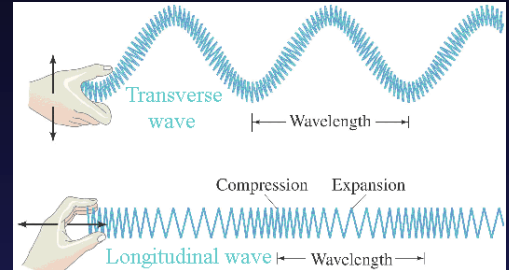


MAKING WAVES

What to do

1. With a friend, grab the ends of the rope and walk apart.
2. Make different pulses and waves by shaking the rope up and down.
3. Try to make a wave which looks like it's oscillating on the spot.
4. With a friend holding the other end, compress the end of the slinky and let it go.
5. Pierce one end of the slinky through the plate. Spool up the slinky and then let most of it fall onto the ground.



With the rope, you're making a transverse wave. These are waves where the rope oscillates at right angles to its traveling direction. Waves in the ocean are a classic example – they move across the surface of the sea, but the water itself is bobbing up and down.

A single pulse which keeps its shape and speed is called a soliton. If you've been to see a sports game in a stadium, you've probably seen a giant soliton: a Mexican wave. Can you make a soliton?

Stationary waves (or standing waves) are waves which don't look like they're moving at all; instead like they're just oscillating up and down. For a rope held at both ends, standing waves only exist at very specific, discrete frequencies. The frequencies of oscillation which produce standing waves are called 'harmonics', and they play a large role in musical instruments.

What happens when both people make waves at their end of the rope?



The wave you're making with a slinky is a longitudinal wave. These waves oscillate in the same direction they travel. Sound is an example of a longitudinal wave.

Dropping the slinky with the plate held up allows the plate to act as a speaker. As the slinky expands and contracts (as it hits the ground), the air in the slinky reverberates against the plate. The plate is pushed back and forth, which pushes the air on the other side back and forth. Our ears hear this as sound.