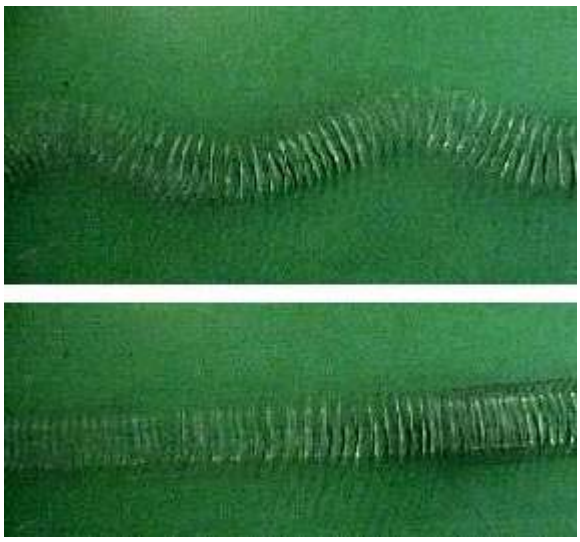
Transverse and Longitudinal Waves

PIRA #: 3B10.20 and 3B20.11
setup time: 1 minute



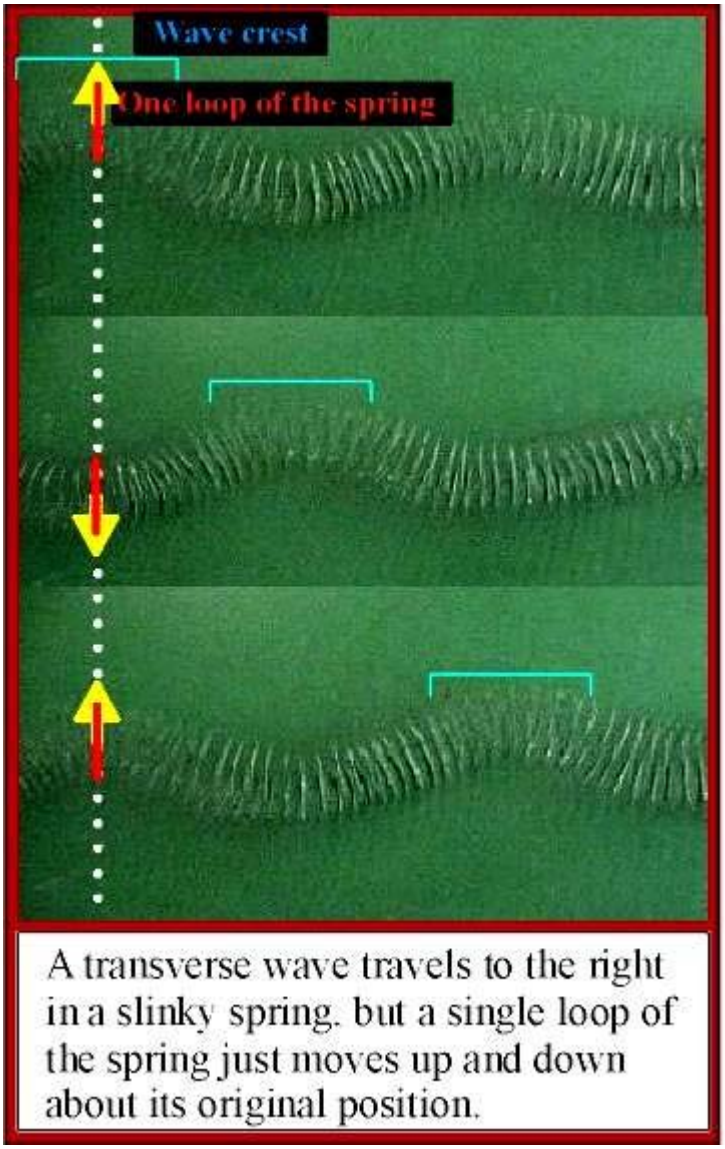
Description:

This demonstration uses a Slinky spring to show the two different kinds of mechanical waves - longitudinal and transverse.

