Pendulums to the Rescue! - Saving Indiana Jones Indiana Jones wraps his whip around a light fixture to swing to safety. What is the tension in the whip at the bottom of his swing? Estimate all values you may need.

Damped Oscillators What is the general form of a damped oscillator?

What is the drag force, F^D?

What do you know about τ? Name? Units? Defining Equation?

Energy of Damped Oscillators A damped harmonic oscillator consists of a block ($m = 2.00kg$), a spring ($k = 10.0\frac{N}{m}$), and a damping force the is linearly proportional to the velocity. Initially, it is pulled to the left $25.0cm$; because of damping, the amplitude falls to $\frac{3}{4}$ of this initial value at the completion of 4 oscillations.

a. What is the value of time constant τ?

b. What would the complete position equation look like for this oscillator?

c. How much energy has been "lost" during these 4 oscillations?

Driven Oscillators Brainstorm in your group what you know about driven oscillators. What does driven mean (in this context)? What kinds of questions could KC ask about driven oscillators? How does a driven oscillator differ from a damped oscillator?

Traveling Waves Name and define, in your own words, the 3 types of waves. Give 1 example of each type.

Name and define, in your own words, the 3 modes of waves. Give 1 example of a wave that travels via each mode.

What is the general form of a traveling wave?

What is the wave speed in general? For a spring?

What do you know about k? Name? Units? Defining Equation?

Traveling Through a Medium A traveling sound wave moves through a medium and the displacement can be described by the following function:

$$D(x,t) = (2.00\mu m)cos(1.75x - 858t)$$

where x is meters and t is in seconds. Determine

a. Determine the amplitude.

b. Determine the wavelength.

c. Determine the speed of this wave.

d. Determine the instantaneous displacement from equilibrium of the elements of the matter at the position $x = 0.050m$ and at $t = 3.00ms$.

e. Determine the maximum speed of the element's oscillatory motion.

Waves-Oscillations.Traveling-Waves.**MS.KC.7:** Two buoys are bobbing up and down with a period of 3 s at a distance of 30 m from each other. It is noticed that when one is at its maximum position the other is also at its maximum position and there is one wave crest between the two buoys. Which of the following statements regarding this situation are true?

(a) The speed of the water waves is 5 m/s.
(b) The speed of the water waves is 10 m/s.
(c) The frequency of the water waves is 0.33 Hz.
(d) The wavelength of the water waves is 30 m.
(e) The wavelength of the water waves is 15 m.