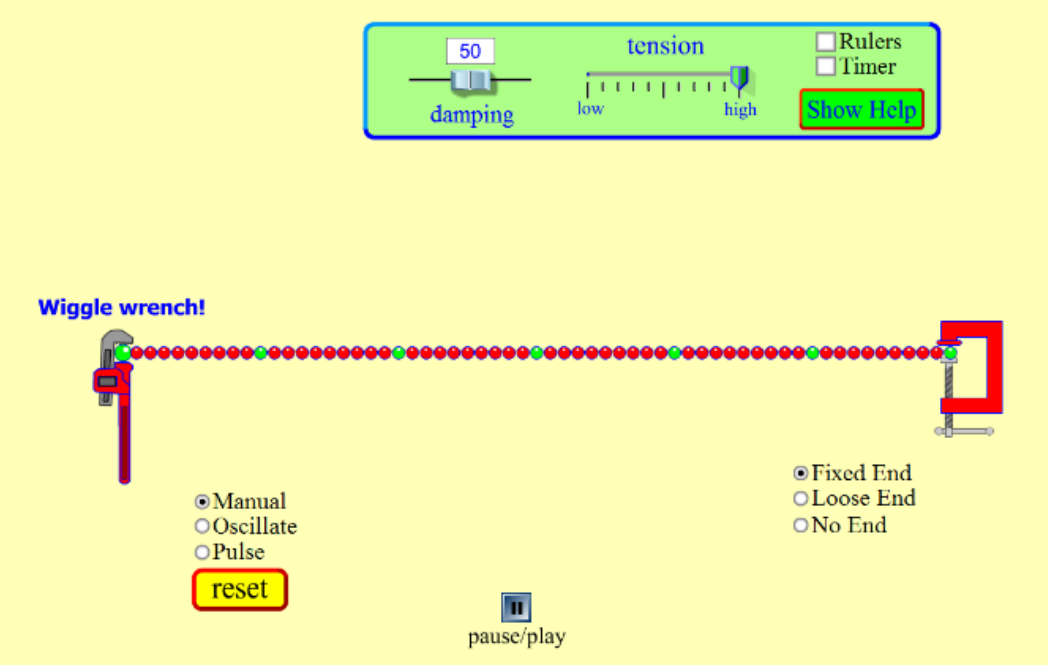
Sound Virtual Practical Activity 1

*This activity requires you to open up the **Wave Simulation** which is located under **Lesson 1 Sound**.*

Wriggle the wrench to create some pulses.



What is the **direction** of **propagation** of the pulses?

What is the direction of movement of the particles making up the medium? (Hint. Keep an eye on one of the green particles as the pulse or wave moves through).

Are these **transverse** or **longitudinal** pulses? Explain your answer.

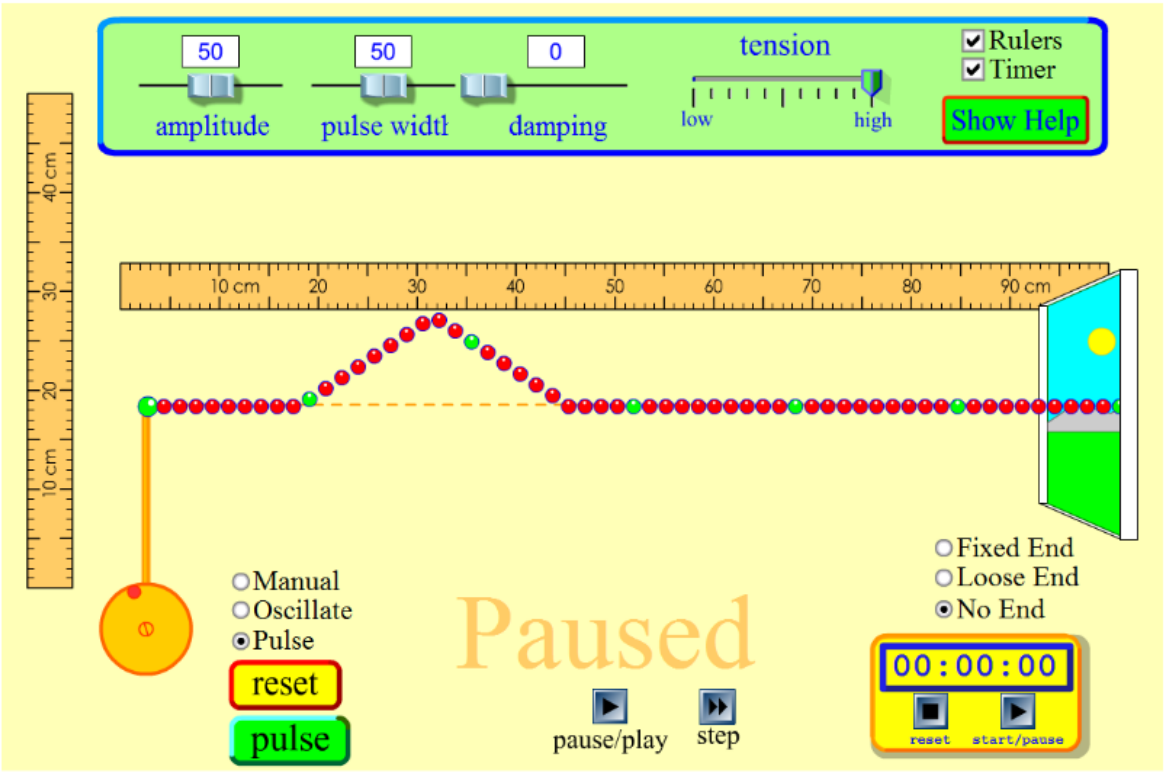
Have a **play** with the various controls and record any observations that you make.

