**WAVES ON A STRING SIMULATION** Name(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Guiding Question:**

 How do the properties of amplitude and frequency affect wavelength?

**Start:**

1. Go to mzpass.weebly.com. Click on CURRICULUM, select ENERGY, then WAVES. Run from the website or click on the PHET link and download for full screen.
2. For this activity you will be **collecting data** to explore three properties of a wave.
3.  Explore the simulation with your partner. Be sure to click on all the buttons.
4. For the first set of investigations, we will look at **amplitude**.
	* you need to be on  
	* The rest of your screen should be set up like this:



Look over the data table, on the back, and discuss how get the data you need.

 moves the wave.

|  |  |  |
| --- | --- | --- |
| Amplitude setting |  **Height of wave at the start****(be sure your ruler is lined up correctly)**LOOSE FIXED NO END | Distance ring moves on pole (end)LOOSE FIXED NO END |
| 100 |  |  |
| 50 |  |  |
| 5 |  |  |

 Discuss what happened to the energy at the end of the wave when we changed the amplitude?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Repeat number 4 – using  and then 

1. For this next part we will investigate **wavelength.**
	* You need to be on 
	* The rest of your screen should be set up like we did for **number 4.**
	* Try out the  button after you hit pause. This may be useful for collecting data.
	Data:![MC900432579[1]]()

wavelength = \_\_\_\_\_\_\_ cm

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


7. Talk about the wavelength of the two waves you measured.

* Discuss & write below how they were similar and how they were different.

![MC900432579[1]]()

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 *Teacher check point*

**Part 2**: For the third set of investigations, we will look at **frequency**.

* + you need to be on 
	+ 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 .
1. Look over the data table and discuss how you will collect the data you need.
2. Before you begin… try a little **practice using the timer**:

Turn the timer on, off and reset the timer while waves are moving.

1. 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.

*\*\*\*NOTE it is easier to do this in the* ***“STEP”*** *mode.*

![MC900432579[1]]()Fill in the table by working together, one person counting the waves and the other 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** |
| 10 | 10 seconds |  |  |  |  |  |
| 50 | 10 seconds |  |  |  |  |  |
| 100 | 10 seconds |  |  |  |  |  |

**\***To find **frequency**, divide the **average** number of waves counted by the **time interval**.

5.  Talk about the data.

* Decide on a way your group can explain wave **frequency** to the class.
* Write your idea(s) on the lines. ![MC900432579[1]]()

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**CONCLUSION** Our data show that the higher the number chosen for the frequency on the slider, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the number of waves passing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a certain amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

6. Use arrows, or draw on the end of the wave, to show what will happen when the **amplitude** is increased:



Line of --origin------

 7. Draw on the end of wave, to show what will happen when the **frequency** is increased:

 

Line of --origin------