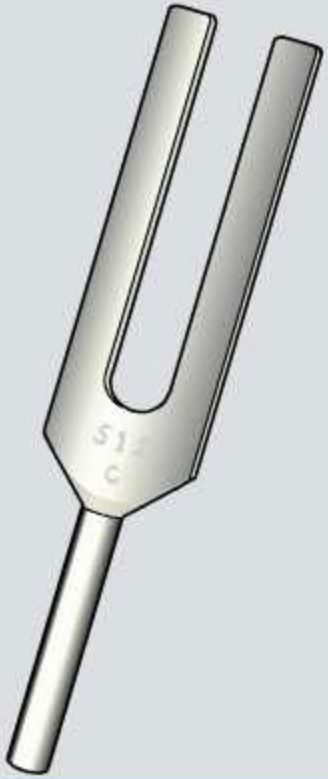
What is Sound?



What causes sound?

Take a tuning fork and strike it against a block of wood.

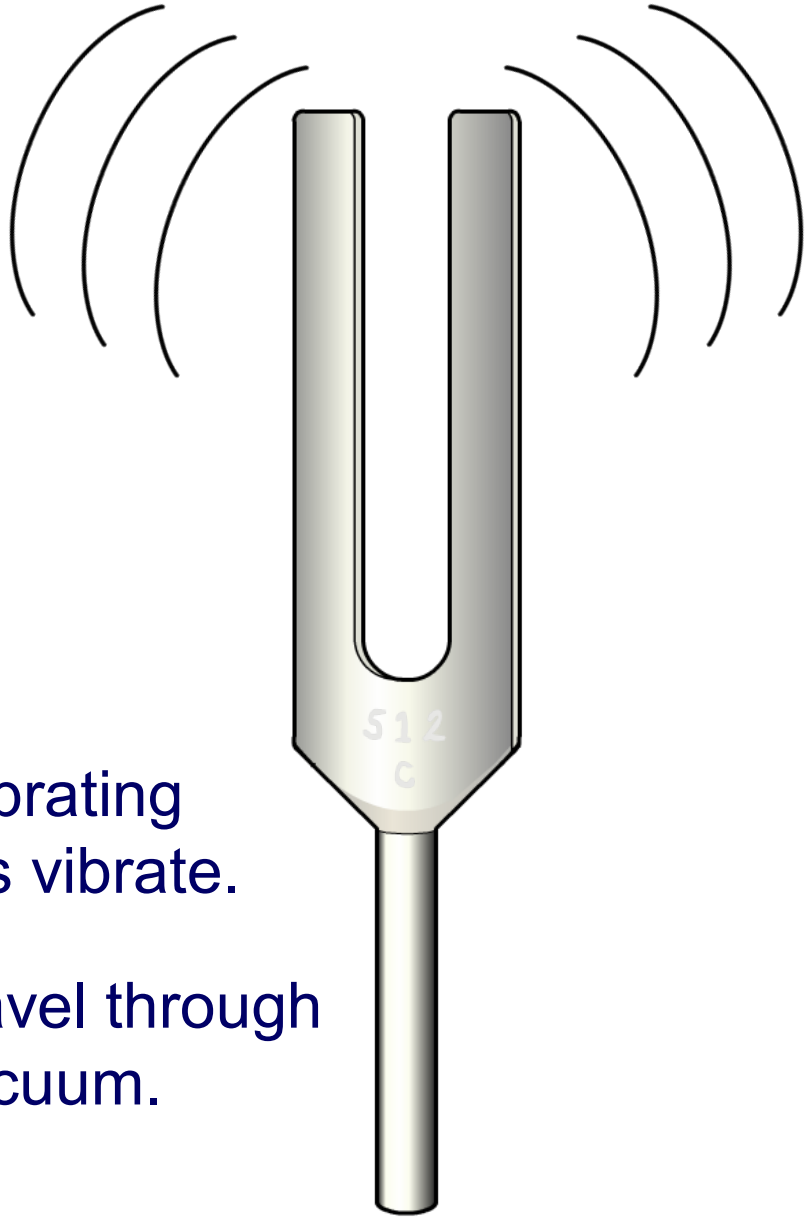
What do you observe?

The tuning fork **vibrates** and you hear a sound.

Sounds are made when an object vibrates.

