

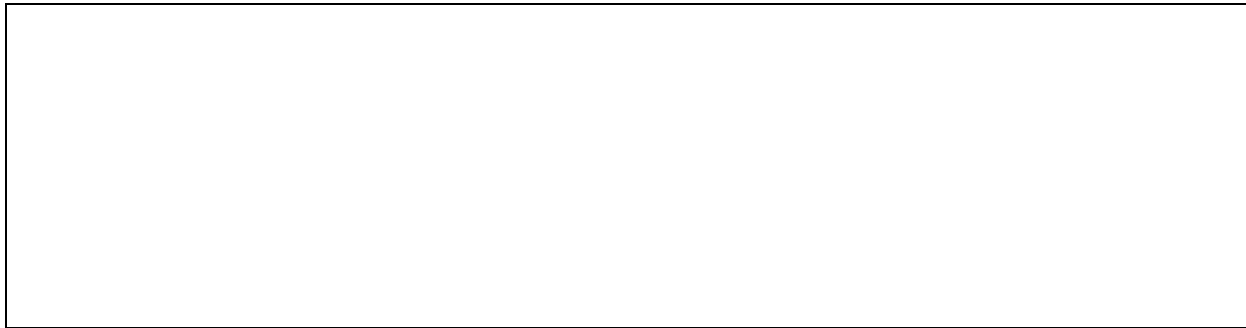
Name \_\_\_\_\_ Date \_\_\_\_\_ Class \_\_\_\_\_

## Surf's Up, Part One

*How can we use what we know about wave characteristics to pick the best surf break?*

**Challenge:** You and your friends are trying to decide what break to surf. One break has a wave height of 8 feet and a period of 8 seconds. A second break has a wave height of 4 feet and a period of 4 seconds. Which break do you choose and why?

1. Draw a diagram of a transverse wave labeled with the following characteristics: crest, trough, wave height, wave length. Circle the characteristics you think are useful for surfers to know.



2. Add definitions below.

- Crest:
  
- Trough:
  
- Wavelength:
  
- Wave Height:
  
- Amplitude:
  
- Frequency:
  
- Period:

3. Go to PHET Wave on a String simulation ([https://phet.colorado.edu/sims/html/wave-on-a-string/latest/wave-on-a-string\\_en.html](https://phet.colorado.edu/sims/html/wave-on-a-string/latest/wave-on-a-string_en.html)) and play around. What do you observe and/or think is interesting?

---



---

4. How is it similar to and different from ocean waves?

---



---

5. Based on the simulation, add the labels amplitude and frequency to the diagram and their definitions to the vocabulary list above.

6. Now check the box for the ruler, set tension in the middle, damping to “NONE,” click the button for “no end” and choose “oscillate.” Set the amplitude and frequency for the units below and use the ruler to measure wavelength. Add to the chart below with a description.

Amplitude	Frequency	Wavelength	Description (describe or draw)
0.75 cm	1.0 Hz		
1.25 cm	1.0 Hz		
.75 cm	3.00 Hz		
1.25 cm	3.00 Hz		

7. Describe the relationship between amplitude, frequency, and wavelength. You may want to use symbols or illustrations to help explain.

- How does changing the amplitude affect wavelength?

---



---

- How does changing the frequency affect wavelength?

---



---

- How does changing the amplitude affect the energy of the wave?

---

---

- How does changing the frequency affect the energy of the wave?

---

---

8. How do you think surfers use wave amplitude, frequency, and wavelength to choose a good break?

---

---

---

---