**LANGDON PARK SIXTH FORM**

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| **Subject: Mathematics** | **Year: Y13** | **Topic 4.5 Calculus - Differential Equations** |

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| ***What and Why*** “You have already learned a lot about calculus, modelling and solving equations. In this unit you will build on this to begin an understanding of one of the key areas of applying mathematics to the world - constructing models and solving them using differential equations in which derivatives and rates of change are key elements. You will learn one important method of solving some differential equations - separation variables. If you are going on to do any kind of degree in which mathematical modelling is important this unit will be a foundation stone for much more extensive work on differential equations you will have to do- in maths, all science and engineering, medicine, economics and much more.” |

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| **Key terms:**  Derivative  Differential  Rate of change  Variable  Separation of variables  Initial conditions  Boundary conditions | **Key ideas**   * Understand what a differential equation is * Understand how to construct a differential equation to model situations involving rates of change * Understand what separation of variables is | **Applications and skills:**   * Be able to set up a differential equation as a model given information about rates of change and variables * Separate variables and carry out appropriate integrations to then solve a differential equation where this is an appropriate technique * Know how to use initial, boundary or particular conditions to deal with arbitrary constants arising in solutions to differential equations * Be able to recognise the limitations of models based on differential equations * Apply your knowledge of differential equations to contexts in areas such as kinematics, population change, price evolution |

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| **Specification point** | **Pre-reading** | **Application and Assessment (date)** | **Independent learning** | **Extension – Cultural Capital and Reading** |
| G6, H7, H8 | **Topics you should be confident in prior to unit:**  All the material you learned in units of Differentiation and Integration | * End of unit assessment, which will also include selected year 12 material * 50% seen * 50% unseen * 90% pass needed or resit required. | Kerboodle Online Login  My Maths  Exam Solutions  Maths Genie | **VIDEO:** A useful video giving an overview of the importance of differential equations  [**https://www.youtube.com/watch?v=Zh-ik4RD5hU**](https://www.youtube.com/watch?v=Zh-ik4RD5hU)  **Enrichment:** A very useful collection of articles and problems which will help you really deepen your understanding of differential equations and their use:  [**https://nrich.maths.org/search/?search=differential+equations&tab=1&fs=111110000000111**](https://nrich.maths.org/search/?search=differential+equations&tab=1&fs=111110000000111) |

**Pre-assessment content review**

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| I feel secure in | I need to focus on | My action plan |

**Pre-assessment skills review**

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| I feel secure in | I need to focus on | My action plan |

**Post-assessment review**

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| Weaknesses in content knowledge | Skills I need to focus on | My action plan |
| Retest / review – teacher and student comment | | |

**Revision planning**

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| Spec point | Notes complete | Revision materials | Past paper Qs | Timed conditions |
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