In a wave pool, the waves carry energy across the pool. You can see the effects of a wave's energy when the wave lifts people in the water.

What Are Mechanical Waves?

- **What causes mechanical waves?**

- **A mechanical wave is created when a source of energy causes a vibration to travel through a medium.**

What Are Mechanical Waves?

A **mechanical wave** is a disturbance in matter that carries energy from one place to another.

- The material through which a wave travels is called a **medium.**
- Mechanical waves require a medium to travel through. Solids, liquids, and gases all can act as mediums.
- A vibration is a repeating back-and-forth motion.

Types of Mechanical Waves

What are the three main types of mechanical waves?

The three main types of mechanical waves are transverse waves, longitudinal waves, and surface waves.

Mechanical waves are classified by the way they move through a medium.

Types of Mechanical Waves

Transverse Waves

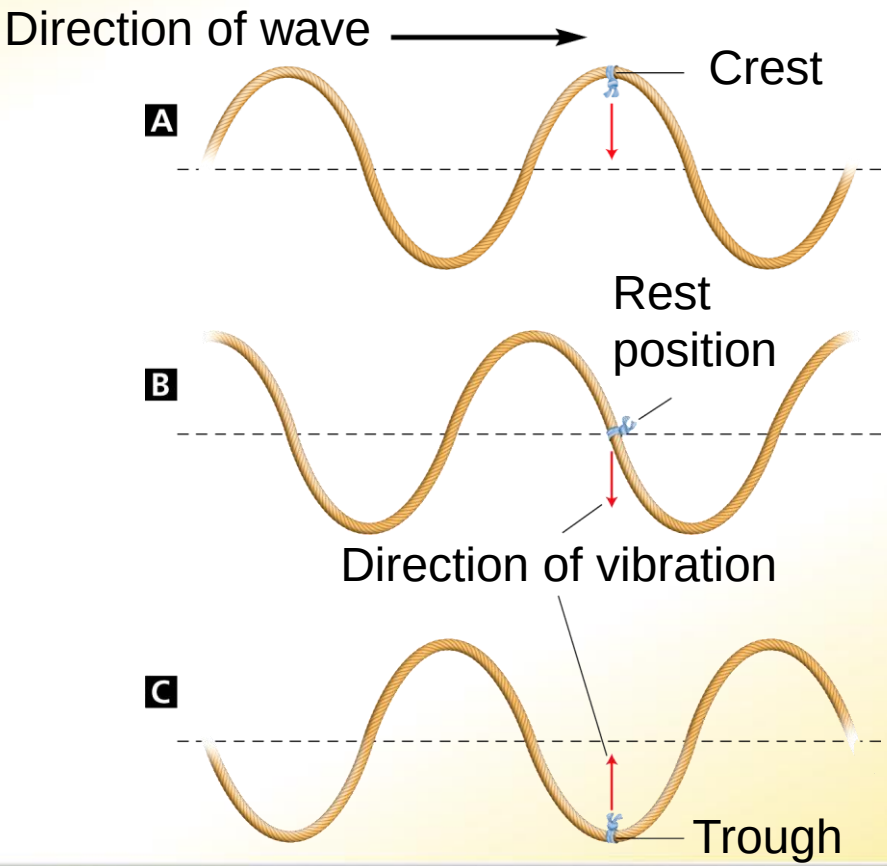
When you shake one end of a rope up and down, the vibration causes a wave.

- The highest point of the wave is the **crest.**
- The lowest point of the wave is the **trough.**
- A single point on the rope vibrates up and down between a crest and trough.

Types of Mechanical Waves

A transverse wave causes the medium to vibrate in a direction perpendicular to the direction in which the wave travels.

DOK Question: Construct a word explanation of the below pictures.



Types of Mechanical Waves

A **transverse wave** is a wave that causes the medium to vibrate at right angles to the direction in which the wave travels.

The wave carries energy from left to right, in a direction perpendicular to the up-and-down motion of the rope.

Types of Mechanical Waves

Longitudinal Waves

In a spring toy, the wave carries energy along the spring.

- An area where the particles in a medium are spaced close together is called a **compression**.
- An area where the particles in a medium are spread out is called a **rarefaction**.