Theory:

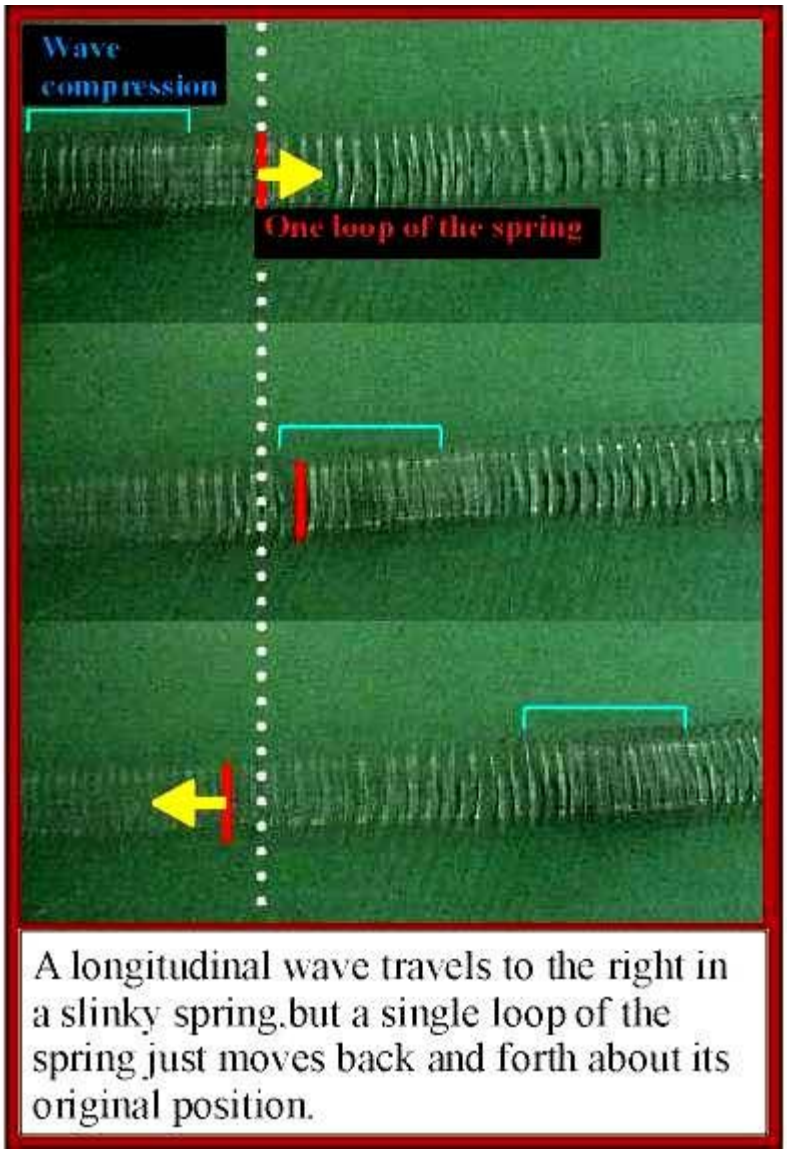
Mechanical waves are waves which occur in matter. A disturbance in one part of the medium will travel to other parts of the medium, even though the actual particles of matter don't stray far from their original positions. Among mechanical waves, we distinguish between two types: **longitudinal waves** and **transverse waves**.
Transverse waves are what we most easily recognize as "waves". Ripples in water, vibration of a piano string, and the motion of the bars on the wave machine are all examples of

transverse wave motion. In a transverse wave, the motion of the medium is perpendicular to the motion of the wave. To clarify, in a water wave, the actual water molecules move up and down while the wave moves horizontally.



A transverse wave travels to the right in a slinky spring. but a single loop of the spring just moves up and down about its original position.

Longitudinal waves, in contrast, are waves in which the medium moves back and forth in the same direction as the motion of the wave. Sound waves are of this type.



A longitudinal wave travels to the right in a slinky spring.but a single loop of the spring just moves back and forth about its original position.

Apparatus:

- **a slinky toy**

Procedure:

Lay the slinky down on the ground and push it back and forth lengthwise to make longitudinal waves. To make transverse waves, shake the slinky back and forth perpendicular to the length.

Video:

high resolution video

3.0 MB

lower resolution video

2.2 MB

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