

Unit 15 Plan: **Waves and Sound**
 Physics1 Honors @ PalmHarborUniversityHigh



Day	Date	Topic	Assignments Due / Schedule
1		Periodic Motion (read 14.1; define bold terms) CW# 1: 1,2,3, 6-11	finish classwork
2		Notes on waves CW# 2: 15-21 (p 386)	HW#1: 75,76,78 (page 398)
3		Mechanical Universe Video: Waves	HW# 2: 81,83,90,93 (page 398)
4		Notes on Interference, Standing Waves and Doppler effect	
5		Notes on Sound CW# 3: 1-5 (p 405)	Read all of Section 15.1 HW# 3: 52,54,57 (page 425)
6		Lab or Demos?	HW# 4: 58,59,63 (page 425) Read all of Section 15.2
7		Sound of Music Notes	Problems: TBA
8		More on Music	p.396-397: 39-42,44,45,47,48,50,51,54,55,56,64,65 p. 424-425: 31,32,34,36-41,43,44,47,49,51
9		Review	
10		Unit Test	

Note: Homework is due on the day following the assignment, unless otherwise noted.

Objectives / Essential Learnings: (key terms in **bold**)

1. Define **periodic motion**, **simple harmonic motion**, and **Hooke's law**.
2. Recognize that **waves** transfer energy without transferring matter.
3. Distinguish between **longitudinal** and **transverse** waves.
4. Define **amplitude**, **wavelength**, **frequency**, and **period**: state the relationship between speed, wavelength and frequency; solve problems using these quantities.
5. Understand that **wave speed** depends on the **medium**.
6. Distinguish between **constructive** and **destructive interference**.
7. Define a **standing wave** and explain how it occurs.
8. Describe the **Doppler effect** for sound and relate it to the blue and red shifts for light.
9. Describe the conditions for a **bow wave** to occur.
10. Describe the conditions for a sonic boom to be heard.
11. Relate the **pitch** of a sound to frequency; relate **loudness** to amplitude.
12. Describe what happens to air when sound moves through it.
13. Compare the transmission of sound through air with transmission through solids, liquids and a vacuum.
14. Describe factors that affect the speed of sound.
15. Give examples of forced vibration. Describe the conditions for **resonance**.
16. Describe the conditions for **beats**.
17. Understand and use the **decibel** scale.
18. Understand **sound intensity** and **relative sound intensity**. Relate intensity, decibel level and perceived loudness.

$$f = \frac{1}{T} \quad T = \frac{1}{f} \quad v = \lambda f \quad F = -kx \quad T = 2\pi \sqrt{\frac{l}{g}}$$

$$\text{relative sound intensity (dB)} = 10 \log\left(\frac{I}{I_0}\right)$$

$$\text{intensity}(I) = \frac{\text{power}}{\text{area}}$$