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**LANGDON PARK SIXTH FORM**

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| **Subject: Physics** | **Year: Y13** | **Topic: 3.7.2 Gravitational Field** |

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| ***What and Why*** “What is Newton’s law of Gravitation? How is this then used to produce Kepler’s laws of planetary motion? How can we explain the motion of bodies in radial and uniform fields? Isaac Newton was mostly renowned for his work on Gravitation. The laws are also applied to probes visiting the Moon or other plants in the Solar Sytem.” |

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| **Key terms**AccelerationEquipotentialEscape velocityGeosynchronous satellite | Gravitational Field StrengthGravitational potentialKepler’s lawKinetic energyLines of force | MassNewton’s law of GravitationOrbital speedPolar satellitePotential energy | Potential gradientRadial fieldUniform fieldWeight |

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| **Specification point** | **Pre-reading** | **Application and Assessment (date)** | **Home learning**  | **Extension – Cultural Capital and Reading** |
| **3.7.2.1:** I can draw the field lines around a spherical body and determine the force. I can define Newton’s law of Gravitation and gravitational field strength.**3.7.2.3:** I can define gravitational potential.I can define and draw equipotentials around regular and irregular bodies.I can graphically represent $g and V$with$ r$, determine the potential gradient.**3.7.2.4:** I can derive Kepler’s 3rd law $T^{2}∝R^{3} $using Newton’s laws of gravitation and the equations for circular motion.I can calculate escape velocity and orbital velocity of bodies in motion.I can explain what geosynchronous and polar satellites are and give examples of uses. | Use the Oxford AQA A2 textbook p.68 to 83. Look at other textbooks in the library for alternative ideas, explanations and diagrams.**YouTube Videos:**(1) [Gravity, Universal Gravitation Constant - Gravitational Force Between Earth, Moon & Sun, Physics](https://www.youtube.com/watch?v=Ep1jIhHdf2A)(2) [Kepler's Laws of Planetary Motion](https://www.youtube.com/watch?v=s77LJO6USEY)(3) [A Level Physics: AQA Unit 4: Circular Motion and Satellites](https://www.youtube.com/watch?v=7f35aRZHtz8) **Websites:**<https://www.physicsclassroom.com/class/circles/Lesson-3/Newton-s-Law-of-Universal-Gravitation><http://hyperphysics.phy-astr.gsu.edu/hbase/kepler.html> | **Practicals:****(1)** Investigate weight and mass**Assessment**:Minitest on Gravitation (2nd week Oct) | (1) Analyse a gravity map and plot the equipotentials, potential energy and potential gradients at given point(2) Produce a spreadsheet for planets in the Solar system and plot a graph of $T^{2}∝R^{3}$Make notes on each topic and complete the exam style practice questions | (1) Obtain data relating to the International Space Station.(2) Find out about the work of Kepler, Galileo and Newton**Reading:** The Ascent of Gravity: The Questto Understand the Force thatExplains EverythingBy Marcus Chown |

**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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