SPH 3U1 – Grade 11 University Physics **L. Lim-Cole**
Waves

You will work in your assigned groups to study two different types of waves. Your task is to construct and play with the waveforms as you make observations.

Recorder: _____

Manager: _____

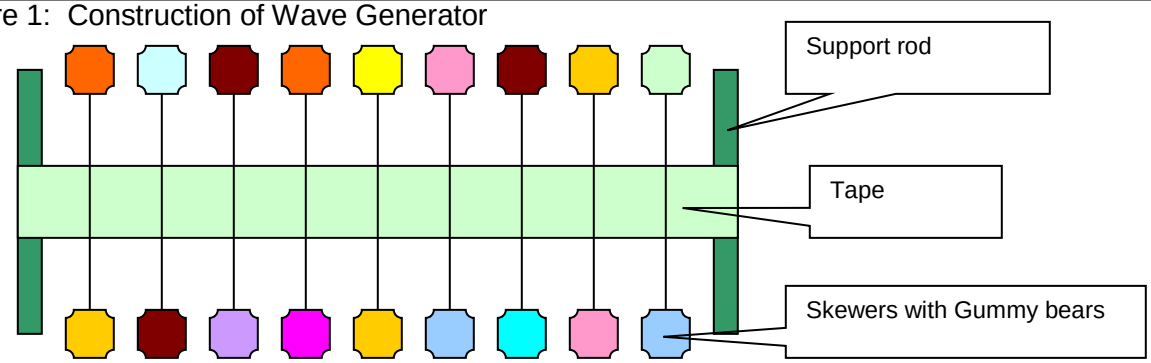
Speaker: _____

Organizer:_____

[C][K/U][T/I][A]: 0 1 2 3 4 5

1. Use the materials provided by your teacher to construct the structure illustrated in Figure 1. DO NOT EAT THE CANDIES! Create your wave generator so it is 1.5 meters long or longer.

Figure 1: Construction of Wave Generator



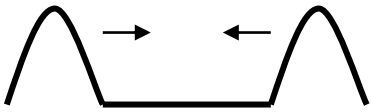
The National STEM Centre, UK (http://www.nationalstemcentre.org.uk/elibrary/resource/2096/wave-machine%22)

2. Have two students hold the wave generator by the ends firmly so that it is horizontal and level to the ground. You may move the gummy bears to balance each skewer. Have one student send a pulse down the wave generator by "flicking" one skewer perpendicular to the tape at one end. An alternative would be clamp the support rods to retort stands. What do you observe?

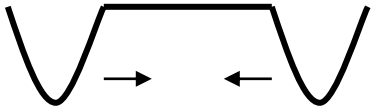
3. Repeat 2 but now lower one of the wooden dowels instead. What do you observe?

4. Use what you have observed in 2 and 3 to adjust your wave generator to maximize function. Describe what you did below.

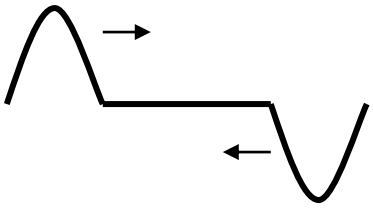
5. **Predict** what you think will happen if two upward pulses were to be sent down the wave generator at the same time. Explain your prediction.



6. **Predict** what you think will happen if two downward pulses were to be sent down the wave generator at the same time. Explain your prediction.



7. **Predict** what you think will happen if one upward and one downward pulse were to meet along the wave generator. Explain your prediction.



8. **Conduct** the activities as described in questions 5 – 7 and describe what you observe. Explain what you observe.

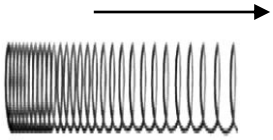
9. **Predict** what you may observe if you send a “large positive pulse” and a “small negative pulse” towards each other. Explain your prediction.

10. **Conduct** question 9 on the wave generator. Does your prediction match what you observe? Explain what you observe.

11. With one person firmly holding one end of the wave generator still, move one skewer up and down at one end. Describe what you observe. Slowly increase the frequency of the oscillations and describe what you observe.

12. Remove the gummy bears from half your wave generator. Study what happens to pulses as it travels through the wave generator. Repeat by adding larger candies to the empty skewers. What do you observe? Why do you think this happens?

13. Obtain a slinky from your teacher. **Place the slinky on the floor**. **Securely hold each end** of the slinky at all times and stretch the slinky on the floor. Predict what you will observe if one person collects 20 coils and releases the 20 coils along the length of the slinky. Do not tangle the slinky!!! (Cost of replacement is $20.00)



14. Conduct question 13 and write your observations. What makes this wave different from the wave studied using the gummy bear wave generator?

15. Move your hand back and forth along the length of the slinky. What do you observe now?

16. What happens when you increase the frequency of the vibrations?

17. Now have both ends oscillate. What do you observe?

18. Send a transverse wave down the slinky. Describe what you observe. Repeat #5-8 using the slinky and record your observations below in a table.

19. Write a summary of what you observed during this activity.