This simulation is a representation of how waves or pulses propagate in a string or slinky spring. What aspect of real wave propagation is being modelled by the **damping** factor setting?

How does tension affect the speed of the pulse?

Now set the **damping level** to **zero.**

Set up with **"No end"** and **tick** the **rulers** and **timers** boxes to show the rulers and the timer. They can be **moved** around to suit your requirements.



With the **tension** setting at **high**, press the **pulse** button and the quickly hit the **pause/play** button and the **step** button to obtain distance and time data for the motion of the pulse.

Repeat this for **tension** settings of **medium (half way)** and **low**.

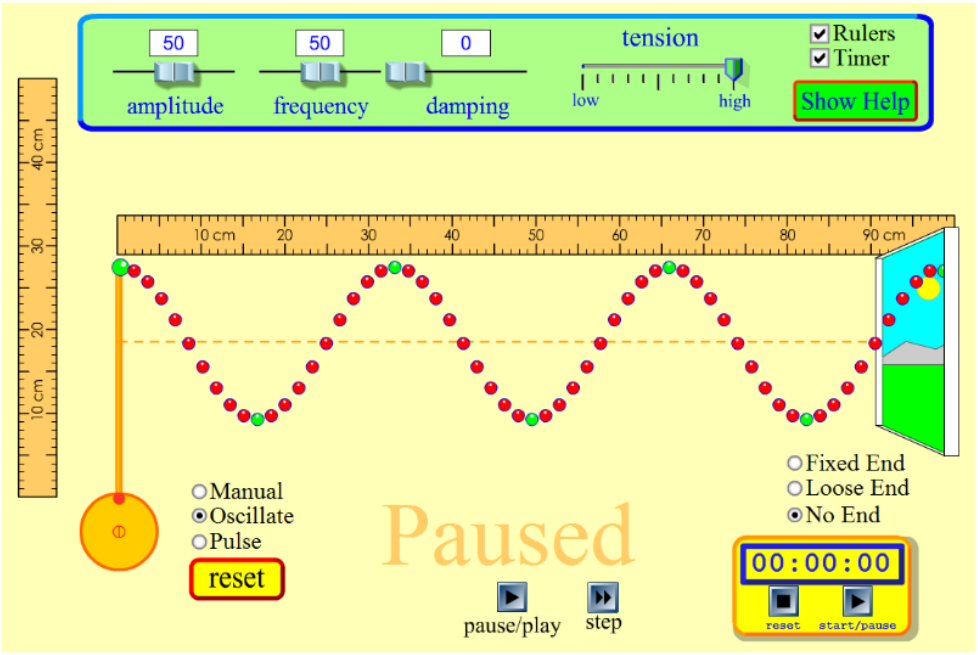
Record your results in the table below and calculate the **speed** of the pulse for each of the three **tension** settings.

Tension	Distance (cm)	Time (sec)	Speed (cm/s)
High			
Medium			
Low			

As the **tension increases**, what happens to the **speed** of the pulses?

The Wave Equation

Set the source control to “oscillate” to create a continuous wave as shown below:



Use the **horizontal ruler** to accurately record the distance between;

a) Successive crests _____ cm

b) Successive troughs _____ cm

This distance is called the **wavelength, λ .**

Use the **step** control to locate the wave in exactly the position shown in the above screenshot and then **reset** the **timer** to zero.

Use the step control again to record the **time** taken for a **wave crest** from the source to travel a distance of **one wavelength** to the right. _____ sec

If you observe carefully you will notice that this is the same time as it takes for the source to complete one complete down and up cycle. This time is called the **period, T** and is measured in seconds.

Complete the following:

In a time of one ..... the wave travels a distance of one..... to the right.

Wavespeed = distance/ time = ... / .....

Frequency, f, is the number of cycles per second and is equal to **1/T**

So substituting **f** for **1/T** we get **V =** _____ This is known as the **Wave Equation**

Where **v= wavespeed (ms^{-1}), f = frequency (Hz) and λ = wavelength (m)**

Acknowledgements

This simulation was created and made available by:

PhET Interactive Simulations
University of Colorado
http://phet.colorado.edu.

Further Notes