

Activity Guide: Making Waves (Part Two)

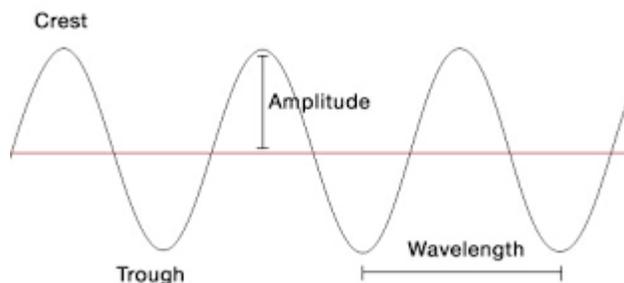
Purpose: Explore the effect of different materials on a wave pattern.

Museum Connection: We are curious, creative and playful!

Main Idea: The pattern of a transverse wave changes as it travels into a different material.

Background Information for Educator: As a wave travels from a heavy material into a lighter one, the speed, wavelength, and amplitude increase. If it travels from a light material into a heavier one, the opposite occurs. The frequency stays the same because it is set at the source.

Frequency is the number of waves created at the wave source per second (and called Hertz). Speed is how quickly the wave moves through a medium (water, rope). It is measured in meters per second, and can be calculated by multiplying the frequency by the wavelength. Wavelength is the distance between two adjacent crests or two adjacent troughs of the wave. Amplitude is the height of the wave from the neutral point of the medium when no wave moves through it.



Sources: <https://thescienceofwaves.weebly.com/parts-and-types-of-a-wave.html>

Prep (Time): 5 minutes to gather supplies

Materials:

| Item | Quantity |
|--|--|
| Ropes of about 6 ft in length (could be jump rope, cotton rope, spring, slinky, even bungee or extension cords –see picture) | As many different ones as can be found |
| Tape measure | 1 |
| Masking or painters tape | 1 roll |

Talking Points:

- What happens to the wavelength when the rope is heavier/lighter?
- What happens to the amplitude (height) when the rope is heavier/lighter?
- What happens to the frequency (how often the wave passes)?

Step-by-Step Instructions:

1. Attach two ropes together with a knot.
2. Two partners sit on either end of the rope which is resting on the floor.
3. Each partner takes turns starting the wave by moving their hand from side to side.
4. Experiment by moving your hand faster and slower and by making bigger movements.
5. To measure speed, put pieces of tape on floor at one-foot intervals. Measure the wavelength from crest to crest and frequency by counting how many waves pass one piece of tape in a second. Multiply the two and you have speed in feet/second.

Picture of Final Project:

