

Course Introduction

- Syllabus overview
 - ◆ books & supplies
 - ◆ course goals
 - ◆ assignments & grading
 - ◆ [course schedule](#) web page

How to Learn Physics

- How to learn physics
 - ◆ learning athletics
 - ◆ learning music
 - ◆ interactive lectures



How to Fail in College

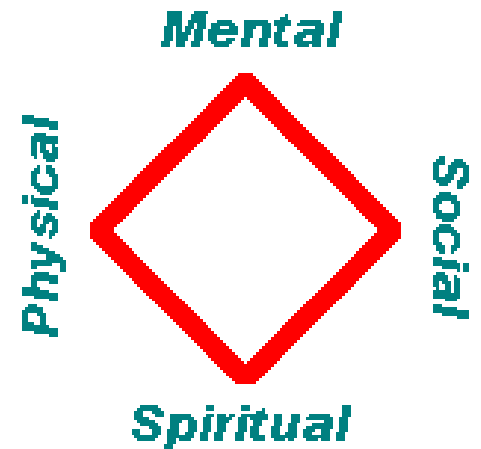
- Hold beliefs that make you stupid
- Adopt shallow thinking strategies
- Never stop to ask questions
- Maintain poor study and note-taking habits
- Give up after any setback

Videos by Dr. Stephen Chew, cognitive psychologist,
Samford University

How to Succeed in College

- Set a GPA goal
- Treat college like an 8 to 5 job
- Attend class
- Keep up
- Get good sleep
- Relate to your professors
- Be a "well-rounded square"

A Well-Rounded Square



About those mobile devices

- They distract you
- They distract your neighbor
- They distract me
- They affect your professional reputation
- Self control, not external control

Units of Measure

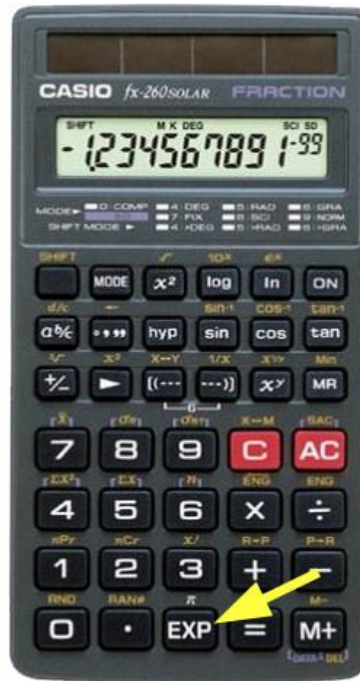
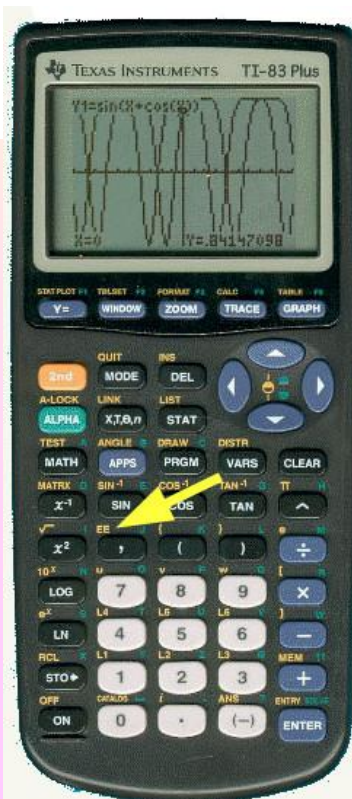
- We'll use mainly the metric system, based on the meter, kilogram, and second
- We'll sometimes use scientific notation:
$$1.21 \text{ GW} = 1,210,000,000 \text{ W}$$
$$= 1.21 \times 10^9 \text{ W}$$
- You should know the metric prefixes and scientific notation

Using your calculator

- Sometimes we'll be using very large or very small numbers. We'll write them in scientific notation, such as:

