

# Properties of Waves

Name:\_\_\_\_\_ Date:\_\_\_\_\_ Class:\_\_\_\_\_

**Directions:** You and a partner are going to use an interactive simulation to study the how amplitude, frequency, and wavelength of a wave are related to one another.

1. Click the link provided to open the “Waves on a string” simulator.
2. Play around with the simulator for a few minutes to see what each control does.  
After you are finished click the reset button.
3. Click the “Oscillate” button. Describe what is happening.

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4. Move the slider that says “Damping” to the value of 20. Describe what happened.  
What do you think is meant by the word “damping” in this case?

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5. Now move to the slider that says frequency. Move the frequency to the values of 25, 50, 75, and 100. Be sure to pause at each number so that you can observe the effects on the wave.

What happens as you move the slider?

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What does this tell you about the frequency of the wave?

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6. Now move the frequency slider back to 50.
7. This time you are going to move the amplitude slider. Again move it to the values of 25, 50, 75, and 100 pausing at each one.

What do you observe about the waves that are created as you move the slider?

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What does this tell you about the amplitude of a wave?

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The amplitude of a wave is related to the energy of a wave. Do you think that a wave with high amplitude has a lot of energy or a little bit of energy? Why do you think this? Did you see anything on the screen that made you think this or could prove your point? How could you demonstrate this relationship?

8. Now let's look at wavelength. Move the amplitude to 50, frequency to 50, and damping to 0. Choose the option that says "No end" and create a wave. Pay careful attention to the wavelength of the waves that are created. Click the pause button and choose the ruler from the top bar. Measure the wavelength of the wave that has been created. Remember that wavelength is from one point to the exact same point of the next wave. Use the green dots to help you measure the distance.

Wavelength = \_\_\_\_\_

9. Now press play. Increase the frequency of the wave to 75 and measure the wavelength, then reduce the frequency to 25 and measure the wavelength. How does increasing the frequency affect the wavelength of the wave?

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10. Move the frequency of the wave back to 50. Now change the amplitude of the wave to 75 and measure the wavelength and to 25 and measure the wavelength. What affect did you notice?

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What are the relationships that are present between frequency, wavelength, and amplitude of a wave?

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Finish the following statements:

- a. If the frequency of a wave is doubled, the wavelength will be \_\_\_\_\_.  
b. If the wavelength of a wave is doubled, the frequency of the wave will be\_\_\_\_\_.

If you have time you may open the second simulator and play around with it. If you are going to turn on the sound you must use earphones! 😊