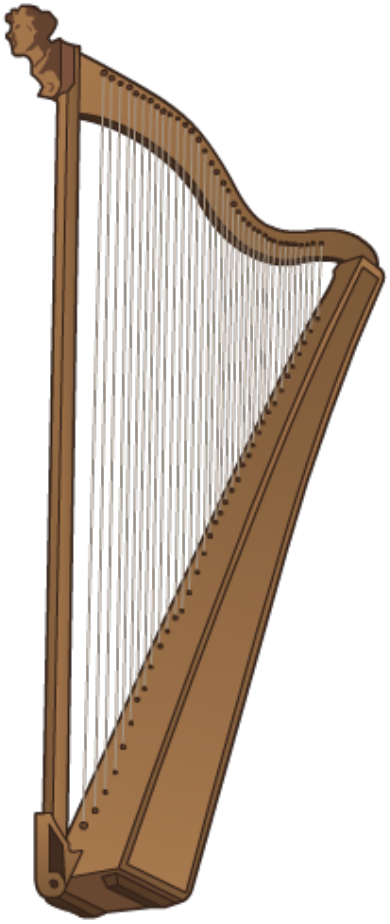
Sound travels because the vibrating object makes nearby particles vibrate.

Sound needs a medium to travel through – it cannot pass through a vacuum.



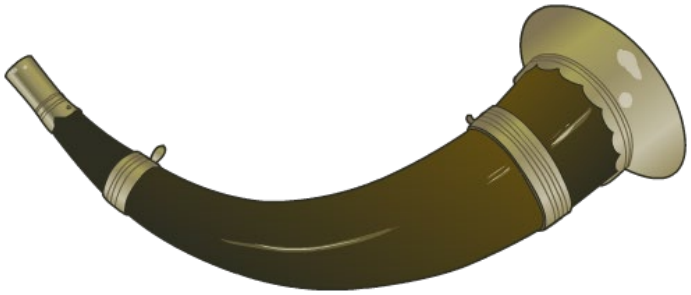
Good vibrations!

What vibrates so that each of these objects makes sound?



