

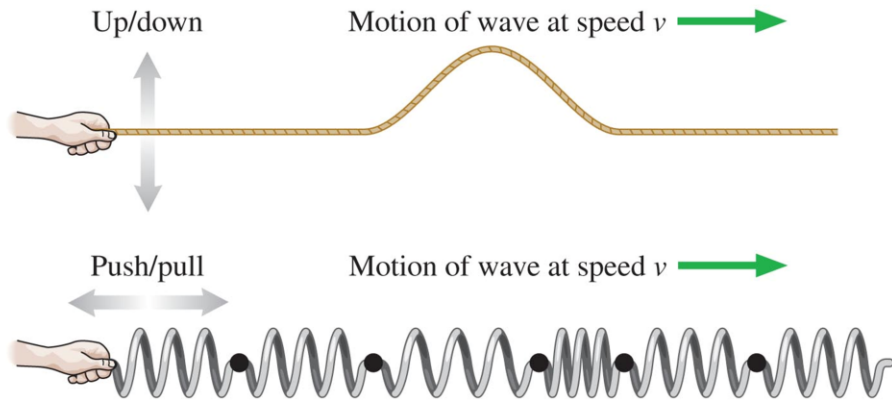
Speed of Waves

Spectators at a sporting event do “The Wave.” Is this a transverse or a longitudinal wave?

- A. Transverse
- B. Longitudinal
- C. Neither

Spectators at a sporting event do “The Wave.” Is this a transverse or a longitudinal wave?

- **A. Transverse**
- B. Longitudinal



Suppose you shake the end of a stretched string to produce a wave. How will each of the following actions affect the speed of the wave down the string?

- A. Speed it up
- B. Slow it down
- C. Will not affect the wave speed.

1. Move your hand up and down more quickly as you generate the wave.
2. Move your hand up and down a greater distance as you generate the wave.
3. Use a heavier string of the same length, under the same tension.
4. Use a lighter string of the same length, under the same tension.
5. Stretch the string tighter to increase the tension.

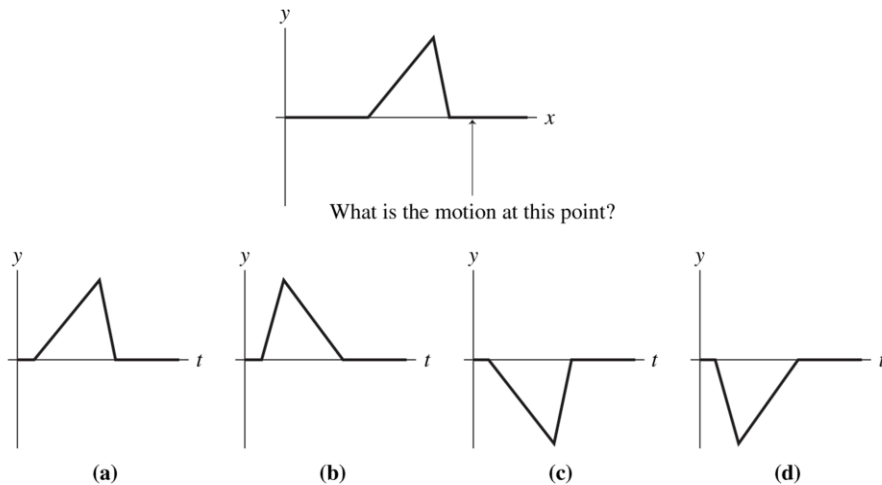
Suppose you shake the end of a stretched string to produce a wave. How will each of the following actions affect the speed of the wave down the string?

- A. Speed it up
- B. Slow it down
- C. Will not affect the wave speed.

1. Move your hand up and down more quickly as you generate the wave. **C**
2. Move your hand up and down a greater distance as you generate the wave. **C**
3. Use a heavier string of the same length, under the same tension. **B**
4. Use a lighter string of the same length, under the same tension. **A**
5. Stretch the string tighter to increase the tension. **A**

Used these questions to get their minds on waves along a string. Some were review but it got them on the topic.

