

**/20****Lab – Waves, Light and the Electromagnetic Spectrum**

Read through the entire lab handout before beginning the lab activity.

**PART 1: Catch a Waveform**

A waveform is a visual record of waves. In this activity, you will make a waveform using the motion of a vibrating metre stick.

**Materials:**

- Metre stick
- Masking tape
- White board and 2 pieces of paper
- Dry erase marker

**What to do:**

1. Tape the marker to the end of the metre stick.
2. Tape a piece of paper to the whiteboard

**Part 1**

3. Have one partner hold the metre stick to a desk with 40 cm of the metre stick (and the marker) extending out from the desk. Hold the end firmly in place on the desk.
4. Gently press down on the metre stick and let it go so that it can vibrate gently.
5. Have a partner hold the whiteboard and walk slowly next to the vibrating marker. The waveform should be recorded on the paper. Make sure that several waves are recorded. You may need to practice this several times to get it right. Your partner can follow a masking tape line on the floor in front of the desk to make it easier to walk in a straight line.

**Part 2**

6. Make a new waveform on a new piece of paper taped to the whiteboard by repeating steps 4 and 5. BUT this time, increase the length that the metre stick extends out from the desk to 60cm.
7. Label each waveform with **40 or 60cm, crest, trough, wavelength, amplitude.**
8. Clean up and put away the equipment you have used.

**What did you find out?**

1. Measure the distance between two adjacent crests on each waveform. Which trial produced waves with the longest wavelengths (40cm trial or 60cm trial)?

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2. Which trial produced the most vibrations?

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3. As the wavelength increases, what happens to the frequency?

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4. What is the relationship between wavelength and frequency?

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5. Is it possible for the wave with the greatest wavelength to also have the greatest frequency? Explain.

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## **PART 2: Rainbows of Light**

The ability to see colour depends on the cells in your eyes that are sensitive to different wavelengths of light. In this activity, you and your partner(s) will observe the colours of the light produced by a flashlight.

### **Materials**

- Ray box
- Glass prism
- White piece of paper

### **What to do:**

1. In a darkened room, shine a ray box through a glass prism. Project the resulting colours onto a white piece of paper. You will need to move the prism around so that the light from the ray box shines into it at different angles to find the best angle to refract the light. What colours do you see?
2. Clean up and put away the equipment you have used. Answer the questions below.

**Observations:** describe/illustrate what you see(3)

What do you see?	
Illustrate	Description

**What did you find out?**

1. Where do you think the colours came from? Explain(3)

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