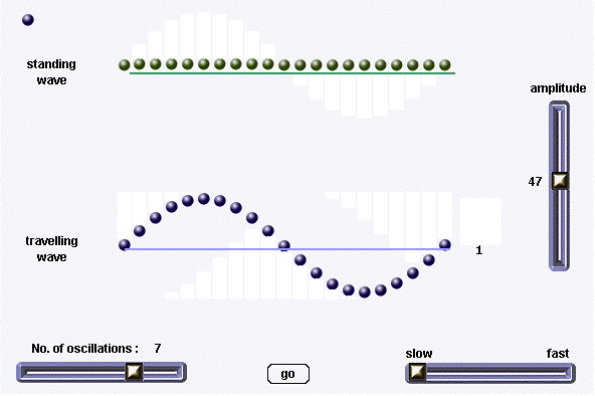
WORKSHEET : TRAVELLING + STANDING WAVES

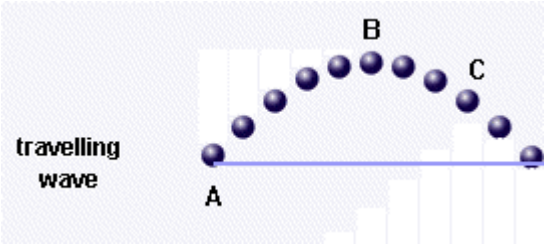
TRAVELLING (PROGRESSIVE) WAVE

- Vary the slider that says “fast-slow”. What do you think this quantity is?
- Observe the first and last particles of the travelling wave. (If need be, cover middle section with a piece of card). What do you notice about their movements? How does that lead to a concept of the wavelength of a progressive wave?
- What equation can you write down which relates the wavelength of the wave to its frequency of oscillations?
- Look at the number that changes as the travelling wave is in motion. What do you think the number represents? What does the rate of change of this number measure? Notice that it changes fastest when the particle is near to the equilibrium position. How does that reconcile with what you have learnt in simple harmonic motion? Is it possible to determine the acceleration from these numbers?
- The particles move up and down with simple harmonic motion, but the profile of the wave shifts leftwards. How should the particles move if you want the wave to travel travel in the opposite direction?
- How would write an equation of motion relating displacement to time for the particle A, B & C?

STANDING (STATIONARY) WAVE

- What is the main observable difference between the 2 waves?
- How are standing waves formed? How would you reproduce such a wave in the real world?
- Set the frequency of oscillations to high. Notice how some particles do not oscillate at all. What do you call such points in the standing wave? What about those that exhibit maximum displacement?
- How do you determine the wavelength of the wave? Suppose the ends of such a rope is fixed and the length of the rope is constant, is it possible to draw another standing wave? How do the wavelengths of such waves that you have drawn compare with that shown here? What do you call these different forms of the standing waves?
- What do you think are energy changes involved in both waves?
- In what ways is the situation here depicted here different from waves in the real world?





Bugs? Comments?
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