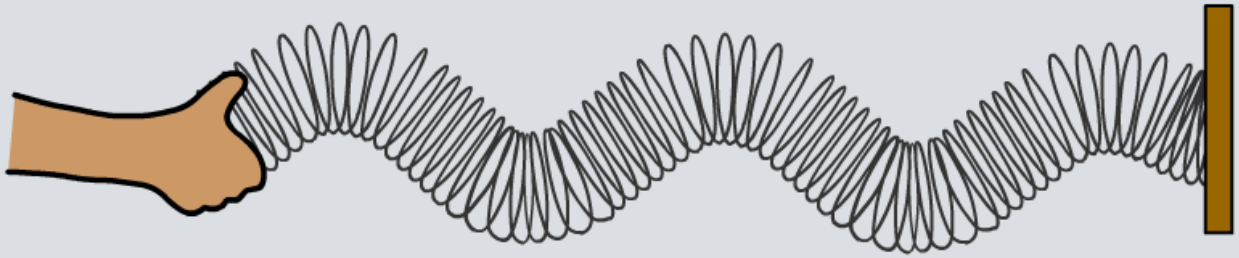
Transverse Waves



What are transverse waves?

When the surface of this lake is disturbed, waves spread out across the surface of the water.

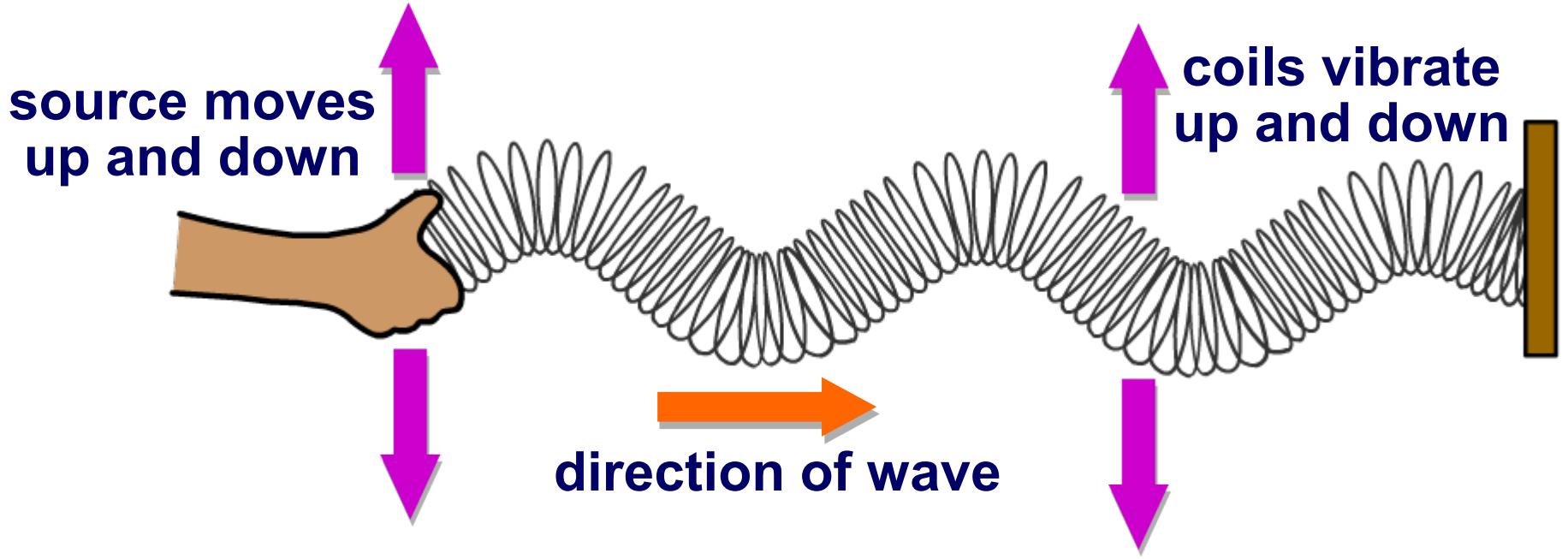
Water waves are an example of **transverse waves**.

In a transverse wave, the particles **move up and down**, so the direction of their movement is at **right angles** to the direction of the wave.

Think about this boat bobbing up and down in the same place as the water waves pass by!

What do transverse waves look like?

