

Wave Motion -- Conceptual Questions

- 1.) What, exactly, is a wave?
- 2.) In Star Wars, a giant galactic battle cruiser is attacked in space by a host of little single engine fighters. Cannons from the battle cruiser blaze as the tiny fighters swarm around it. You see a fighter hit, blowing up spectacularly with a ferocious outpouring of light and fire and a cacophonous kaboom. What's wrong with this picture?
- 3.) How many wavelengths are there between a crest and its adjacent trough? Between every third crests? Between every two successive troughs?
- 4.) You are on a pier watching ocean waves pass by. Six crests pass you in 25 seconds. If there is approximately 20 meters between crests:
 - a.) Will the wavelength of the train be a whole number?
 - b.) If the number of wave passing by every 25 seconds was halved, what would the period do?
 - c.) How is the wave velocity related to the time it takes for a full wave to pass by?
 - d.) What is the wave frequency?
 - e.) How is the wave velocity related to the frequency of the wave train?
 - f.) A student is given the following scenario: *A closed, empty plastic water bottle is thrown off the end of the pier (bad form!) and into the waves. That day, the wave velocity is 1.5 meters/second and the surf's wavelength is 10 meters. Ignoring currents, and assuming the pier is 100 meters long, how long will it take the bottle to hit the beach?* The student complains that this is a trick question. Explain why he or she might think so.

