IB Physics

Topic 4 – Simple Harmonic Motion and Waves

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| **A/B** | Class  | Due on this class |
| **1****Apr 21/18** | -Intro to Simple Harmonic Motion (SHM)-Kinematics of SHM | **Read:** 11.1,3 |
| **2****Apr 24/22** | -Dynamics and Energy in SHM-Resonance (Intro/Film)-Resonance Demos/Destroying the School | **Read:** 11.2,4-6**Check #1:** Simple Harmonic Motion: 1-4 |
| **3****Apr 28/25** | -More Resonance-**PreQuiz 11.1 – Simple Harmonic Motion** | **Check #2:** Simple Harmonic Motion: 5-8 |
| **4****Apr 30/29** | -Frequency, wavelength and velocity-**Skill Set 11.1** | **Read:** 11.7**Check #3:** Simple Harmonic Motion: 9, 11: 3, 5, 7 |
| **5****May 2/1** | -Types of waves /Energy Transport-Reflections | **Read:**  11.8,9,11**Check #4:** 11: 36(2.2 m/s), 37 |
|  | **Oaks Park Week May 5th – May 9th** |  |
| **6****May 12/13** | -Superposition and Interference patterns-Young's double slit experiment (qualitative)-Standing waves intro | **Read:** 11.12,13 23.2[[1]](#footnote-1)**Check #5:** 11: 38(190 m to 550 m, and 2.78 m to 3.41 m) |
| **7****May 14/15** | -Standing waves frequency and wavelength-Standing wave demos | **Check #6:** 12: 46(343 Hz, 1029 Hz, 1715 Hz)**Read:** 12.4 |
| **8****May 16/19** | -**PreQuiz 12.1 – Standing Waves**-Sound Introduction – Spectrum and speed and different media -Beat formation-Sound, Standing waves and Music: Beware of the undertone | **Read:** 12.1,2,3,5,6**Check #7:** 11: 52(440 Hz, 880 Hz, 1320 Hz, 1760 Hz), 53, 54(70 Hz, 140 Hz, 210 Hz, 280 Hz) |
| **9****May 20/21** | -**Skill Set 12.1** -Diffraction and resolution-The Rayleigh Criterion-Bats | **Read:** 11.15, 24.5**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, 40(15 Hz, 3.8 Hz), 41 |
| **May 22/23** | **Present Oaks Park to Class** |  |
| **10****May 27/28** | -Description of Sound lab-The Doppler effect/Shock Waves | **Read:** 12.7,8**Check #9:** 11: 66(1.7x10-2 m), 12: 1, 30(0.656 m, 262 Hz, 1.31 m, and the same as in the pipe, 262 Hz, 1.31 m) |
| **11****May 29/30** | -**PreQuiz 12.2 – Doppler effect, Interference** -Sound lab or SHM Lab - An eclectic group project | **Check #10:** 12: 34(closed, 88 Hz), 33, 49, 50(1710 Hz, 1420 Hz), 51**Check:** Your lab plan |
| **12****Jun 2/3** | -**Skill Set 12.2**-Properties of Electromagnetic waves-Refraction in one dimension | **Read:** 11.14, 23.4**Check #11:** 12: 53, 54(3.09x104 Hz), 55 |
| **13****Jun 4/5** | -Solving refraction problems in two dimensions-Total internal reflection and critical angle-Refractive index and wavelength: dispersion | **Read:** 23.5,6, 24.4**Check #12:** 23: 23, 24(1.31), 25 |
| **14****Jun 6/9** | -Polarisation -**PreQuiz 12.3 – Refraction and interference****Try these problems:** 24: 54(0.058),55,56(61.2o),59 | **Read**: 24.3,10, 11**Check #13:** 23: 26(34o), 27, 29, 36(61.7o, Lucite), 37 |
| **Finals** | **Test on Waves** | **Turn In:** Sound Lab**Turn In:** Problem Set T4 (13 stamps worth) |

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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 – 13 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
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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-1)