A Slinky can be used to model transverse waves, by moving one end of the Slinky **up and down**.



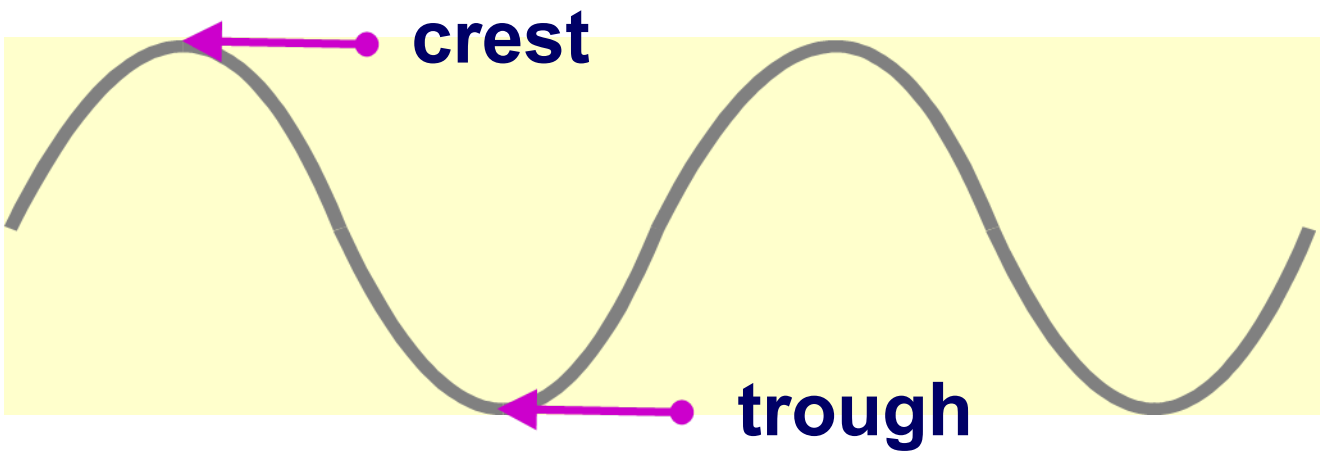
The wave travels away from the source. The direction of the wave is at **right angles** to the movement of the source.

In a transverse wave, the coils do not travel horizontally; each coil of the Slinky just **vibrates up and down**.

What are the parts of a transverse wave?

Certain parts of a transverse wave have special names.

The high points of a transverse wave are called **crests** and the low points of a transverse wave are called **troughs**.

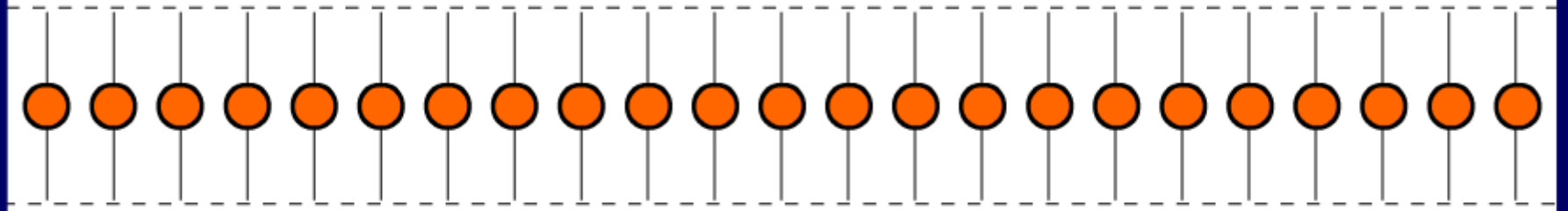


Water waves and electromagnetic waves, such as light, are examples of transverse waves.

S waves, the secondary waves produced by earthquakes, are transverse waves, which shake the Earth from side to side.

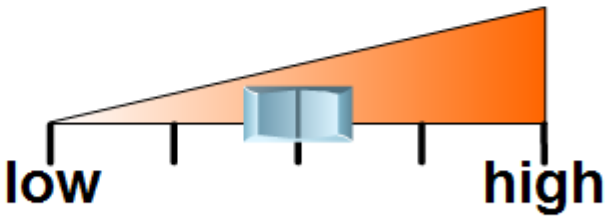
Simulation of a transverse wave

How do particles in a transverse wave move?



In a transverse wave, each particle vibrates **up and down**. These vibrations are at **right angles** to the wave direction.

