Waves on a String

**Directions:**

1. Open *Waves on a String,* **investigate** wave behavior using the simulation for a few minutes.

2. With the *Oscillate* button on and with *No End* checked, **investigate** waves more carefully using the *Amplitude* slider*.*

a) Define *Amplitude* in everyday language.

b) Explain how the wave behaves as the *Amplitude* changes.

3. Repeat step number 2, for *Frequency, Tension* and *Damping*.

4. Set *Amplitude* on high, *Frequency*, *Damping* and *Tension* on low. Also, have on *Oscillate*, *Timer* and *No End*. Use the *Pause* button to freeze the wave.

a) **Place** a blank piece of paper on your monitor and **trace** the wave and the wave generator. **Mark** the green balls. This is a vertical position- horizontal position graph, label your axes.

b) Quickly press *Play,* and then *Pause* again. Use the same piece of paper, put it on the monitor and make sure to get the generator in the same spot. **Trace** the new wave.

c) **Write** about the differences and similarities in the characteristics. You may have to do some more tests by pressing *Play,* then *Pause* and tracing to test your ideas.

d) Try some other settings and **explain** why I recommended the settings that I did.

5. Set *Amplitude* on high, *Frequency*, *Damping* and *Tension* on low. Also, have on *Oscillate*, *Timer* and *No End*. Use the *Pause* button to freeze the wave.

a) **Measure** the vertical location of a green ball with a ruler.

b) **Record** the vertical position and time.

c) Quickly press *Play,* then *Pause* repeatedly to **make** a data table the vertical position of the green ball versus time.

c) **Make** a graph of vertical position versus time.

d) **Write** about the differences and similarities between vertical position- horizontal position graphs and vertical position-time graphs.

7. **Investigate** how waves behave when the string end is *Fixed* and *Loose* with *Manual* settings.

8. Alter the setting in an attempt to produce a standing wave. **Write** a procedure that another student could follow to produce a standing wave.