“The Wave”

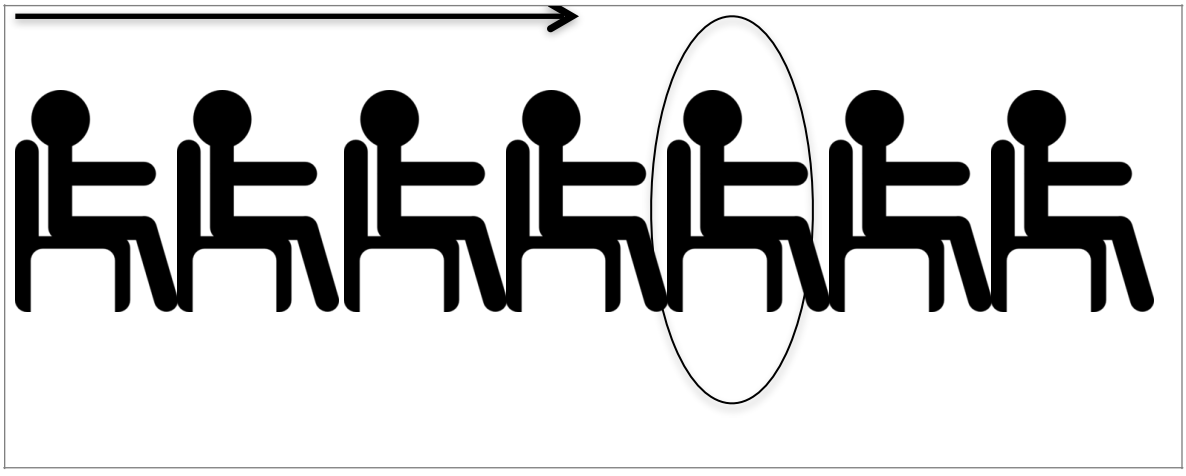
Traveling vs. Oscillating
Linear motion is *traveling*: you go somewhere. We represent traveling motion with an arrow. Harmonic motion is *oscillating*: you move and return to your original spot. We represent oscillating motion with a double-sided arrow.
“The Wave” A stadium cheer in which fans stand up with their arms raised as “The Wave” comes by. Not actually a physics wave, but illustrates very clearly how a physics wave works. “The wave” is an oscillation that moves.

1 What do people do when “The Wave” comes by them?

2 When the wave moves through, do you *travel* with the wave?

3 What is a *physics word* for when someone stands up and sits right back down in the same spot?

4 If the wave is moving in the direction of the arrow, use a *double sided arrow* to draw what guy in the circle is going to do when it reaches him:

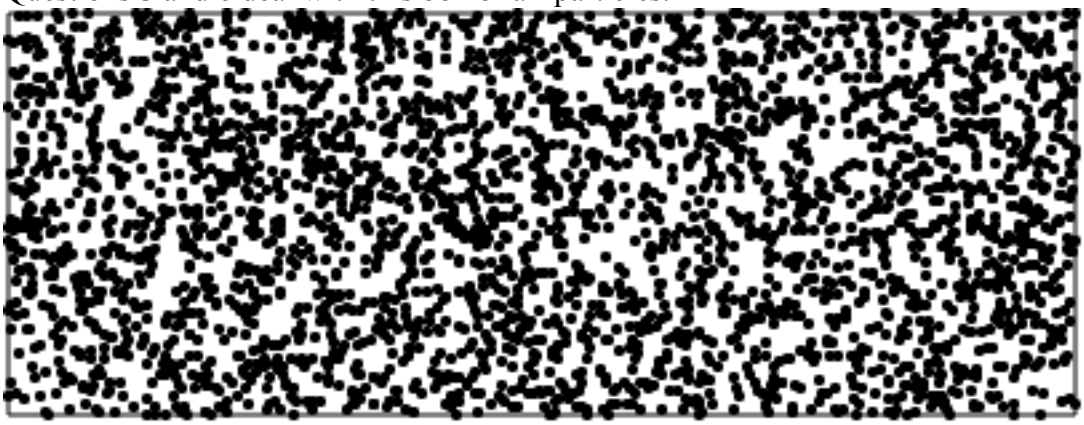


Part C: Particle Motion in Transverse and Longitudinal Waves

Oscillate Harmonic motion; When something oscillates, it moves, than returns to the original spot.
Wave When a wave comes through, a particle *oscillates* but does not *travel*.
Transverse Wave When a transverse wave comes through, every particle *oscillates* in a direction *perpendicular* to the motion of the wave.
Longitudinal wave When a longitudinal wave comes through, every particle oscillates in a direction *parallel* to the motion of the wave.

To diagram oscillation, we use a double-sided arrow, showing an object that moves in one direction, then back in the other direction:

Questions **5** and **6** deal with this box of air particles.



7 If a transverse wave moves horizontally through the box, what directions will the particles oscillate? [answer with a double sided arrow]

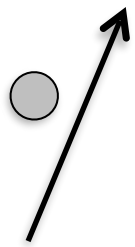
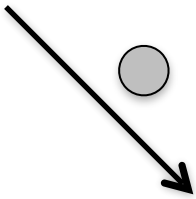
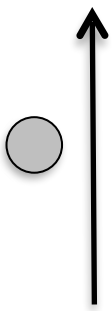
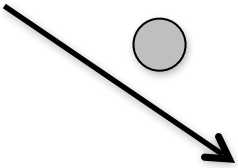
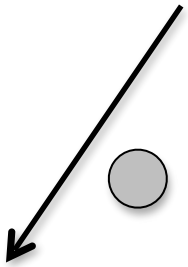
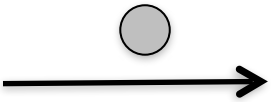
8 If a longitudinal wave moves horizontally though the box, what direction will the particles oscillate?

Questions **9** and **10** deal with this box of air particles.

9 If a transverse wave moves vertically through the box, what direction will the particles oscillate? [answer with a double sided arrow.]

10 If a longitudinal wave moves vertically through the box, what direction will the particles oscillate?

In questions **11 – 16**, the circles represent an air particle and the arrows represent a wave moving by the air particle. In the each case, draw a double-sided arrow showing how the particle will oscillate as the wave passes through:

11 Transverse wave 	12 Longitudinal Wave 	13 Transverse Wave 
14 Transverse Wave 	15 Longitudinal Wave 	16 A sound wave 

17

Sometimes, when you play speakers very loudly, the move a little bit back and forth. Which direction do they move? Why?

18

You are attempting to charge into the castle of a terrible warlock, when the warlock blocks you with a series of extremely high amplitude sound waves. In addition to the pain to your ears, the sound waves are powerful enough to make your body move. Which direction do you move?