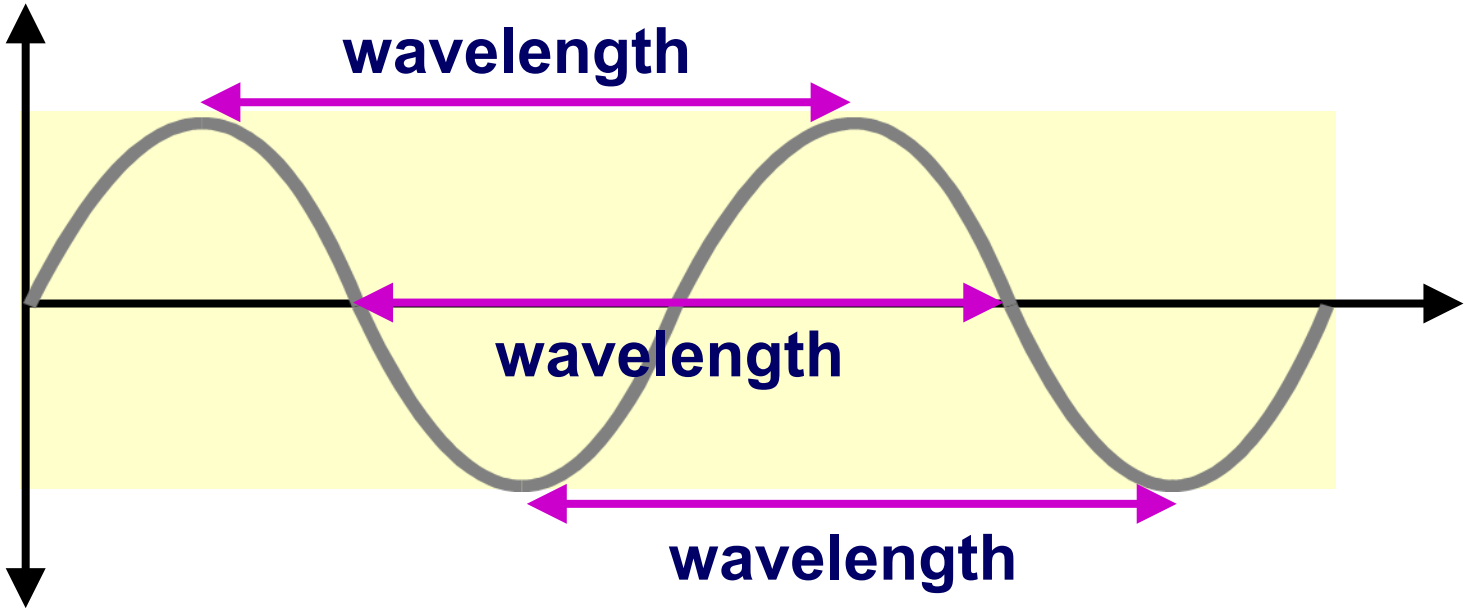
Use the controls to investigate the motion of particles in a transverse wave.



grid off

Wavelength of a transverse wave

The **wavelength** of any wave is the distance between two matching points on neighboring waves.

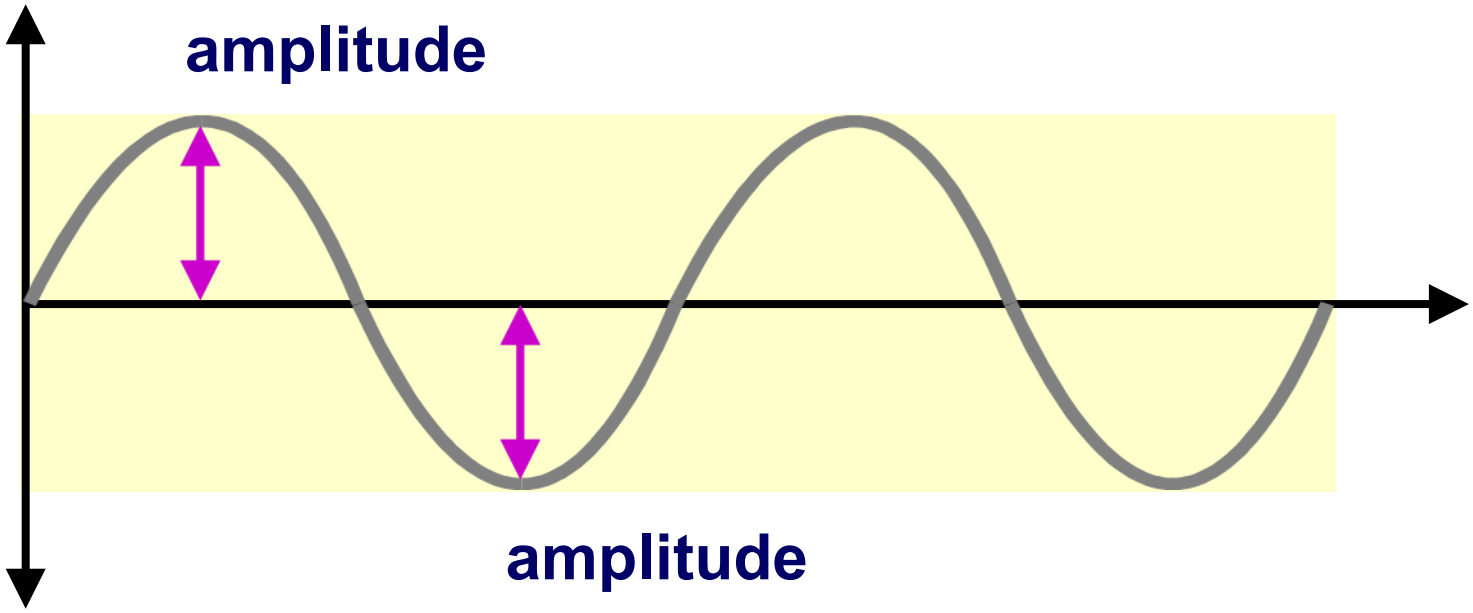


The wavelength is the same whichever two matching points are used to measure this distance.

The symbol used to represent wavelength is λ.

Amplitude of a transverse wave

The **amplitude** of any wave is the maximum distance a point moves from its rest position.

