Standing Waves

As you work through the steps in the lab procedure, use the exact values you see in the simulations to record your observed values and the calculated results on this worksheet.

Standing Wave – Superposition with Reflected Wave

Record your answers and observations for Part I: Standing Wave – Superposition with Reflected Wave here by matching the correct response to the condition of the system you studied.

Observations:

- About half the amplitude of the incident or reflected wave.

- Where the wave amplitude is highest or lowest.

- Where the incident wave crosses the centerline.

- About double the amplitude of the incident or reflected wave.

- is in phase with the incident wave

- is out of phase with the incident wave

- About double the amplitude of the incident or reflected wave at the antinodes, zero at the nodes.

- About double the amplitude of the incident or reflected wave at the nodes, zero at the antinodes.

1. Where would you expect the nodes to be?

2. Where would you expect the antinodes to be?

3. About how high do you expect the resultant wave to be?

4. Describe the image produced by the simulation.

5. From the reflected wave's leftmost point, describe the area between that point and the barrier to the right.

6. How could this happen?

7. Notice where the nodes and antinodes are located (N and A, respectively) along the centerline. Can a node and antinode have the same value at any time?

Standing Wave – Superposition with Reflected Wave

Complete the tables.

Table1: Initial Questions and Predictions

	Question	Observation/Prediction
1	How long did it take, in simulation time (t), to complete this full iteration of the wave?	
2	What is the wavelength of the wave?	
3	At what locations would you expect the nodes to be?	
4	At what locations would you expect the antinodes to be?	
5	What would you expect the amplitude of the constructively interfered waves to be?	
6	What would you expect the amplitude of the destructively interfered waves to be?	

How far has the wave traveled?

Describe the waveform at t = 0.250 s.

Table 2: Wave Superposition Data

Time	Location	Wave F amplitude	Wave G amplitude	Resultant wave amplitude
0.11 s	0.250	0.75	0.75	
0.11 s	−0.250	−0.75	−0.75	
0.11 s	0.500	0.67	−0.67	
0.11 s	−0.500	0.67	−0.67	
0.25 s	0.000			
0.25 s	0.250			
0.25 s	0.500			

The points at 0.250 and 0.750 are _____ .

The points at 0.000 and 0.500 are _____ .

Nodes are found at points of _____ .

Antinodes are found at points of maximum _____ .

"Rogue" waves in the ocean were considered a myth for a very long time, fanciful and fabricated tales of fishermen too long in the sun and on the sea. What basic physics mechanism provides an explanation of their existence?

Constructive and destructive interference of vibrational waves on an aircraft can create a range of effects from a slight tail flutter to complete destruction of the aircraft. (True/False)