harp strings

drum skin



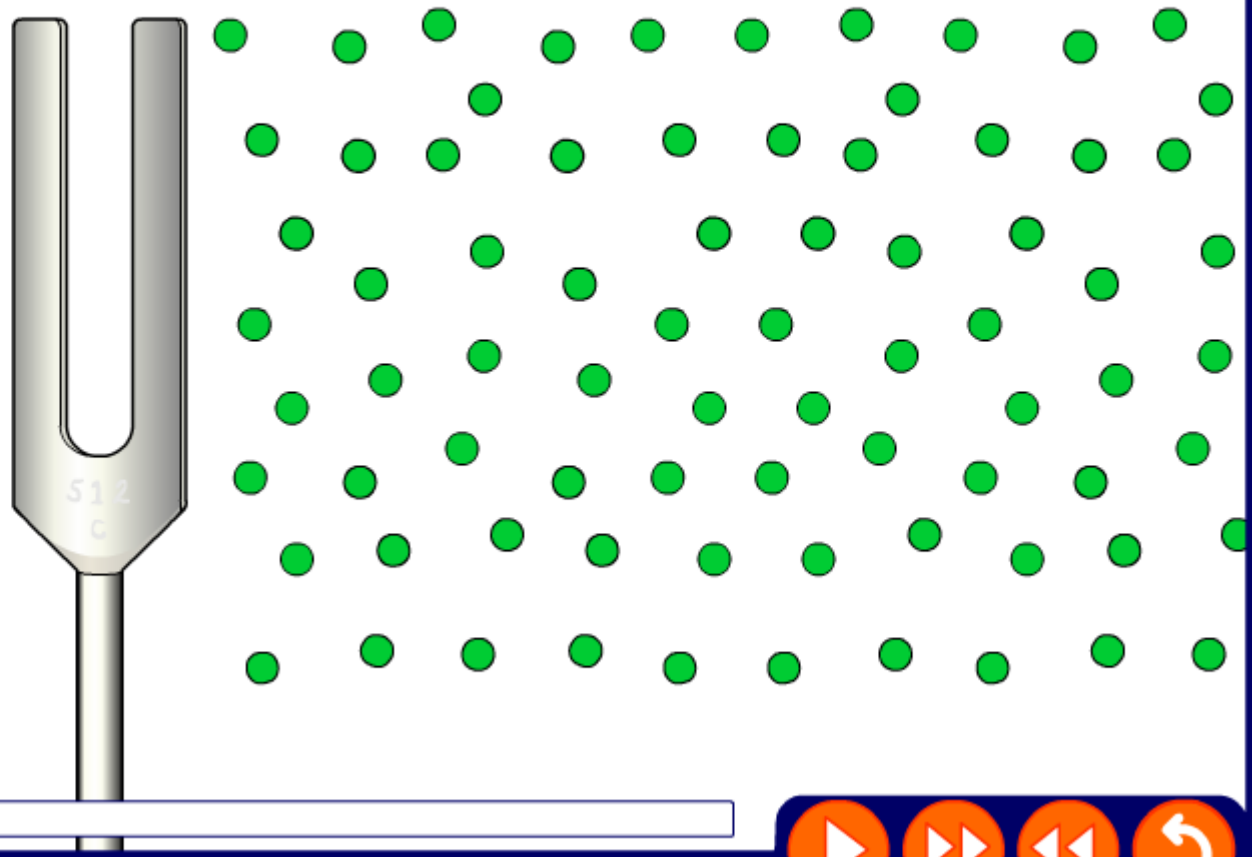
mouth blowing horn

lute strings

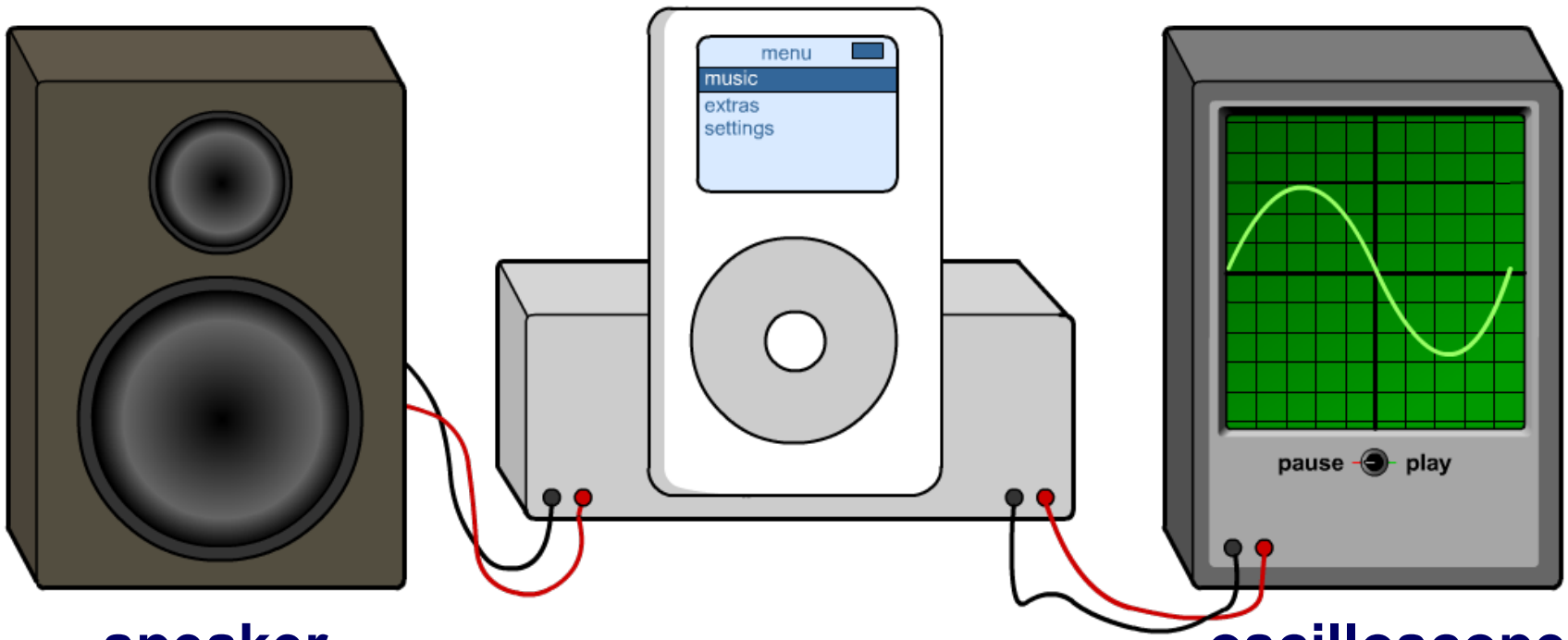
How does sound travel through air?

