IB Physics

Topic 4 – Simple Harmonic Motion and Waves

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| **B days** | Class | Due on this class |
| **1**  **Apr 16** | •Intro to Simple Harmonic Motion (SHM)  •Kinematics of SHM | **Read:** 11.1,3 |
| **2**  **Apr 18** | •Dynamics and Energy in SHM  •Resonance (Intro/Film)  •Resonance Demos/Destroying the School | **Read:** 11.2,4-6  **Check #1:** Simple Harmonic Motion: 1-3 |
| **3**  **Apr 20** | •More Resonance  •**PreQuiz 11.1 – Simple Harmonic Motion** | **Check #2:** Simple Harmonic Motion: 4-7 |
| **4**  **Apr 25** | •Frequency, wavelength and velocity  •**Skill Set 11.1** | **Read:** 11.7  **Check #3:** Simple Harmonic Motion: 8-9 |
| **5**  **Apr 27** | •Types of waves /Energy Transport  •Reflections | **Read:**  11.8,9,11  **Check #4:** 11: 3, 5, 7 |
| **6**  **May 1** | •Superposition and Interference patterns | **Read:** 11.12, 23.2[[1]](#footnote-2)  **Check #5:** 11: 36(2.2 m/s), 37, 38(190 m to 550 m, and 2.78 m to 3.41 m) |
| **7**  **May 3** | •Standing waves  •Standing wave demos | **Check #6:** 12: 46(343 Hz, 1029 Hz, 1715 Hz)  **Read:** 11.13, 12.4 |
|  | **Oaks Park Week May 7-11th** |  |
| **8**  **May 15** | •More standing wave demos  •Sound Introduction – Spectrum and speed and different media | **Read:** 12.1,2,3,5  **Check #7:** 11: 52(440 Hz, 880 Hz, 1320 Hz, 1760 Hz), 53, 54(70 Hz, 140 Hz, 210 Hz, 280 Hz) |
| **9**  **May 17** | •**PreQuiz 12.1 – Standing Waves**  •Beat formation  •Sound, Standing waves and Music: Beware of the undertone | **Read:** 12.6  **Check #8:** 12: 4(0.64 s, 2.9 s, use 1560 m/s as the speed of sound in sea water), 6(427 m, use 2949 m/s as the speed in concrete), 25 |
| **10**  **May 21** | •**Skill Set 12.1**  •Diffraction and resolution  •The Rayleigh Criterion  •Bats | **Read:** 11.15, 24.5  **Check #9:** 12: 1, 40(15 Hz, 4.8 Hz), 41, 30(0.656 m, 262 Hz, 1.31 m, and the same as in the pipe, 262 Hz, 1.31 m) |
| **May 23** | **Present Oaks Park to Class** |  |
| **11**  **May 25** | •Description of Sound lab  •The Doppler effect/Shock Waves | **Read:** 12.7,8  **Check #10:** 11: 66(1.7x10-2 m), 12: 34(closed, 88 Hz), 33 |
| **12**  **May 30** | •**PreQuiz 12.2 – Doppler effect, Interference**  •Sound lab or SHM Lab - An eclectic group project | **Check #11:** 12: 49, 50(1710 Hz, 1420 Hz), 51  **Check:** Your lab plan |
| **13**  **Jun 1** | •**Skill Set 12.2**  •Properties of Electromagnetic waves  •Refraction in one dimension | **Read:** 11.14, 23.4  **Check #12:** 12: 53, 54(3.09x104 Hz), 55 |
| **14**  **Jun 5** | •Solving refraction problems in two dimensions  •Total internal reflection and critical angle  •Refractive index and wavelength: dispersion | **Read:** 23.5,6, 24.4  **Check #13:** 23: 23, 24(1.31), 25 |
| **15**  **Jun 7** | •Young's double slit experiment (qualitative)  •Polarisation  •**PreQuiz 12.3 – Refraction and interference**  **Try these problems:** 24: 53, 54(56.7o) | **Read**: 24.3,10, 11  **Check #14:** 23: 26(34o), 27, 29, 36(61.7o, Lucite), 37 |
| **16**  **Jun 11** | **Test on Waves** | **Turn In:** Sound Lab  **Turn In:** Problem Set T4 (14 stamps worth) |
| **Finals** | **Skill Set Final** |  |

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| Four Prequizzes/Skill Sets:   * 11.1 – Simple Harmonic Motion * 12.1 – Standing Waves * 12.2 – Doppler and interference * 12.3 – Refraction and interference (PreQuiz Only)   Two Labs:   * Sound lab – Your own procedure – done in class. No handout. * Oaks Park – Student presentations of analysis of work done at Oaks Park   Homework – 14 day’s worth! | Handouts:   * This Syllabus * Simple Harmonic Motion (worksheet) * Oaks Park   + Permission/Parent Letter   + Prearrange   + Oaks Park Lab * PreQuiz 11.1 – Simple Harmonic Motion * PreQuiz 12.1 – Standing Waves * PreQuiz 12.2 – Doppler and interference * PreQuiz 12.3 – Refraction and interference |

1. Yes – this is not a typo. Chapter 23 starts on page 683, and 24 on 723. We jump around a bit in this chapter. [↑](#footnote-ref-2)