Chapter 15 Day 1
Section 1

SPI 0707.11.6 Differentiate between transverse and longitudinal waves in terms of how they are produced and transmitted.

What You Will Learn

- What a wave is
- How energy, waves, and matter are all related
- The difference between transverse and longitudinal waves

What Mastery Looks Like

38 Which statement best explains the difference between longitudinal and transverse waves?

F Longitudinal waves have troughs, while transverse waves have crests.

G Longitudinal waves produce energy, while transverse waves consume energy.

H Particles in longitudinal waves travel towards a force, while particles in transverse waves travel away from a force.

J Particles in longitudinal waves travel in the direction of the wave, while particles in transverse waves travel perpendicular to the wave.

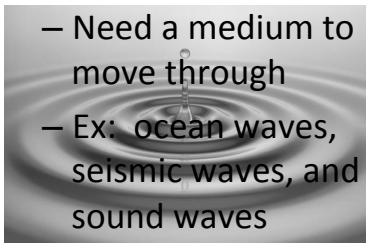
With Your Group…

- Watch this clip…
  - https://www.youtube.com/watch?v=ufsrgE0BYf0
- Discuss how people at NASA (who are on Earth) are able to communicate with astronauts in space.
- How do astronauts in space communicate with each other?
- Write your group's best answer on a white board.

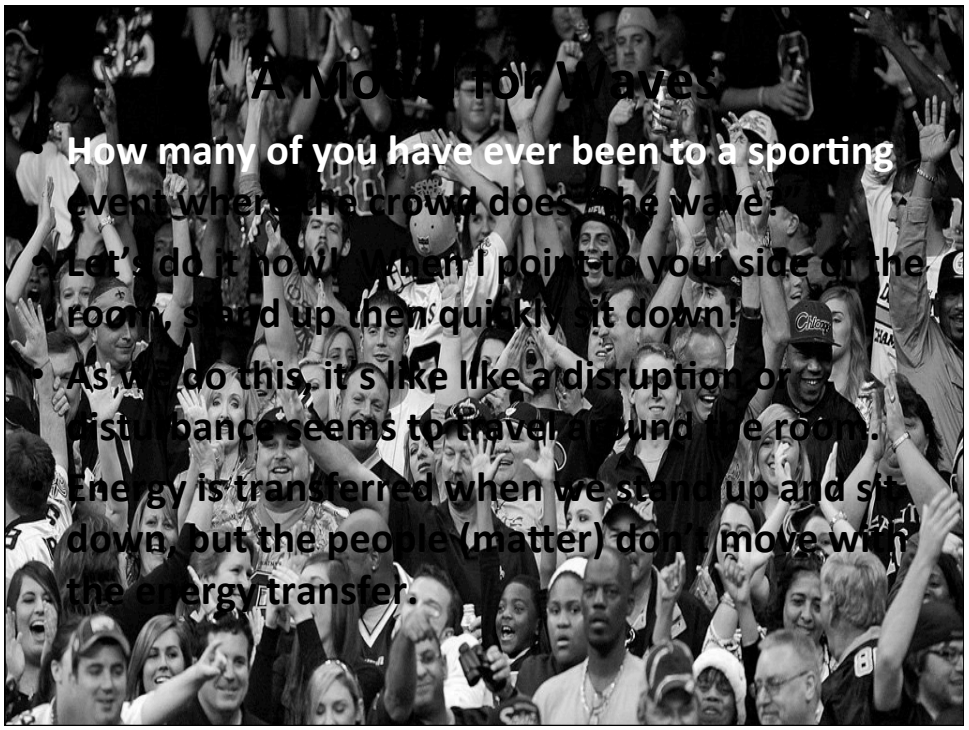
What is a wave?

- Brain Pop
- All waves do the same basic things…
  - Transfer energy from one place to another.
  - They do this WITHOUT transferring matter.

- MECHANICAL
  - Need a medium to move through
  - Ex: ocean waves, seismic waves, and sound waves



- ELECTROMAGNETIC
  - medium
  - Can travel through space
  - Ex: light and radio



A Model for Waves

- **How many of you have ever been to a sporting event where the crowd does the wave?**
- **Let's do it now! When I point to your side of the room, stand up then quickly sit down!**
- **As we do this, it's like like a disruption or disturbance seems to travel around the room.**
- **Energy is transferred when we stand up and sit down, but the people (matter) don't move with the energy transfer.**

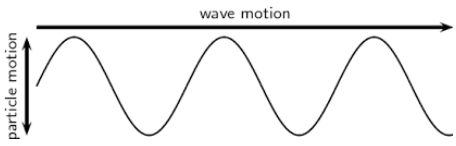
Mechanical Waves

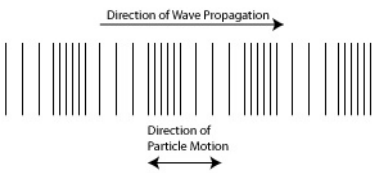
- Without the people in the stadium, could the wave exist?
- No, it couldn't. The people are the reason the energy can transfer.
- In a water wave, what transfers the energy?
- Water molecules work just like the people in a stadium.
- When waves can ONLY travel through matter, they are considered mechanical waves.
- Mechanical waves are produced by something that is vibrating. That's a repeating back and forth motion.
  - What are some things you can name that vibrate?

Categories of Waves

- TRANSVERSE
  - Ex: ocean waves and most electromagnetic waves
  - Suppose that a slinky is stretched out in a horizontal direction across the room and that a pulse is introduced into the slinky on the left end by vibrating the first coil up and down. Energy will begin to be transported through the slinky from left to right.
- LONGITUDINAL aka COMPRESSIONAL
  - Ex: sound waves (not the same as radio waves)
  - A sound wave traveling through air is a basic example of a longitudinal wave.
  - As a sound wave moves from the lips of a speaker to the ear of a listener, particles of air vibrate back and forth in the same direction and the opposite direction of energy transport. Each individual particle pushes on its neighboring particle so as to push it forward.

With your group, use the slinkies to demonstrate both transverse and compressional waves.





Exit Ticket

Answer the question and explain why your answer is correct.

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