What happens to the surrounding air particles when a tuning fork is struck?

Click "**play**" to find out.



‘Seeing’ sound waves



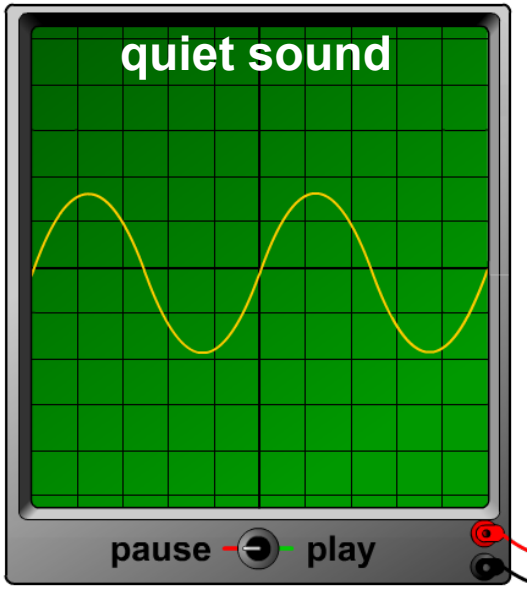
speaker **oscilloscope**

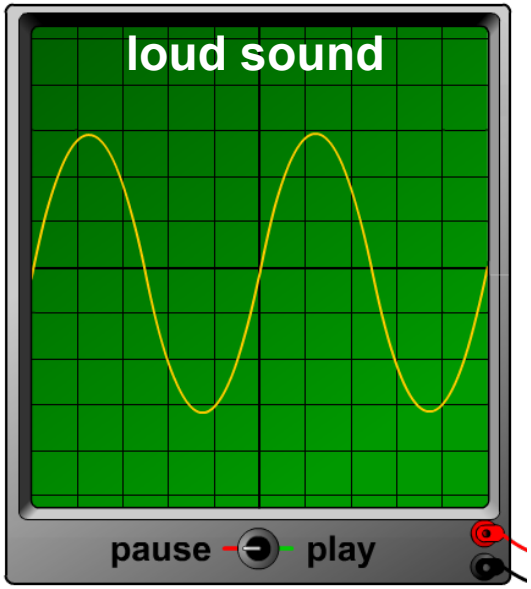
If we connect an mp3 player to a speaker, we can all hear the sound produced.

If we also connect an oscilloscope to the mp3 player then we can ‘see’ the sound waves.

Loudness and amplitude

A sound can be quiet or loud.



