Bowl of soup

Piece of cheese

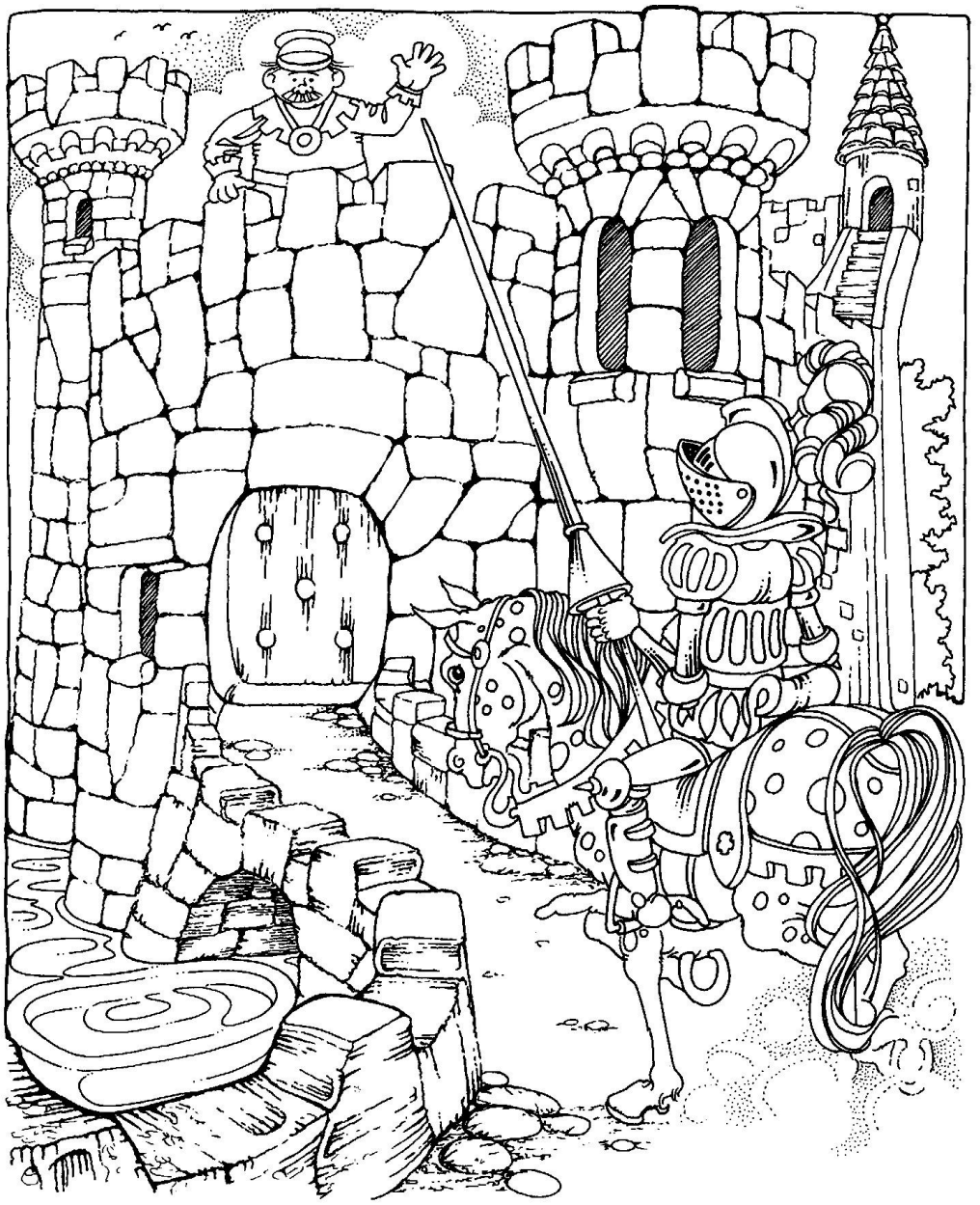
Hot bath

Toothbrush

Comfy chair

Slippers

Good book



Lance has just returned from a long day of dragon hunting. He is looking forward to **a bowl of soup, a piece of cheese, a hot bath, a toothbrush, a big comfy chair, a pair of slippers,** and a **good book.** Can you help him find everything he needs?

