**Part A: How do waves change upon entering a different medium**

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λ=2.0m

1. Have the students practice walking at a constant pace towards the line that you define as the medium change. Students representing each wave crest should be holding a rope or metre sticks to ensure they move together. As the students cross the line that represents the medium change they should move to heel-toe walking. Record wavelength in the slower medium.
2. Calculate the ratio of the wavelength in the first medium to the wavelength in the second medium.

Ratio:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Repeat the experiment but measure distance and time for the waves in both media and use these to calculate the speeds of the waves.
2. Calculate the ratio of the wave speed in the first medium to the wave speed in the second medium.

Ratio:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Compare the wavelength ratio to the speed ratio.
2. Count the number of waves. Repeat step 1 with two timers (one in each medium). Record the amount of time it takes the waves to pass a point in each medium. This will allow you to calculate the wave frequencies.
3. How did the wave frequencies compare?
4. Reverse the direction of the wave ( go from slow to fast) so that the students can see that everything is consistent ( no measurements required )

**Part B: Refraction**

1. Repeat step 1 in the first part but make sure the waves strike the interface between the media at an angle as shown below.

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1. Use a rope to mark the direction of the waves in both media.
2. Measure the angle of incidence and angle of refraction in both media.

angle of incidence \_\_\_\_\_\_ angle of refraction \_\_\_\_\_

1. Take the ratio of the sine of angle of incidence and sine of the angle of refraction for both steps 3 and 4. How did they relate to the wavelength and speed ratios from Part A
2. Repeat step 3 but with the wave going from the slow medium to the fast medium. (no measurements are required)

**Challenge**

How could you use this to show

1. Dispersion?
2. Total internal reflection?
3. Interference?