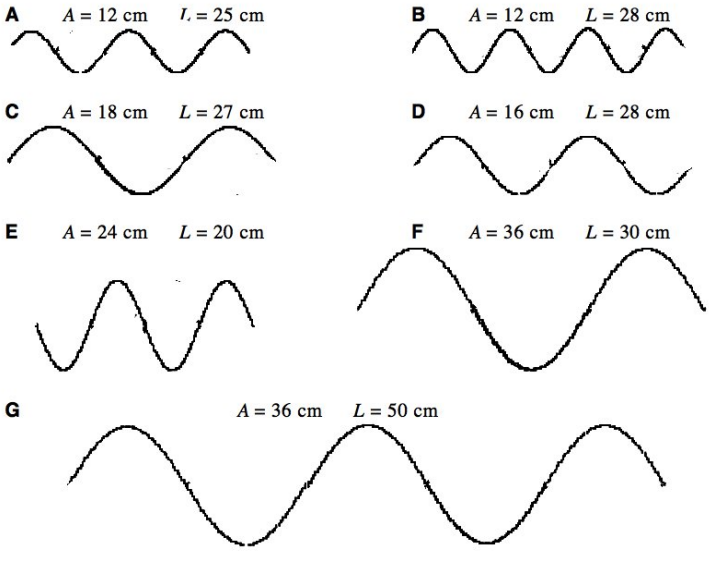
Unit 5: Waves & Sound

Name: _____ Period: _____ Date: _____

Homework from CPO	Due Date
Read P. 613-615, Questions on 619: 1-4	
read pg 617, 618, do problems 8, 9 on p 619; p628 16-19	
Read p 624, do problem 8 on 627, do problems 5-8 & 11 on pg 630	

Vocabulary	Sentence that correctly uses the word	Pattern, Diagram, or Equation
Wave		
Period		
Amplitude		
Frequency		
Wavelength		
Longitudinal Wave		
Transverse Wave		
Superposition		
Constructive Interference		



Rank (least to greatest) these waves by:
Wavelength:

Amplitude:

Frequency:

Period:

Speed:

PhET Introduction Activity Part 1

Part 1:

Go to: http://phet.colorado.edu/en/simulation/wave-on-a-string or, google search: "PhET Waves" and click on "Wave on a String - …". Click "Run Now."

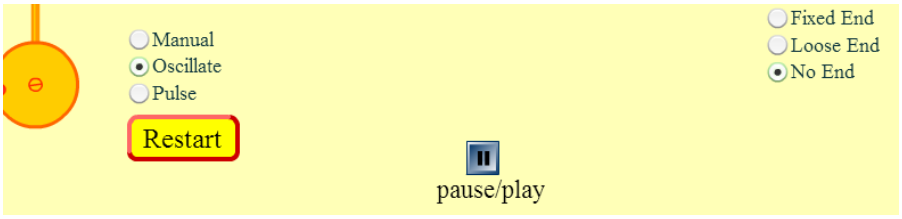
From here spend 3 minutes and try things out! Shake the wrench, play with all the dials, and figure out what happens with each action.

Thinking questions

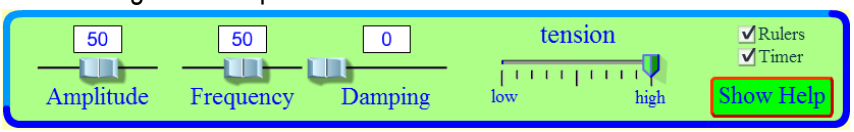
-When damping is set to 100 what happens to the wave?

-When damping is set to 0 what happens?

After trying things out on your own, switch the settings at the bottom to match these: ("Oscillate" and "No End")



And then switch the settings at the top to match these:

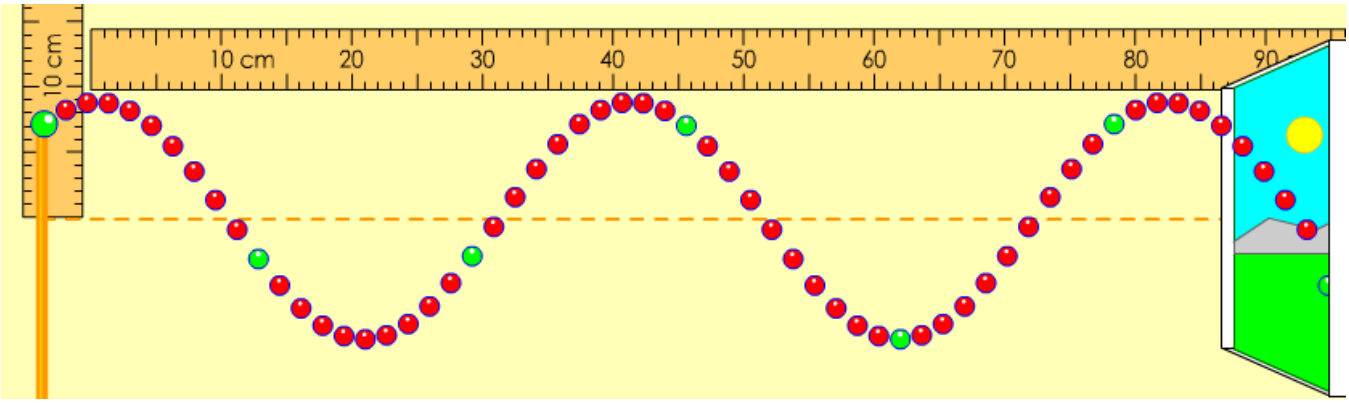


Double Check! Is your tension set to maximum? Is your damping set to zero?

We now have some rulers and a timer to make some measurements. Pause your simulation if it's running and consider: What are some different things we can measure about a wave? Brainstorm ideas below (There are at least 5 things we can measure):

(Pay attention to the class discussion of wave characteristics!)

Label the wave below to show an example of each of these terms: wavelength, amplitude, direction of wave propagation, direction of oscillation, crest, trough.



PhET Introduction Activity Part 2

Let's do some preliminary investigations for wave patterns.

1. Set your amplitude to 20, 40, and 80. Pause and draw a sketch for each situation.

2. Does amplitude affect wave speed?

3. Does amplitude affect frequency?

5. Now that we've covered the least interesting variable, let's explore tension. Set your frequency to 20. Adjust the tension. How does tension seem to affect the speed of the wave?

6. Set your tension back to maximum. Set your frequency to 20 and then 40. Pause and draw a sketch of the wave in each case.

7. How does frequency seem to affect wavelength?

8. How does frequency seem to affect wave speed?

9. How does frequency seem to affect period (length of time it takes for one wavelength to pass by)?

10. At this point, we have done some mini-experiments to get a sense of how things work. In the space below, brainstorm some research questions we can explore and take thorough data in the next class with.

Patterns in waves

- Shaking a spring at different frequencies, measuring period- T vs. f

-Shaking a single spring at different frequencies, measuring speed- v vs. f

- Shaking a spring at different frequencies, measuring wavelength- λ vs f

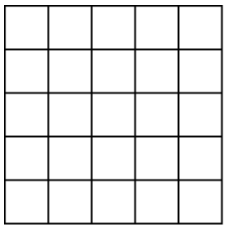
1a. Pattern:

1b. Pattern:

1c. Pattern:

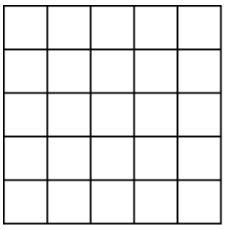
2. Graphically

T



f (frequency)

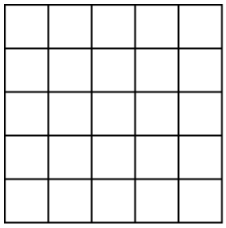
v



f

λ

(wavelength)



f

3.Mathematically

T =

v =

λ =

4. Data Tables: when *needed* assume a constant wave speed of 5 m/s, and a frequency of 10 Hz.

f	T
1	
2	
5	

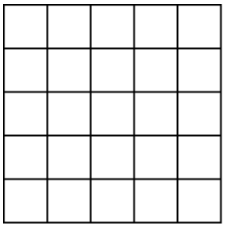
f	v
1	
2	
5	

f	λ
1	
2	
5	

5. What is being held constant in graph 1c?

6. How would the graph for 1c change if the velocity of the wave was doubled?

Before



After