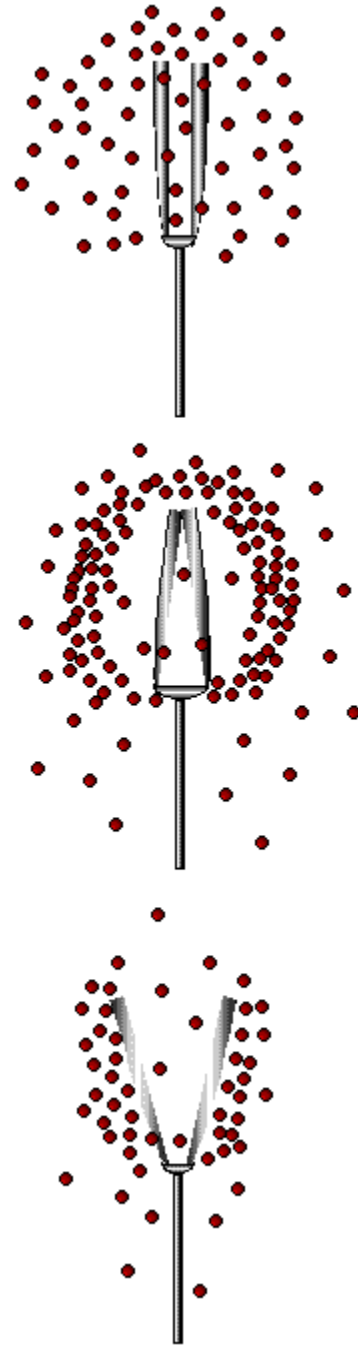
1.6×10^{-19} J instead of 0.000000000000000000016 J

- Use the EXP or EE key on your calculator to save time and avoid errors: 1 . 6 EE (-) 1 9 or 1 . 6 EXP +/- 1 9



Sound waves

- All the phenomena we will study this semester relate to sound waves
- Sound wave [applet](#)
- Molecular motions [applet](#)
- Standing waves on a string [applet](#)



Simple Harmonic Motion

- Simple harmonic motion (SHM) is a smooth, oscillatory motion.
- Any complex oscillation or vibration can be constructed by adding together several simultaneously-occurring simple harmonic motions.
- *SHMs are the fundamental building blocks of all complex oscillations and vibrations!*

Animations

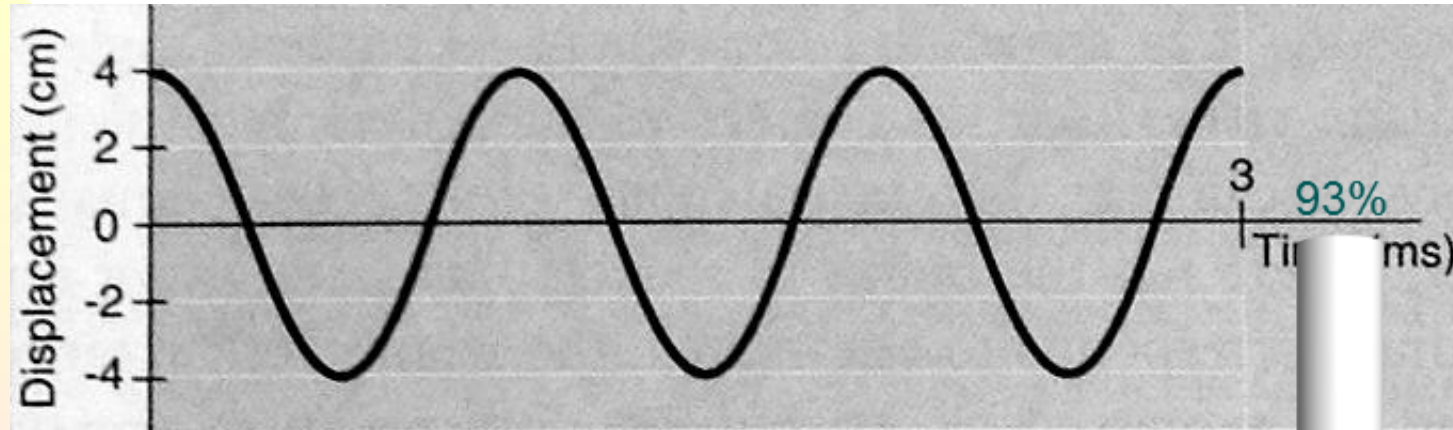
- Animated mass on a spring
- Animated pendulum