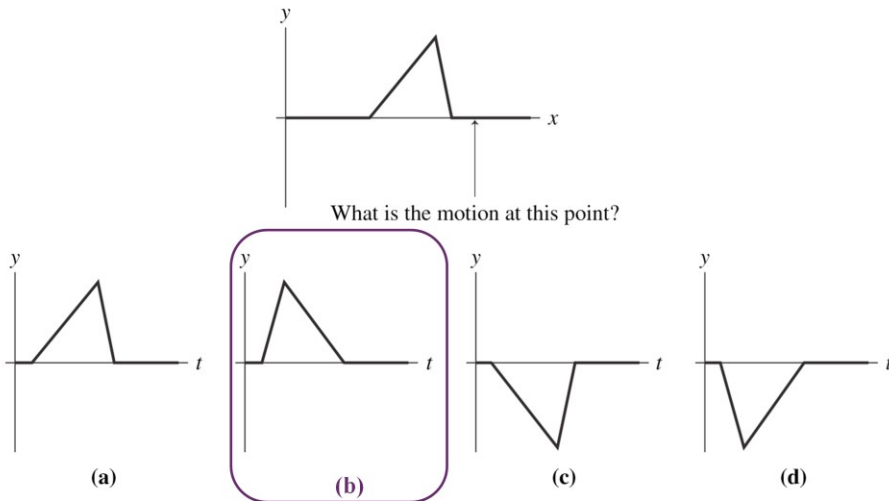
The graph below shows a snapshot graph of a wave on a string that is moving to the right. A point on the string is noted. Which of the choices is the history graph for the subsequent motion of this point?



This is a very hard thing for students to do. Translating from a position graph to a history graph or vice versa requires a lot of visualization. The Knight, Jones and Fields workbooks have a lot of hard examples to work out but they work. I also used the Wave on a String simulation from PhET to help them visualize the pulse traveling and how one bead on the string moves.

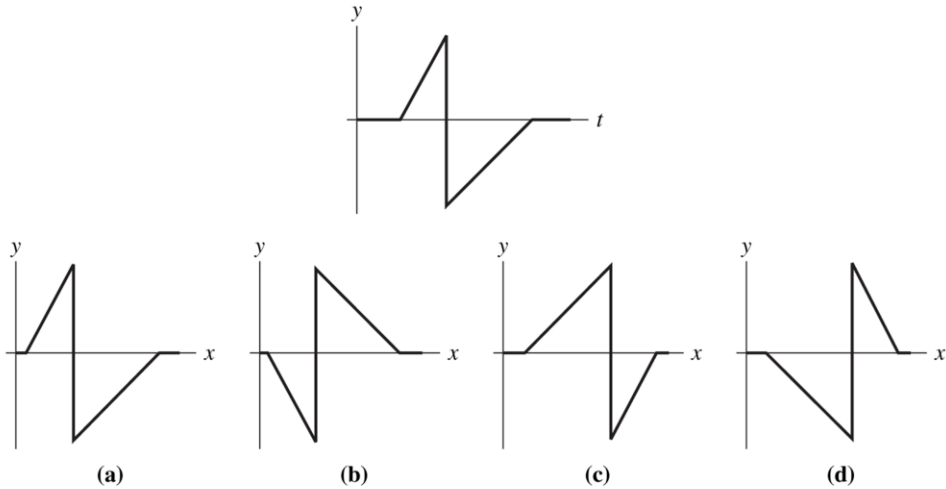
Answer: B

The graph below shows a snapshot graph of a wave on a string that is moving to the right. A point on the string is noted. Which of the choices is the history graph for the subsequent motion of this point?



