



Light and Sound Wave Simulation

PURPOSE: To investigate how waves respond to a variety of materials and how properties like amplitude, frequency, and wavelength changes their qualities.

- Get a sheet of paper put name, period, and a title on it.
- Review the pictures to the right.
- Google “PHET Wave Interference”
- Next Click on the “Wave Interference” simulator and click “Run Now” ONLY ONCE

A. WATER WAVE SIMULATOR

First you are going to record your observations about the water wave simulator.

Now click “Show graph”.

1. Increase the frequency and leave it. Draw the line you see on the graph.
2. Decrease the frequency and leave it. Draw the line you see on the graph.
3. Increase the amplitude and leave it. Draw the line you see on the graph.
4. Decrease the amplitude and leave it. Draw the line you see on the graph.

Now rotate your view of the water and observe.

5. Put the frequency and amplitude back in the center. What happens if you add a second drip with the add drip button on the right?
6. Turn off the second drip but add a barrier (also on the right). Record your observations.

B. SOUND WAVE SIMULATOR

Now click on the top tab that says “sound”. Now click “Show graph.”

7. Describe what you see?
8. What happens when you press the particle button?
9. Describe how the particles marked “X” move.

For each of the following question look at the particles & grey scale views.

10. Increase the frequency and leave it. Draw the line you see on the graph.
11. Decrease the frequency and leave it. Draw the line you see on the graph.
12. Increase the amplitude and leave it. Draw the line you see on the graph.
13. Decrease the amplitude and leave it. Draw the line you see on the graph.
14. Click on the particle button. What happens when you turn the speaker off? (wait a min)

15. Put the frequency and amplitude back in the center. Click the pulse button once and observe. Describe what you see.
16. Turn the speaker back on. Turn on the sound button below the word 'Audio' and **LISTEN**. Do the next section fast, because it gets noisy. Write how the sound changes when....
 - a. Increase Frequency
 - b. Decrease Frequency
 - c. Increase Amplitude
 - d. Decrease Amplitude
17. Put the sliders for frequency and amplitude in the middle and on grey scale. What happens if you add a barrier? Make sure you describe how your graph changes too!
18. Slide the barrier toward the speakers. Describe how your waves change on the graph.

C. LIGHT WAVE SIMULATOR

Now click the top tab that says "light." Click "show graph." Note that it shows the electric field.

20. What happens when you change the wavelength?
21. Which color has the highest frequency?
22. Which color has the lowest frequency?
23. Which color has the highest amplitude?
24. Which color has the lowest amplitude?
25. What happens when you set the amplitude to 0 and then try to adjust the wavelength color?
26. Turn amplitude back on. What happens to the wavelength and frequency as you change the color?
27. What can you say about the difference in colors?
28. Now add a barrier. What happens to the color behind the wall?

Now take the information you have observed using this simulator and write your conclusions.

- How do you think changing amplitude and frequency affect the way waves change?
- How do you think changing amplitude and frequency affect the way we hear?
- How do you think changing amplitude and frequency affect the colors we see?
- How does frequency relate to wavelength?
- How does this help us understand how things walls can change the way we see certain lights and hear certain sounds?