Virtual Investigation – Waves

Open the java applet http://phet.colorado.edu/en/simulation/wave-interference

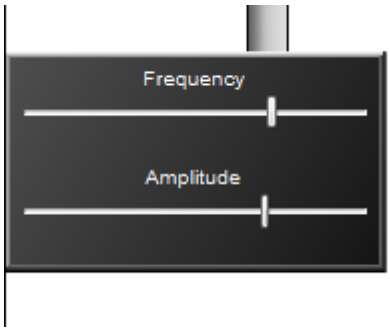
Have a play with the different settings.

Now you will investigate the wave equation, reflection and diffraction.

The Wave Equation

You can investigate the wave equation by using the detector. For one drip use the detector and graph to investigate that the relationship:

speed = frequency x wavelength



Remember that wavelength needs to be in metres, not centimetres.

Increase the frequency and amplitude to about 3 quarters of the way along the slider.

To get frequency and wavelength you can pause the animation and analyse the graphs. Frequency is the number of waves per second, wavelength is the distance between waves. To get wave speed you will need to allow the simulation to run and use the measuring tape and stopclock to time how long it takes one wave to travel a certain distance. Then use speed = distance/time. Does speed actually equal the frequency x wavelength?

Reflection

Add wall in the path of a wave and allow the animation to run. Pause the simulation and sketch the wave pattern you see. You may then wish to change the angle of the wall and produce another sketch.

Diffraction

Remove the wall and add a barrier with one slit in the path of the waves and allow the animation to run. Pause the simulation and sketch the wave pattern you see. Change the gap width and sketch the pattern you get for a narrow gap (< wavelength) and a big gap (>wavelength). Now try for two slits.