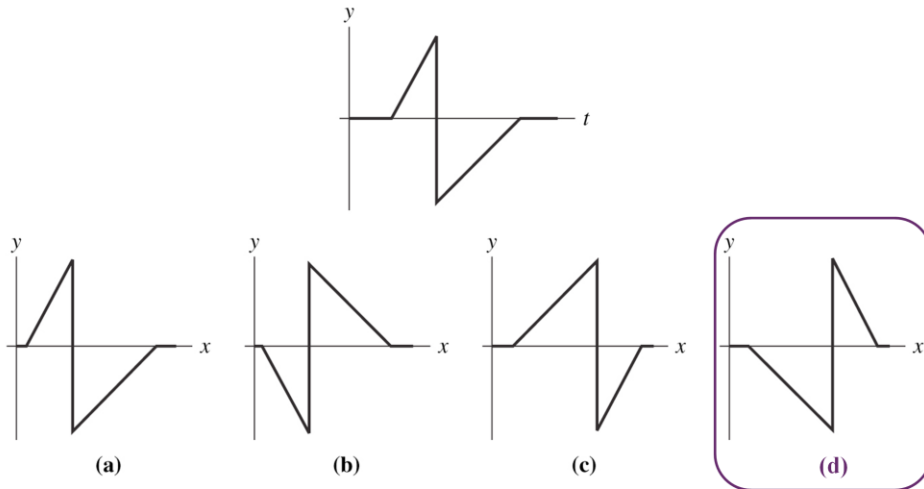
Answer: B

The graph below shows a history graph of the motion of one point on a string as a wave moves by to the right. Which of the choices is the correct snapshot graph for the motion of the string?

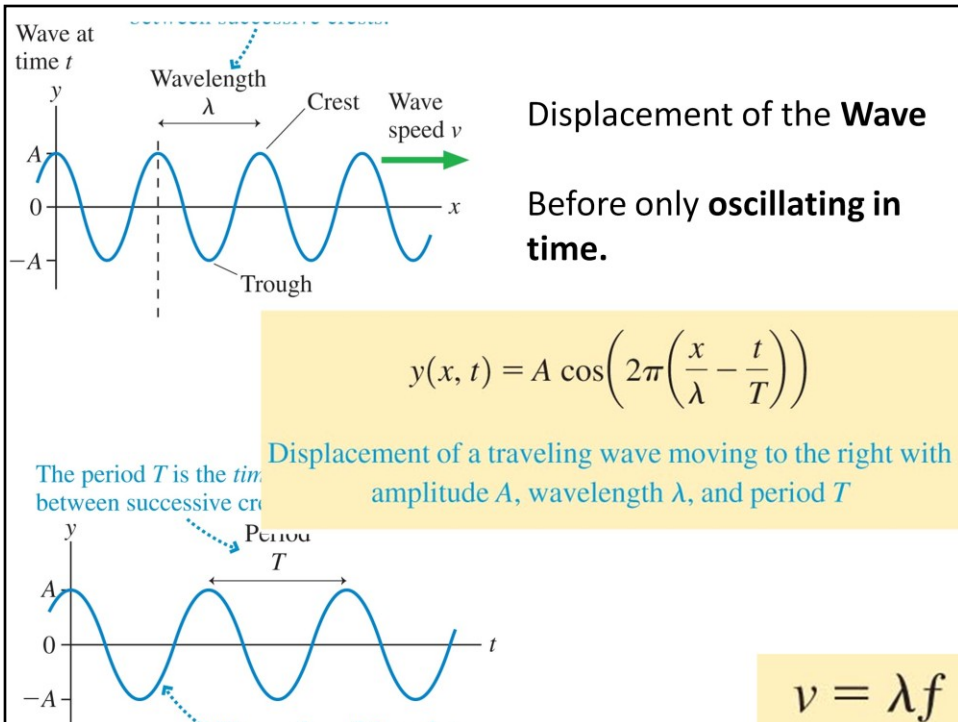


Answer: D

The graph below shows a history graph of the motion of one point on a string as a wave moves by to the right. Which of the choices is the correct snapshot graph for the motion of the string?



Answer: D



Applications of Ultrasound



600 kHz ultrasound
 $\frac{1}{4}$ cm wavelength

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Kaiya, my neice I used this to show typical ultrasound photos. Just shadows.