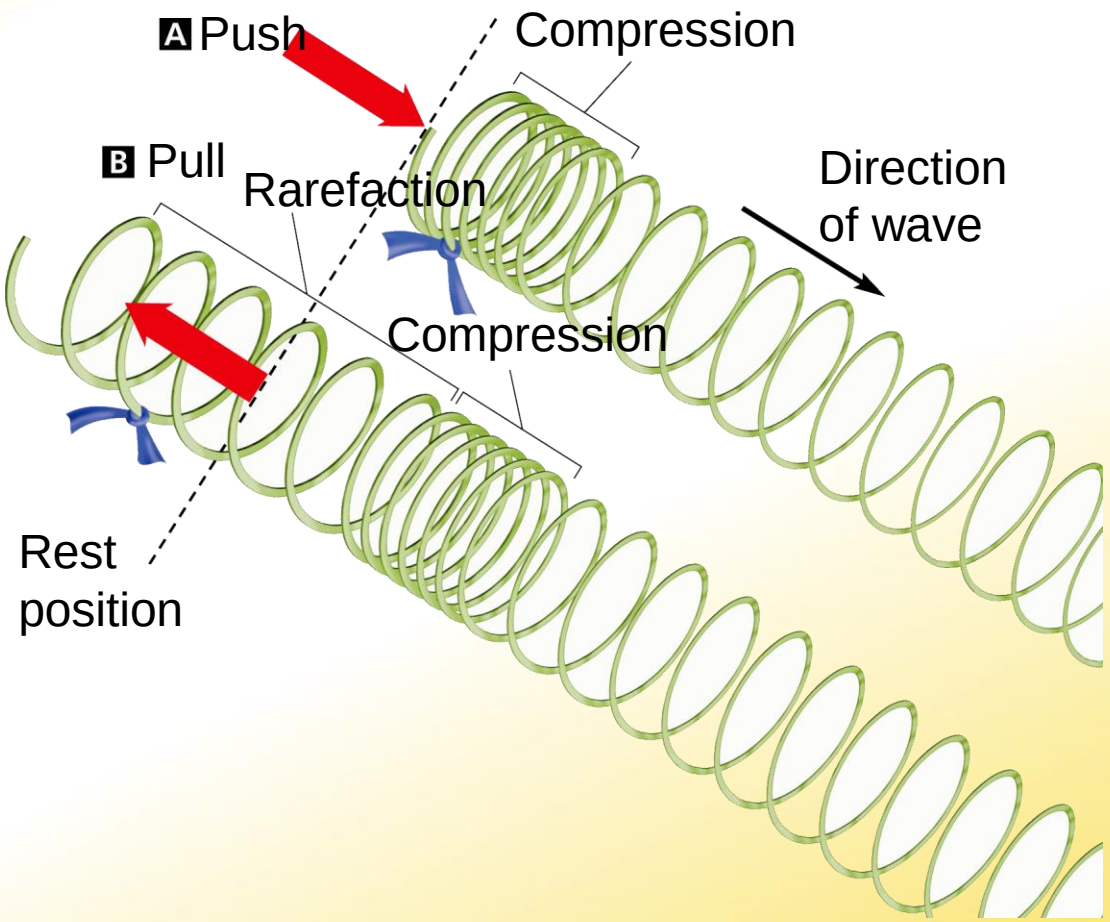
Types of Mechanical Waves

A. A compression starts to move along the spring.

B. A rarefaction follows the compression along the spring.

DOK Question:

Construct a word explanation of the below pictures.



Types of Mechanical Waves

As compressions and rarefactions travel along the spring, each coil vibrates back and forth around its rest position.

A **longitudinal wave** is a wave in which the vibration of the medium is parallel to the direction the wave travels.

Types of Mechanical Waves

Surface Waves

Ocean waves are the most familiar kind of surface waves.