WELCOME TO PHYSICS

1. Thank you Mr. Hottenstein!!!
2. New Calendar for the World!
3. Collect PGA$/textbooks this week
4. Objectives/waves study sheet – handout
5. Around the room
6. Vocabulary of Waves (start unit)

- Hanke-Henry Calendar - Xtr week
- Proposed Konichek Calendar

- Show at least 10 people and get vote as to whether they
- 1) Want to keep the same calendar
    - 2). Hanke-Henry Calendar
    - 3). Proposed Konichek Calendar
    - 4). Combination of above? (what is your idea?)

  (Due by April 20th – 5 pts. Extra credit)

PGA$ this week!

Collect Textbooks this week!

my.hrw.com

pkonichek1

k4X9n

Handout

Objectives – Go over activities/labs

Handout

Wave Study Sheet

Start answering questions that you know the answers to. Read through all of them.

Around the room.

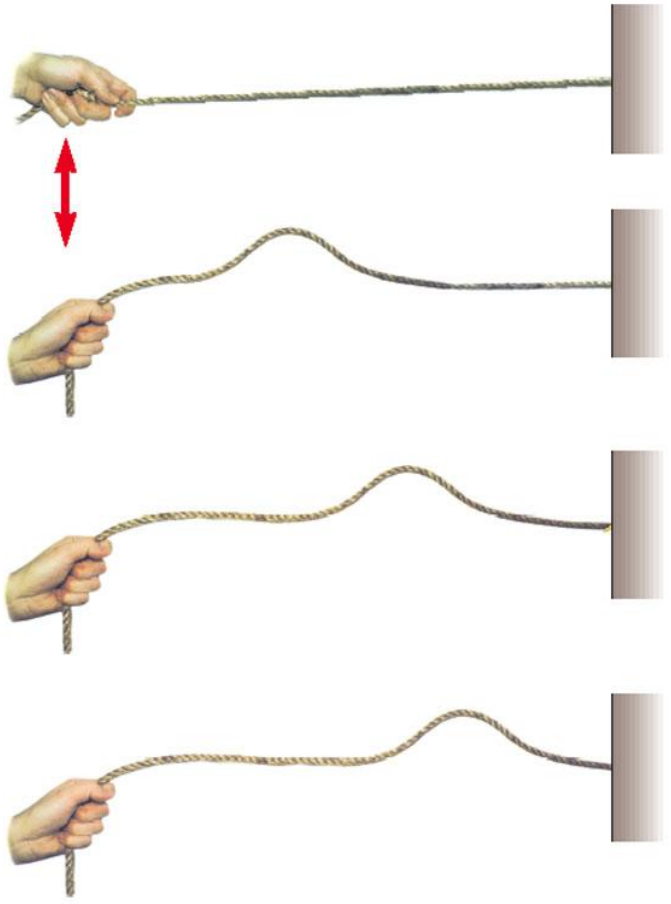
Be careful with equipment.

Wave Motion

- A wave is the motion of a disturbance
- Mechanical waves require
  - Some source of disturbance
  - A medium that can be disturbed
  - Some physical connection between or mechanism though which adjacent portions of the medium influence each other
- All waves carry energy and momentum