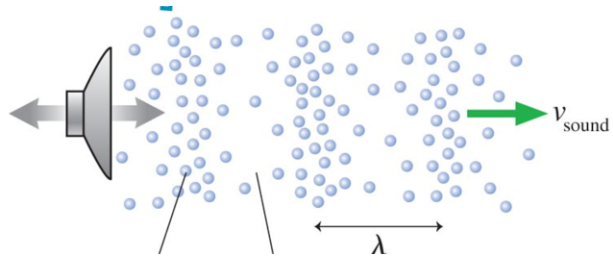


Brecken my nephew, kaiya's twin. Hard to see that there's two in there!



Kaiya's foot

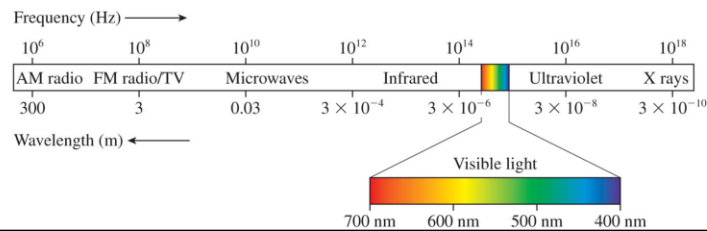
Sound and Light Waves



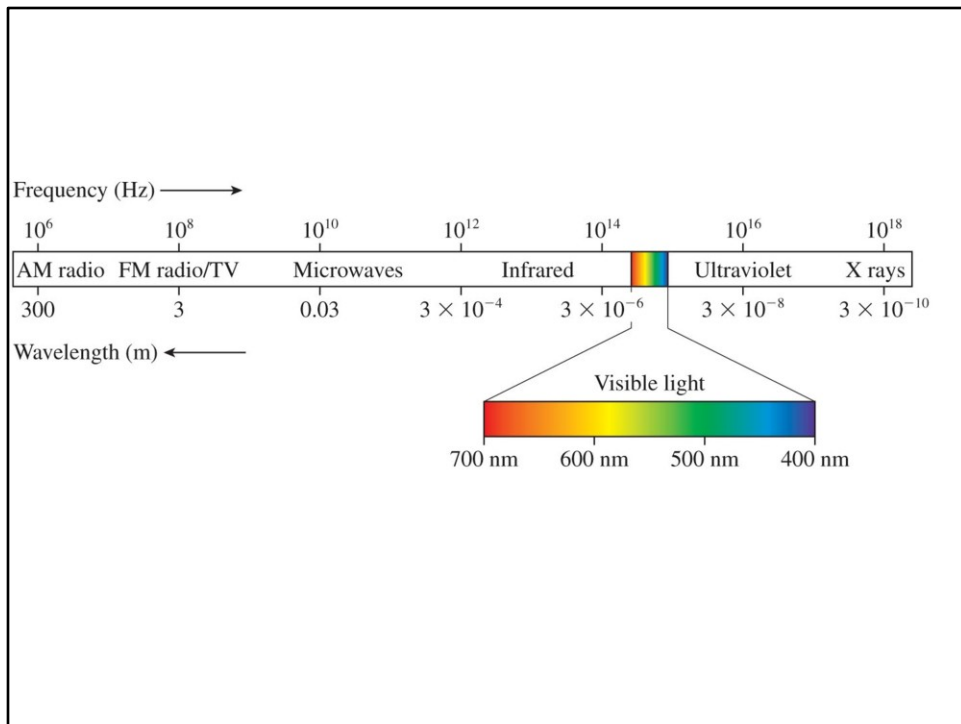
The speed of sound varies with the medium.

Light and other electromagnetic waves in vacuum and in air move at the same speed,

$3.00 \times 10^8 \text{ m/s}$.



Introduction to the Electromagnetic spectrum and how it relates to what we've learned about sound waves.



Advanced Applications of Ultrasound

I used the Acoustics Today articles on Ultrasound. Specifically on brain surgery along with CT scans and MR imaging. This also brings back in the idea of superposition and constructive interference.