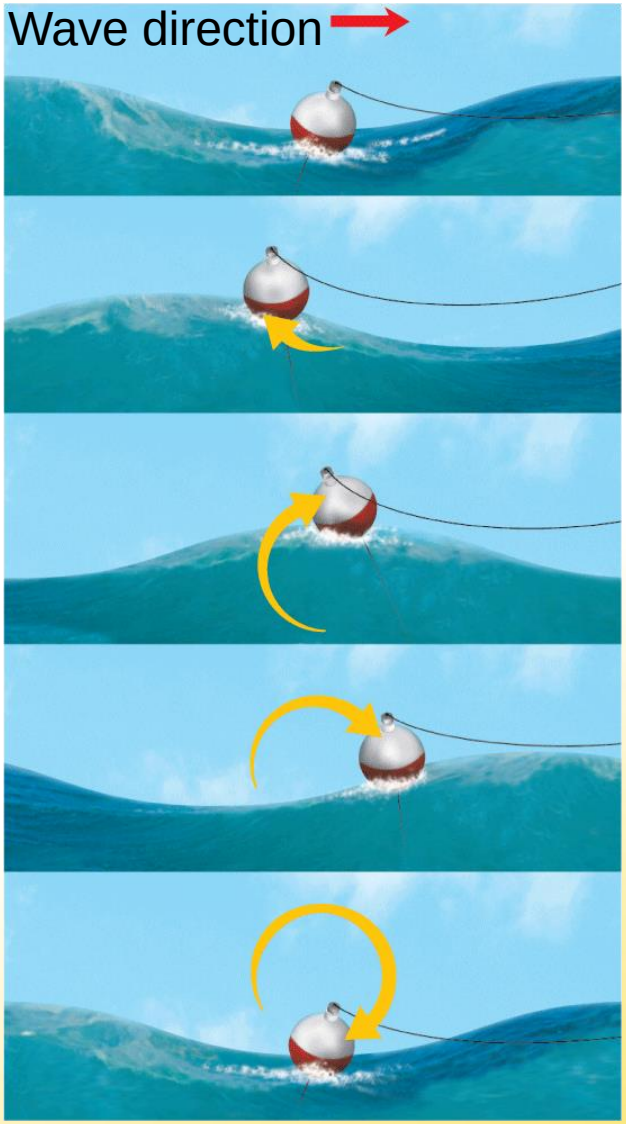
A **surface wave** is a wave that travels along a surface separating two media.

Types of Mechanical Waves

As the ocean wave moves to the right, the bobber moves in a circle, returning to its original position.

DOK Question:

Construct a word explanation of the below pictures.



Types of Mechanical Waves

The bobber helps to visualize the motion of the medium.

- When a crest passes the bobber, the bobber moves up. When a trough passes, the bobber moves down.
- The bobber also is pushed back and forth by the surface wave, like the motion of a longitudinal wave.
- The two motions combine, and the bobber moves in a circle.

Assessment Questions

1. A mechanical wave carries energy from one place to another through the
   a. physical transfer of matter.
   b. interaction of electromagnetic fields.
   c. phase changes of a medium.
   d. vibration of a medium.

Assessment Questions

1. A mechanical wave carries energy from one place to another through the
   a. physical transfer of matter.
   b. interaction of electromagnetic fields.
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   ANS: D

Assessment Questions

2. In what type of wave is the vibration of the medium parallel to the direction in which the wave travels?
   a. transverse wave
   b. longitudinal wave
   c. surface wave
   d. rarefaction

Assessment Questions

2. In what type of wave is the vibration of the medium parallel to the direction in which the wave travels?
   a. transverse wave
   b. longitudinal wave
   c. surface wave
   d. rarefaction

   ANS: B

Assessment Questions

3. An example of a transverse wave is a(n)
   a. sound wave traveling through air.
   b. ocean wave far from the shore.
   c. ocean wave as it approaches the shore.
   d. light wave traveling through space.

Assessment Questions

3. An example of a transverse wave is a(n)
   a. sound wave traveling through air.
   b. ocean wave far from the shore.
   c. ocean wave as it approaches the shore.
   d. light wave traveling through space.

   ANS: A

Assessment Questions

1. As a surface wave travels across water, molecules of water move in a circular pattern.

   True
   False

Assessment Questions

1. As a surface wave travels across water, molecules of water move in a circular pattern.

   True
   False

   ANS: T