - communicating, listening and working together * Putting all their work individually together in their portfolio * Applying their skills and knowledge in creating a podcast and research project both individually and as a group   Chemistry   * Creating a summary of what we have learned that will be useful for revision * Inputting in the group projects   Physics:   * Conducting research * Problem solving * Presenting work |
| 1. **Methodologies** | |
| Physics:   * Probing questioning to help students discover new concepts * Group discussion * Design work * Research and practical work * Presentations and demonstrations * Problem solving and calculations   Chemistry   * Group presentations * Peer teaching * Use of diagrams and imagery to help understanding * Videos * Think, pair share * Self reflection of learning   Biology:   * Assessment for learning * Whole class teaching * Group discussions * Peer Learning * One-to-one tuition * Demonstrations * Practical Experiments * Field trips | |
| 1. **Assessment Methods** | |
| **Ongoing**  Physics:   * Worksheets * Project work * Design work * Questioning   Chemistry   * Group presentations * Worksheets   Biology:   * Oral questions in class * Written exercises in creating podcast in groups * Worksheets * Correcting of homework | **Cumulative**  Physics:   * Research project   Chemistry   * Submitting summary worksheets * Group presentation on a research topic   Biology:   * Presentation of podcasts to their peers. * Individual project presentation on Biology research project. * Experiment write up * Portfolio for marine science |
| 1. **Evaluation** | |
| Biology:   * Feedback at end of module * Research project completion and successful presentation * Successful completion of group project tasks such as podcast creation   Chemistry   * Group presentations * Self reflection of learning at the end of the module * Submission of work | |
| 1. **Resources** | |
| Physics:   * Slides, videos, demonstrations, laboratory equipment.   Chemistry   * Powerpoint presentation * Leaving Certificate chemistry text book * Youtube videos * ICT   Biology:   * Textbook * Experiment Laboratory Book * ICT * PowerPoint * Presentations * In-class quizzes * Worksheets * Exam Questions * Wall charts/posters * Models | |
| 1. **Literacy** | |
| Physics:   * Highlighting new vocabulary, Scrabble challenge to use Physics words   Chemistry   * Using scientific language * Using the shorthand version for the elements on the periodic table * Incorporating scientific language into explanations   Biology:   * Visual Literacy promoted through the use of a powerpoint. * Flowcharts to make connections between keywords. * Making posters/ graphic organisers of subject specific vocabulary * Presentations to class based on research gotten | |
| 1. **Numeracy** | |
| Physics:   * Problem solving calculations * Costing of materials * Scaling numbers from very small amounts of energy to the speed of light   Chemistry   * Balancing chemical equations * Getting information from the periodic table   Biology:   * Use of graphs to interpret data. * Emphasis on the number of characteristics * Calculating time tides for marine science | |
| 1. **Reflections**   Physics:  Chemistry:  Biology: | |