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| Year 11 | **Topic: GCSE B7 - Ecology**  **GCSE C6 – Rates of Reaction**  **GCSE P5 – Forces**  **Period:** Autumn 1 |
| **Overview of topic:**  **B7 -** Ecosystems is the overriding theme of this topic. Students will look at the factors that affects organisms, biotic and abiotic, explaining how these impact on populations. Students will also learn how different organisms are adapted to different environments. Students will learn about the distribution of organisms and will investigate how to sample plants in a given area, explaining how factors may affect their distribution. Cycles will also be covered looking at the water cycle and nitrogen cycle. The topic will then move into discussions around biodiversity and the human impact on ecosystems and global warming. There will be a final focus on the positive impact that humans can have on ecosystems. Biology Only students will also study decomposition including an additional required practical investigating the effect of temperature on decomposition. The impact of environmental change will also be discussed. Students will also learn about trophic levels within an ecosystem and biomass. Finally, students will also learn about food production including food security and farming techniques including the role of biotechnology.  **C6 -** Rates of reaction begins with students learning how to calculate the rate of reactions in various ways, through equations, graph interpretation and gradient calculations. Students will gain the knowledge of how different factors affect the rate of reactions, describing the factors in terms of collision theory and activation energy. Students will also complete the required practical of changing concentration and measuring rate through gas production and change in colour. Students will also learn about reversible reactions and dynamic equilibrium. Higher Tier students will also be able to explain how changing factors, temperature, concentration and pressure will affect the position of equilibrium.  **P5 -** Forces builds on students KS3 knowledge of contact and non-contact forces exploring gravity with the calculation of weight = mass x gravitational field strength. Students will also learn about the effect of resultant forces. Here students will also calculate work done. Students will then further their understanding of elasticity, where they will complete a required practical explaining the relationship between force and the extension of a spring. Students will then move into learning about motion speed, velocity, acceleration and displacement. Students will then learn about Newton’s first, second and third laws with a required practical focusing on the second law. Stopping distances, reaction times and braking distances will complete the unit for all students. Higher Tier students will also be able to describe and calculate momentum. For Physics Only students there is further learning about moments, levers and gears. After this, students will further learn about pressure, this time focussing on pressure in fluids and atmospheric pressure. Physics only students will also study changes in momentum in this topic. | |
| **Key** **knowledge:**  B7 – the cycling of nutrients within an ecosystem.  C6 – an understanding of factors that affect the rate of a reaction.  P5 – the principles of forces and their interactions  **Key vocabulary:**   |  |  | | --- | --- | | **Tier 2** | **Tier 3** | | **Translate**  **Random**  **Abundance**  **Adapt**  **Transferred**  **Compost**  **Sustainable**  **Security**  **Fisheries**  **Modification** | **Interdependence**  **Prefix – bio**  **Quadrat**  **Combustion**  **Detritivore**  **Decay**  **Methane**  **Conservation**  **Pollution**  **Pollutant**  **Greenhouse Effect**  **Biomass** | | **Mean**  **Frequency**  **Ratio**  **Volume**  **Interpret**  **Predict** | **Reaction**  **Turbidity**  **Collision**  **Activation**  **Reversible**  **Equilibrium** | | **Quantity**  **Constant**  **Gradient** | **Weight**  **Resultant**  **Energy**  **Elasticity**  **Deformation**  **Displacement**  **Centripetal**  **Deceleration**  **Terminal**  **Equilibrium**  **Acceleration**  **Braking**  **Inertia** | | **Key skills:**  ***Know how to…***  ***B7 – Use quadrats and collect data to then make estimates.***  ***C6 – Collect data, interpret results and calculate rate of reaction. Higher students to also calculate gradients.***  ***P5 – Collect data and interpret results. Use and manipulate equations.*** |
| **Co-curricular opportunities:**  **B7 – An understanding of conservation and protection of species.**  **P5 – An understanding of the factors that can affect the speed of cars.** | **Key reading skills taught are questioning and key texts:**  **B7- Conservation projects**  **C6 – Uses of catalysts**  **P5 – Factors affecting braking distances**  **Wider Reading Opportunities/Links:**  **B7 -** [**https://www.wwf.org.uk/learn/wildlife/endangered-animals**](https://www.wwf.org.uk/learn/wildlife/endangered-animals)  **C6 -** [**https://www.thermofisher.com/blog/materials/characterizing-the-effectiveness-of-industrial-catalysts/**](https://www.thermofisher.com/blog/materials/characterizing-the-effectiveness-of-industrial-catalysts/)  **P5 -** [**https://www.britannica.com/biography/Isaac-Newton**](https://www.britannica.com/biography/Isaac-Newton) |
| **How can I use this information at home?**   * Conversation starters with your children to discuss their learning * Support your child in carrying out independent research around the topic * Visit your local library (or BorrowBox), museums, or other locations to explore the topic * Promote books/other texts that explore this topic (see reading section) * Help your child to learn the key vocabulary | |