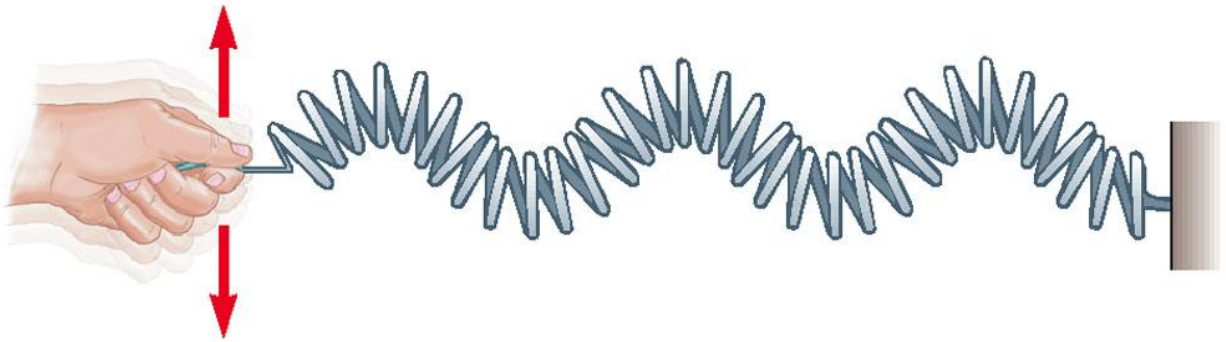
Traveling Waves

- Flip one end of a long rope that is under tension and fixed at one end
- The pulse travels to the right with a definite speed
- A disturbance of this type is called a *traveling wave*



Transverse wave

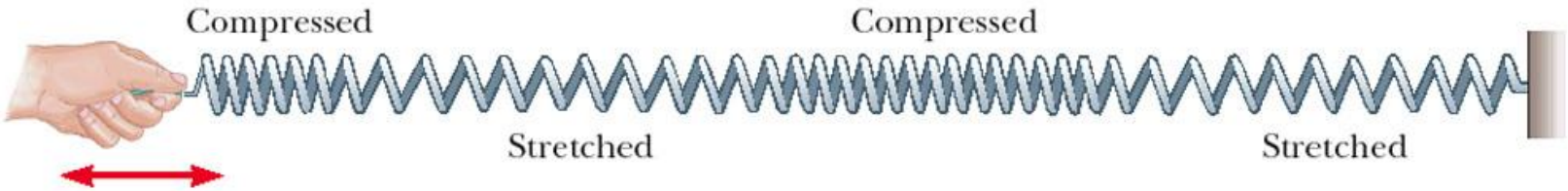
- Each element that is disturbed moves in a direction perpendicular to the wave motion



(a) Transverse wave

Longitudinal wave

- The elements of the medium undergo displacements parallel to the motion of the wave
- A longitudinal wave is also called a compression wave



