Waves on a String (Interactive Simulation)

Discuss the words in the box.

| Pre-Lab: (Define)	Post Lab: (Define at the end)
crest	amplitude
trough	frequency
line of origin	wavelength

Guiding Question:
How do the properties of amplitude and frequency affect wavelength?

Part I:

Phet Waves on a string

1. For this activity you will be **collecting data** to explore three properties of a wave.
2. Explore the simulation. Be sure to click on all the buttons.
3. For the first set of investigations, we will look at **amplitude**.
   - you need to be on oscillate and loose end
   - The rest of your screen should be set up like this:
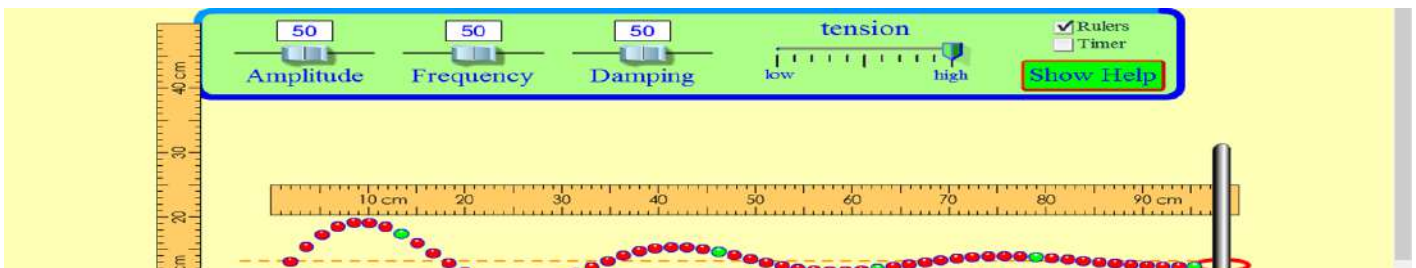
Use the pause button to make measuring easier.

Amplitude setting	Height of wave at the start (be sure your ruler is lined up correctly)	Distance ring moves on pole (end)
100		
50		
5		

Explain what happened to the energy at the end of the wave when we changed the amplitude.

_____

_____

4. For this next part we will investigate **wavelength.**
   - You need to be on ⦿ Oscillate
   - The rest of your screen should be set up like we did for **number 4.**
   - Try out the ▶▶ step button after you hit pause. This may be useful for collecting data.

Data:

Wavelength = _____ cm
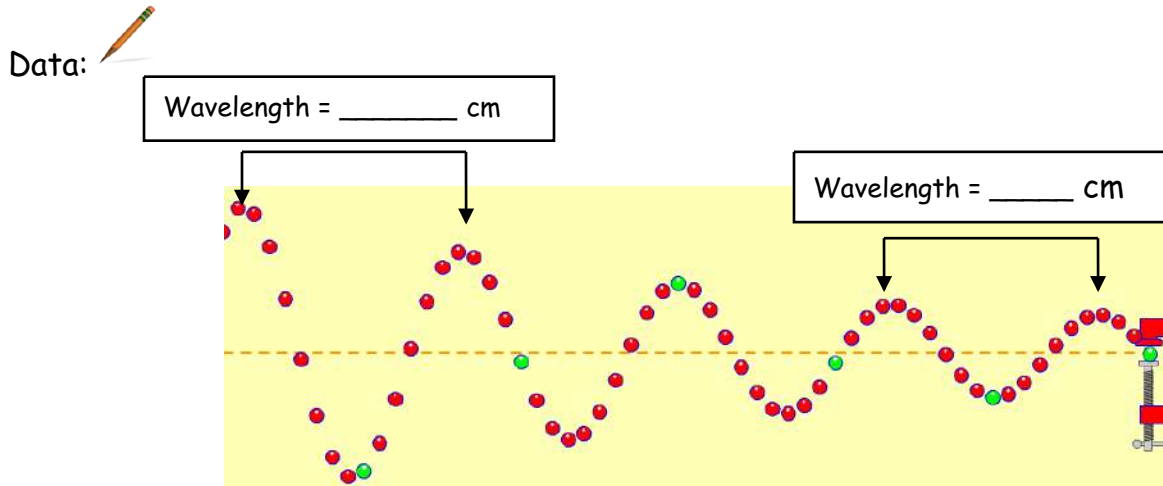
Wavelength = _____ cm

7. Think about the wavelength of the two waves you measured.
   ➢ How are they similar? _____
   ➢ How are they different? _____

# Part 2: For the third set of investigations, we will look at **frequency.**
- you need to be on oscillate
- open both the ruler and timer
- controlled variables: Amplitude and damping should be left on 50 and tension stays on "high"
- Remember, to stop or slow the wave use pause/play and ▶▶ step

   1. Before you begin… try a little **practice using the timer**:
   - Turn the timer on, off and reset the timer while waves are moving.

   2. Practice counting waves passing a given point:
   - Move the vertical ruler so that it is along the wave's path.
     This will be the point where you watch waves pass and count
     them. Count 5 waves passing the ruler. Change the frequency and count again.
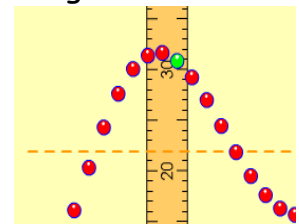
3. ✏️ Fill in the table by counting the waves and using the timer.

Data:

| frequency	Time interval	Number of waves:			**Average** number of waves counted in 10 second period	Number of waves in 1 second **frequency****
		Trial #1	**Trial #2**	**Trial #3**		
50	10 seconds					
10	10 seconds					
100	10 seconds					

*To find **frequency**, <u>divide</u> the **average** number of waves counted by the **time interval**.
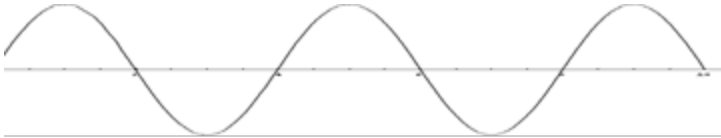

5. Think about the data.
   ➢ Decide on a way you can explain wave **frequency** to the class.

   ➢ ✏️ Write your idea(s) on the lines.

_____

_____

_____

6. Draw another wave to show what will happen when the **amplitude** is increased:
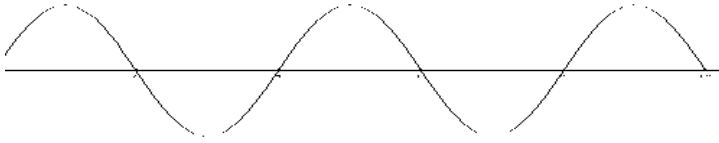
7. Draw another wave to show what will happen when the **frequency** is increased:

8. How does increasing the amplitude of a wave affect wavelength?

9. How does increasing the frequency of a wave affect wavelength?

Conclusion: Our data shows that the higher the number chosen for the frequency on the slider, the _____ the number of waves passing a _____ _____ in a certain amount of _____.