PHY138 – Waves, Lecture 1

Today's overview

- Oscillations; Repeating Motion
- Simple Harmonic Motion
- Oscillations / Circular Motion Connection
- Potential and Kinetic Energy in Oscillations

PHY138 – Waves, Lecture 1

"Hey, who's the New Guy?"

Jason Harlow

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PHY138 – Waves, Lecture 1

"But wait, isn't he the guy from the labs?"

Yes! Same guy!

Jason Harlow has ***two jobs***:

- Laboratory Coordinator for PHY110/PHY138
- Second Quarter Lecturer for PHY138

PHY138-Y1Y Year-Long Plan

"Where the hell is Vatche?"

Quarter	Topic	Lecturer	When
1	Mechanics	Vatche	early Fall 2007
2	**Waves and Oscillations**	**Jason Harlow (me)**	**late Fall 2007**
3	Electricity and Magnetism	Kimberly Strong	early Spring 2008
4	Nuclear and Radiation	Tony Key	late Spring 2008

Waves Quarter

- Pre-class quizzes on www.masteringphysics.com before Mondays at 10:00 AM. (4 of them)
- Electronic Problem Sets on www.masteringphysics.com before Fridays at 11:59 PM. (3 of them)
- The team written problem set due Nov. 23.
- The test on Tue. Dec. 4 at 6:00 PM on Waves Quarter Lecture Material ***and Fall Lab Work***.

Informal Survey – please be honest

- What course are you enjoying most this semester (so far)?

A. Biology
B. Chemistry
C. Math
D. Physics
E. A different course.

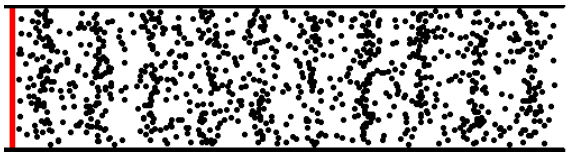
Informal Survey – please be honest

- What course represents the most amount of *work* for you this semester (so far)?

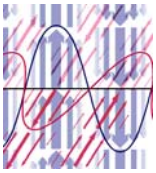
A. Biology
B. Chemistry
C. Math
D. Physics
E. A different course.

Waves are everywhere!

Sound Waves result from periodic oscillations of air molecules, which collide with their neighbours and create a disturbance which moves at the speed of sound.



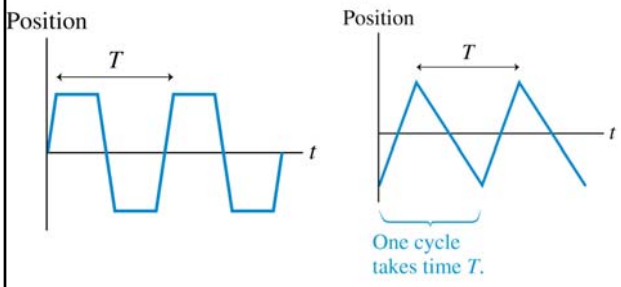
Electric and **Magnetic** fields, when oscillated, can create waves which carry energy. At the right frequency, we see electromagnetic waves as **Light**.



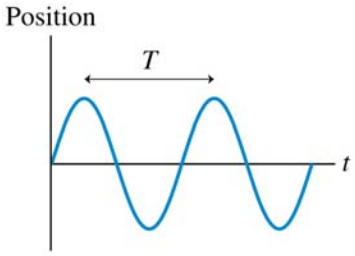
Knight Chapter 14: "Oscillations"

- Waves are caused by oscillations, and they travel through media that have some natural ability to oscillate.
- Next week's reading assignment from the text by Knight is: **Chapter 14**, Sections 14.1-14.8
- Suggested Chapter 14 Exercises and Problems for Study and Practice: 13, 17, 23, 33, 51, 55, 77

Some oscillations are ***not*** sinusoidal:



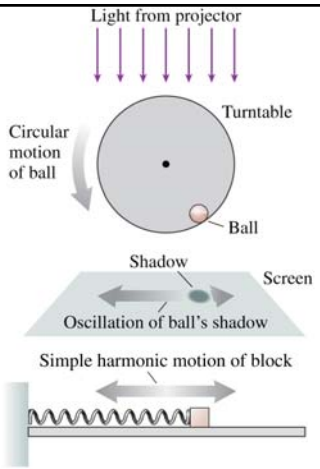
Sinusoidal oscillations = Simple Harmonic Motion (SHM)

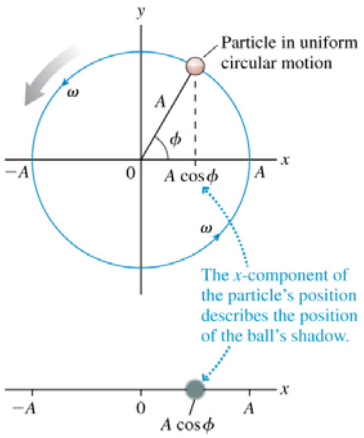


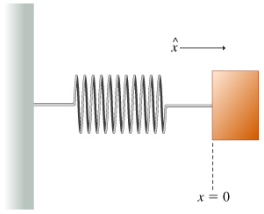
Quiz

- An object moves with simple harmonic motion. If the amplitude and the period are both increased by a factor of 2, the object's maximum speed is

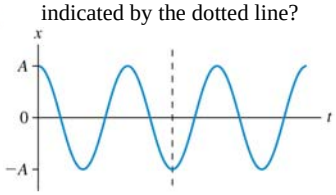
A. decreased by factor of ¼.
B. decreased by factor of ½.
C. increased by factor of 4.
D. increased by factor of 2.
E. unchanged.



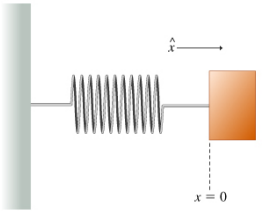




This is the position graph of a mass on a spring. What can you say about the velocity and the force at the instant indicated by the dotted line?



A. Velocity is positive; force is zero.
B. Velocity is negative; force is zero.
C. Velocity is negative; force is to the right.
D. Velocity is zero; force is to the right.
E. Velocity is zero; force is to the left.



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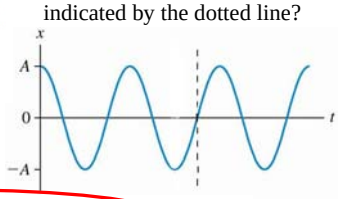

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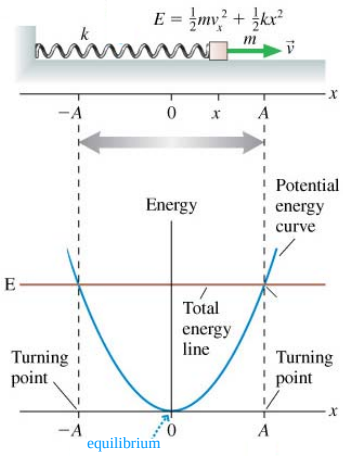

K.E., Potential Energy and Total Mechanical Energy for SHM.