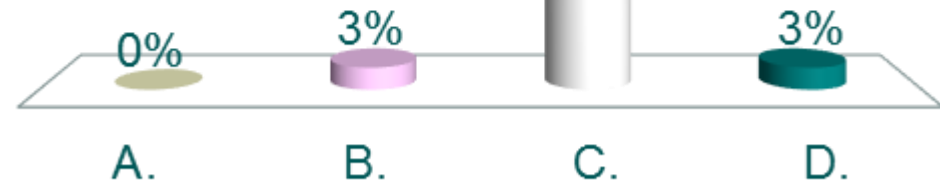
Definitions

- **Period (s)** – the time required to complete one cycle
- **Frequency (Hz)** – the number of cycles completed each second
- **Amplitude (m)** – the maximum displacement from equilibrium

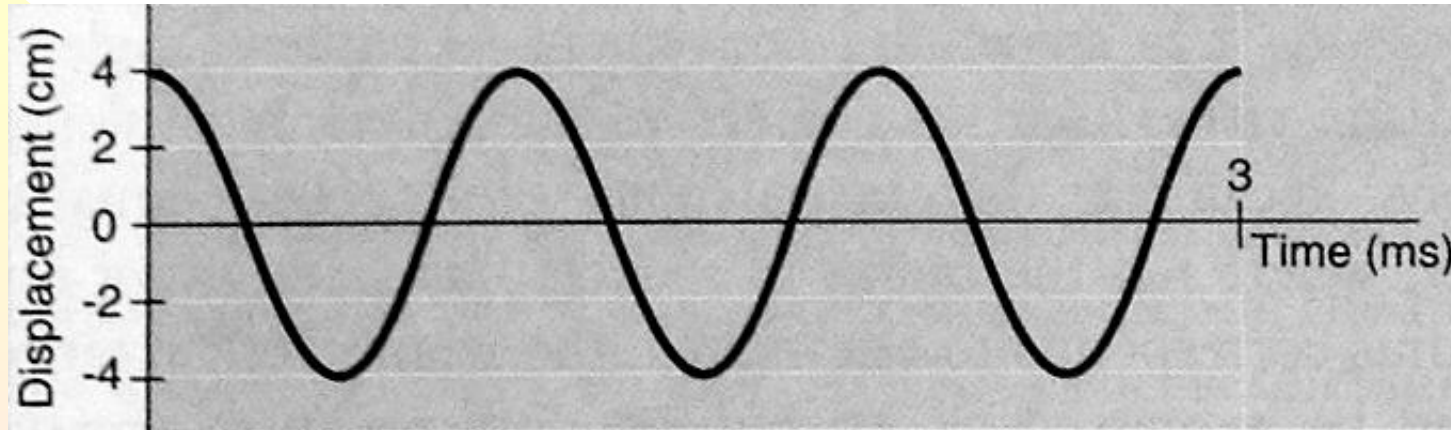
The graph below shows the position vs. time of an oscillator. What is the period of oscillation?



- A. 0.43 ms
- B. 0.50 ms
- C. 1.0 ms
- D. 3.0 ms



The graph below shows the position vs. time of an oscillator. What is the period of oscillation?



- A. 0.43 ms
- B. 0.50 ms
- C. 1.0 ms**
- D. 3.0 ms

The oscillator completed three full cycles in 3.0 ms