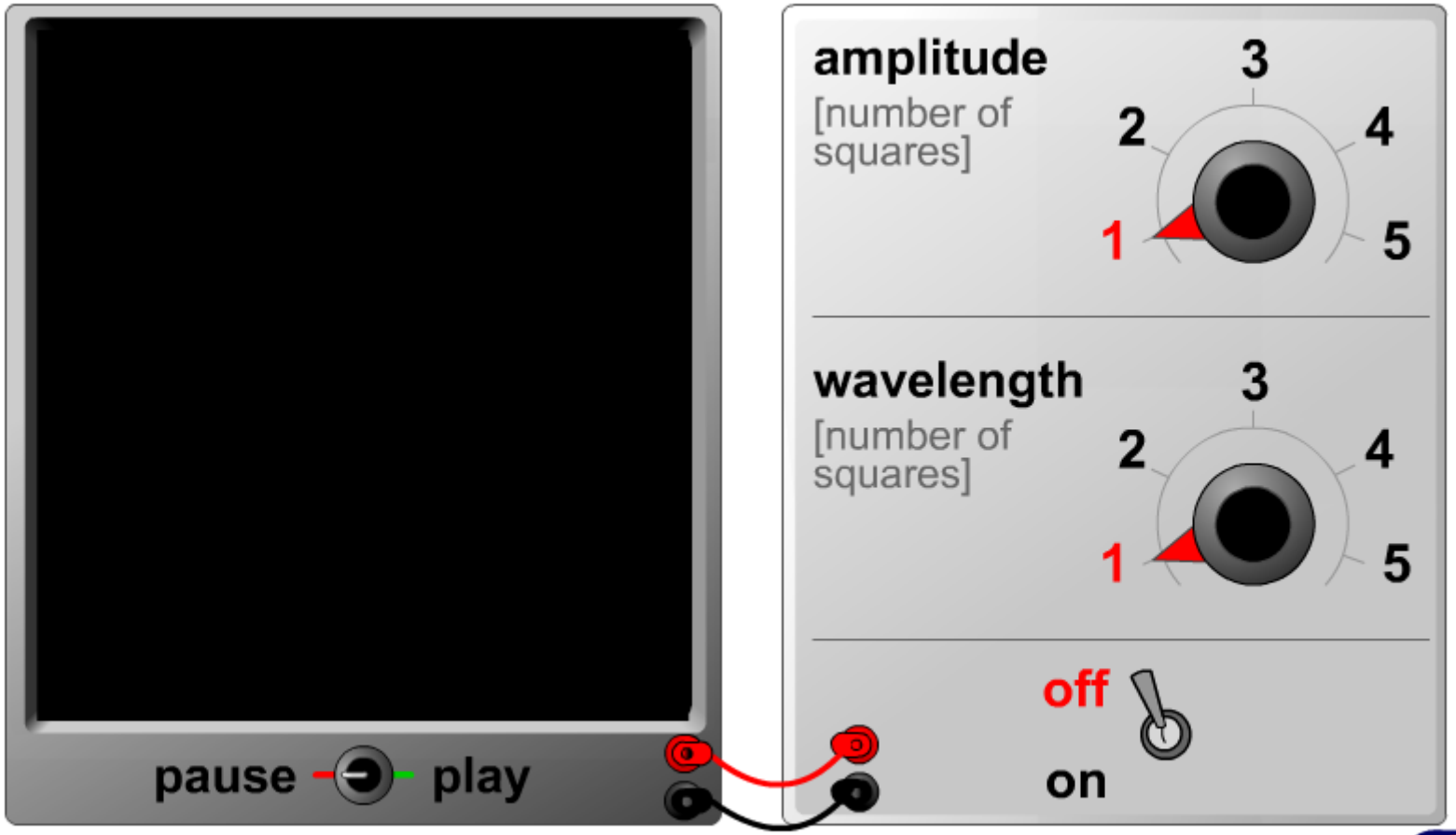


The amplitude of a transverse wave is the height of a crest or trough from the wave's rest position of the wave.

The larger the amplitude, the greater the energy of the wave.

Investigating transverse waves

Use the controls to investigate transverse waves

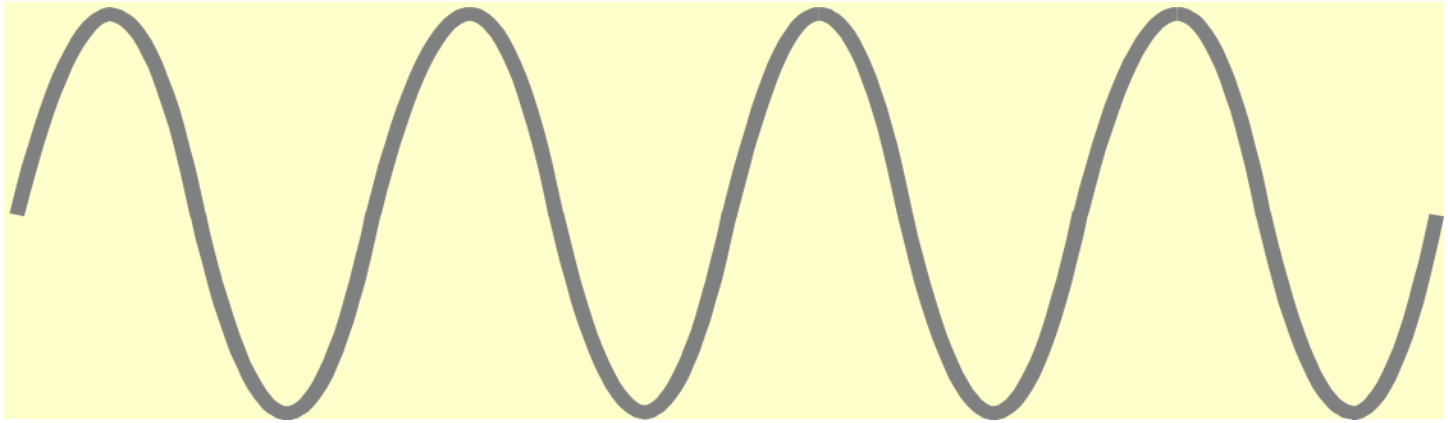


Frequency of transverse waves

The **frequency** is the number of waves passing any point each second.

- frequency = number of waves past a point / time
- frequency is measured in hertz (Hz)
- 1 wave per second = 1 Hz

If this set of transverse waves pass a point in one second, what is the frequency? **4 Hz**



Frequency of waves – activity

Which values complete the properties of each set of waves?

	number of waves	time (s)	frequency (Hz)
A. 	2	?	2
B. 	?	5	2
C. 	1	2	?
D. 	6	?	3

1 | 5 | 4 | 10 | 3 | 0.5 | 2

solve