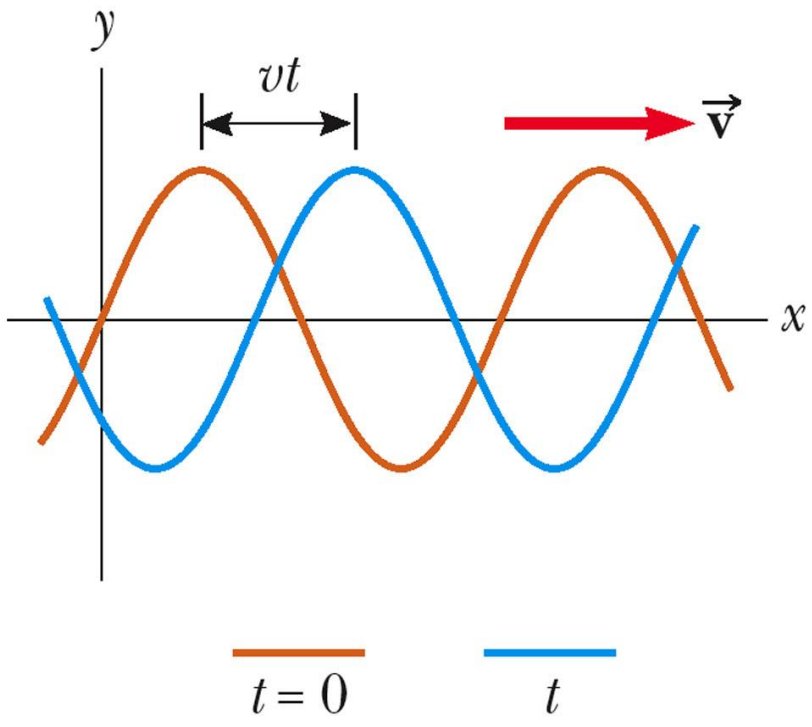
(b) Longitudinal wave

Other Types of Waves

- Waves may be a combination of transverse and longitudinal
- A **soliton** consists of a solitary wave front that propagates in isolation
  - First studied by John Scott Russell in 1849
  - Now used widely to model physical phenomena
  - Solitons are found in fiber optics, proteins, DNA, and magnets
  - http://en.wikipedia.org/wiki/Wave_of_Translation#The_wave_of_translation

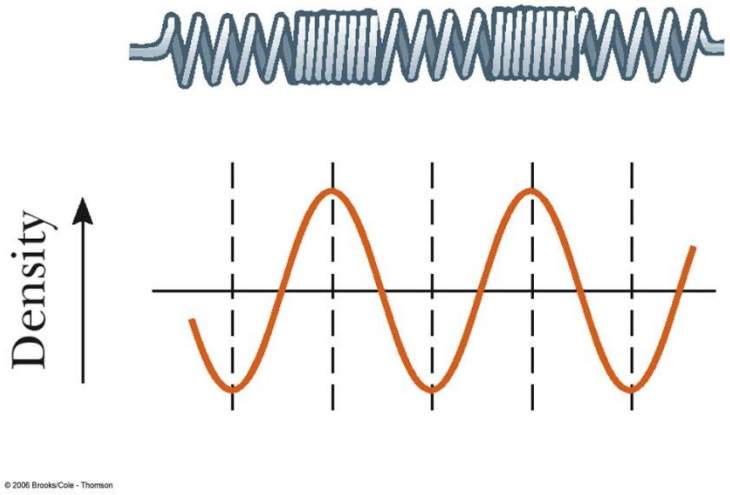
Waveform – A Picture of a Wave

- The brown curve is a "snapshot" of the wave at some instant in time
- The blue curve is later in time
- The high points are *crests* of the wave
- The low points are *troughs* of the wave



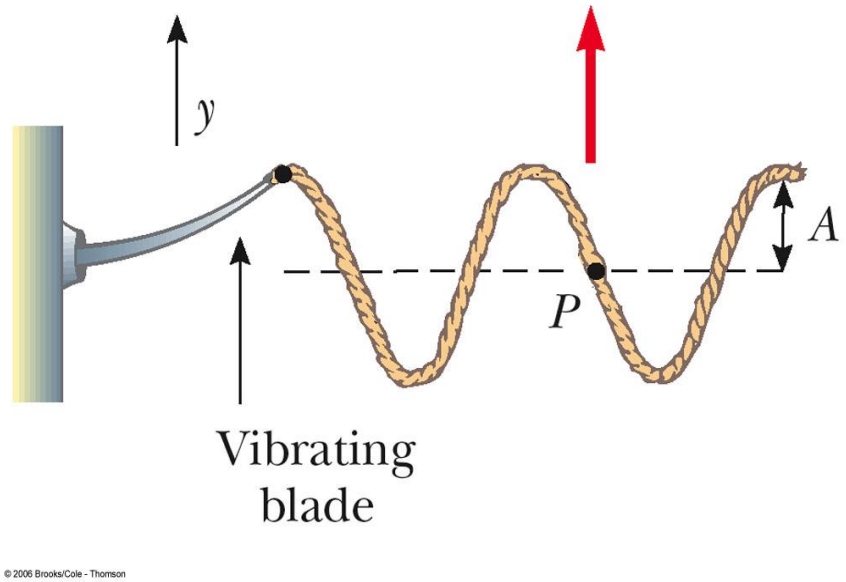
Longitudinal Wave Representation

- A longitudinal wave can also be represented as a sine curve
- Compressions correspond to crests and stretches correspond to troughs
- Also called density waves or pressure waves



