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**LANGDON PARK SIXTH FORM**

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| **Subject: Physics** | **Year: Y13** | **Topic: 3.6.1 Simple Harmonic Motion (shm)** |

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| ***What and Why*** “Examples of simple harmonic oscillators include the simple pendulum and a spring/mass system. How can damping be reduced in an oscillating system? Why did the Tacoma suspension bridge collapse? We use the idea of resonance to explain the cause of this. Why were dampers and masses added to the Millennium bridge to prevent it from vibrating uncontrollably? ” |

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| **Key terms**  Acceleration  Acceleration due to gravity  Amplitude  Angular frequency  Barton’s pendulum  Damped oscillations | Damping  Displacement  Equilibrium  Forced vibrations  Free vibrations  Frequency  Kinetic energy | Pendulum  Period  Phase difference  Potential energy  Radian  Resonance  Resonant frequency | Sinusoidal wave  Spring constant  Spring/mass system  Velocity |

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| **Specification point** | **Pre-reading** | **Application and Assessment (date)** | **Home learning** | **Extension – Cultural Capital and Reading** |
| **3.6.1.2:** I can define simple harmonic motion.  I can describe the acceleration for a simple harmonic oscillator.  I can determine the displacement and velocity for shm.  I can represent displacement, velocity and acceleration graphically for a simple harmonic oscillator.  To determine maximum velocity and acceleration.  **3.6.1.3:** Determine the period for a simple pendulum and spring/mass system.  To describe the variation of kinetic energy and potential energy for a simple harmonic oscillator.  **3.6.1.4:** Explain the phenomenon of resonance and the effect of damped oscillations | Use the Oxford AQA A2 textbook p.16 to 31. Look at other textbooks in the library for alternative ideas, explanations and diagrams.  **YouTube Videos:**  (1) [Simple Harmonic Motion: Hooke's Law](https://www.youtube.com/watch?v=gZ_KnZHCn4M)  (2) [Tacoma Bridge](https://www.youtube.com/watch?v=3mclp9QmCGs)  (3) [Time period of a pendulum depends on its length | Oscillation| Physics](https://www.youtube.com/watch?v=02w9lSii_Hs)    **Websites:**  [**https://isaacphysics.org/concepts/cp\_shm**](https://isaacphysics.org/concepts/cp_shm)  [**https://www.s-cool.co.uk/a-level/physics/simple-harmonic-motion-and-damping/revise-it/damping-natural-frequency-and-resonance**](https://www.s-cool.co.uk/a-level/physics/simple-harmonic-motion-and-damping/revise-it/damping-natural-frequency-and-resonance) | **Practicals:**  (1) Required practical 7 (i):  Determination of using a simple pendulum  (2) Required practical 7 (ii):  Determination of the spring constant, using a spring/mass system as a simple harmonic oscillator  (3) Demonstrate various simple harmonic oscillators  **Assessment**:  Minitest on shm (4th week Jun)  Multiple choice test on Further Mechanics (1st week Jul) | (1) Error analysis form required practical and discuss the advantages of data logger for time and position measurements  (2) Analyse data kinetic energy and potential energy for a simple harmonic oscillator  Make notes on each topic and complete the exam style practice questions | (1) School visit: Millennium  Bridge. Measurements to  analyse data in the lab and  relate to damping  **Reading:**  Catastrophe to Triumph:  Bridges of the Tacoma  Narrows  By Richard S Hobbs |

**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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