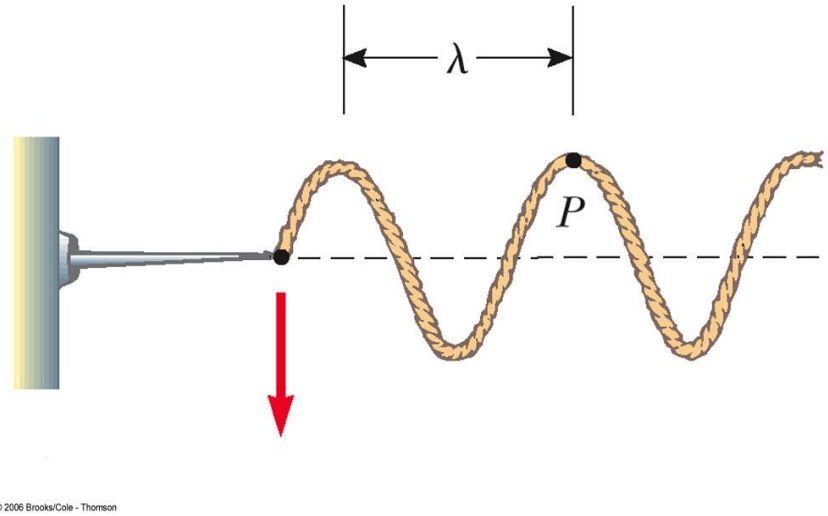
Description of a Wave

- A steady stream of pulses on a very long string produces a continuous wave
- The blade oscillates in simple harmonic motion
- Each small segment of the string, such as P, oscillates with simple harmonic motion



Amplitude and Wavelength

- Amplitude is the maximum displacement of string above the equilibrium position
- Wavelength, λ, is the distance between two successive points that behave identically

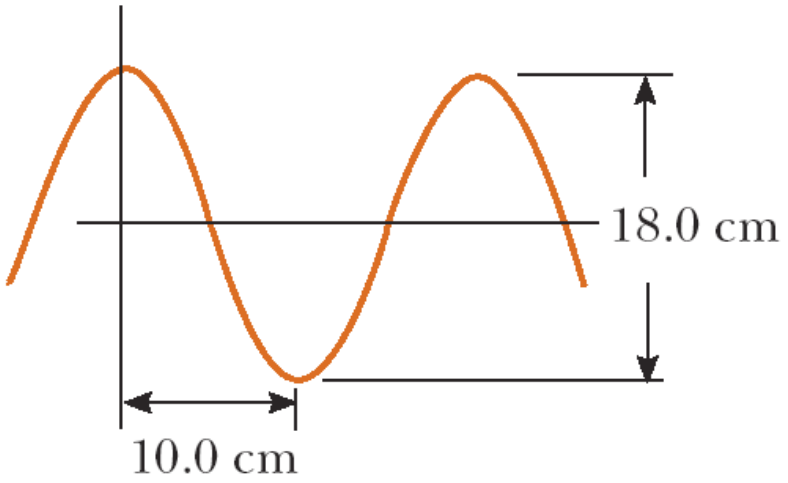


Speed of a Wave

- $v = f \lambda$
  - Is derived from the basic speed equation of distance/time
- This is a general equation that can be applied to many types of waves

Sample Problem

- A wave traveling in the positive *x*-direction has a frequency of 25.0 Hz, as shown. Find the (a) amplitude
- (b) wavelength
- (c) period
- (d) speed of the wave



Sample #2

- A bat can detect small objects, such as an insect, whose size is approximately equal to one wavelength of the sound the bat makes. If bats emit a chirp at a frequency of 60.0 kHz, and if the speed of sound in air is 340 m/s, what is the smallest insect a bat can detect?