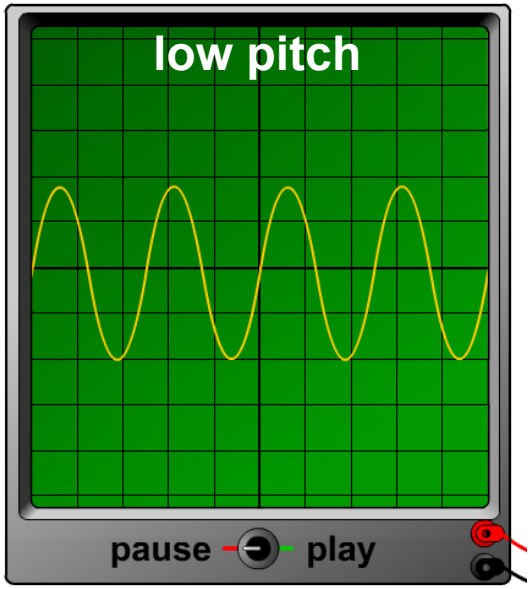


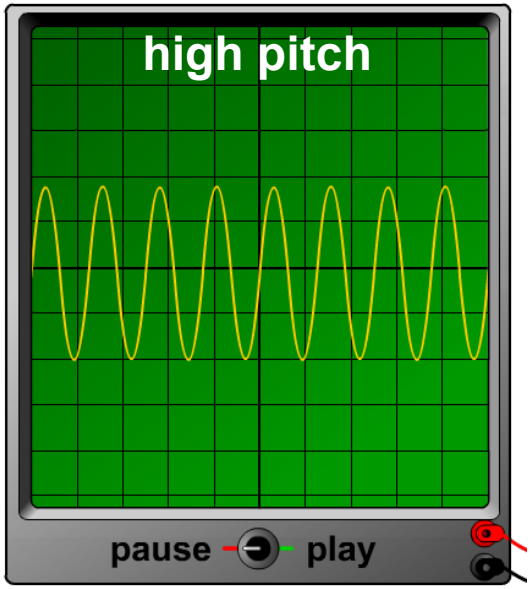
On an oscilloscope trace, the loudness of a sound is shown by the height of the wave. This is called the **amplitude**.
Which word should be crossed out in this sentence:

The **larger** the amplitude of the wave on the trace, the **louder/~~quieter~~** the sound.

Pitch and frequency

A sound can be high or low – this is the **pitch** of the sound.



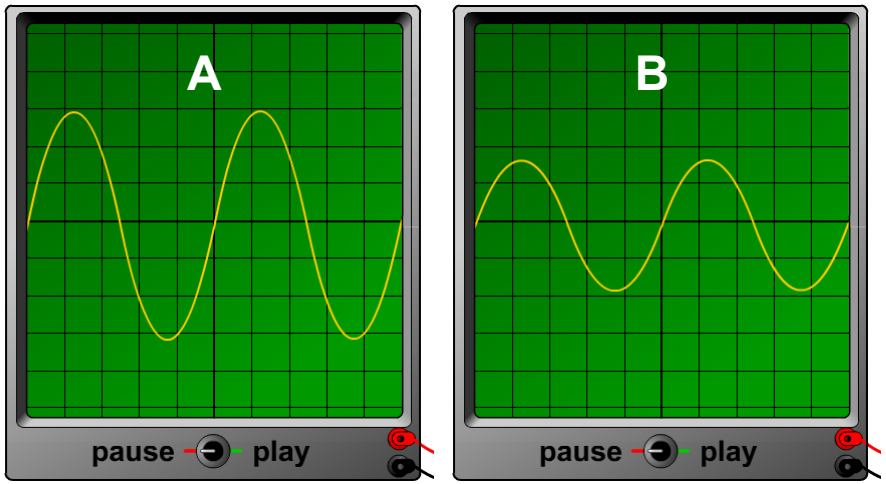


On an oscilloscope trace, the pitch of a sound is shown by how many waves there are. This is called the **frequency**. Which word should be crossed out in this sentence:

The **greater** the frequency of the waves on the trace, the ~~**lower**~~**/higher** the pitch.

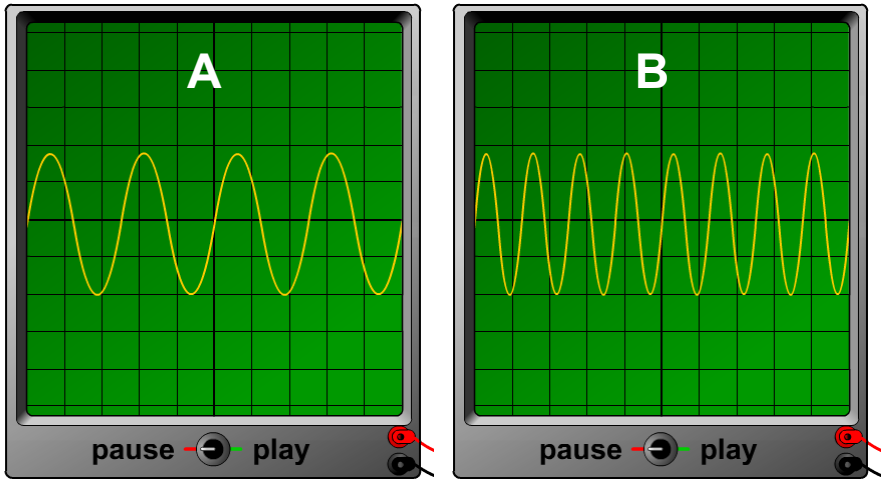
Which wave is the loudest and highest?

Which trace represents the loudest sound?



Sound A has the largest amplitude (i.e. the tallest waves), so it is the loudest of these two sounds.

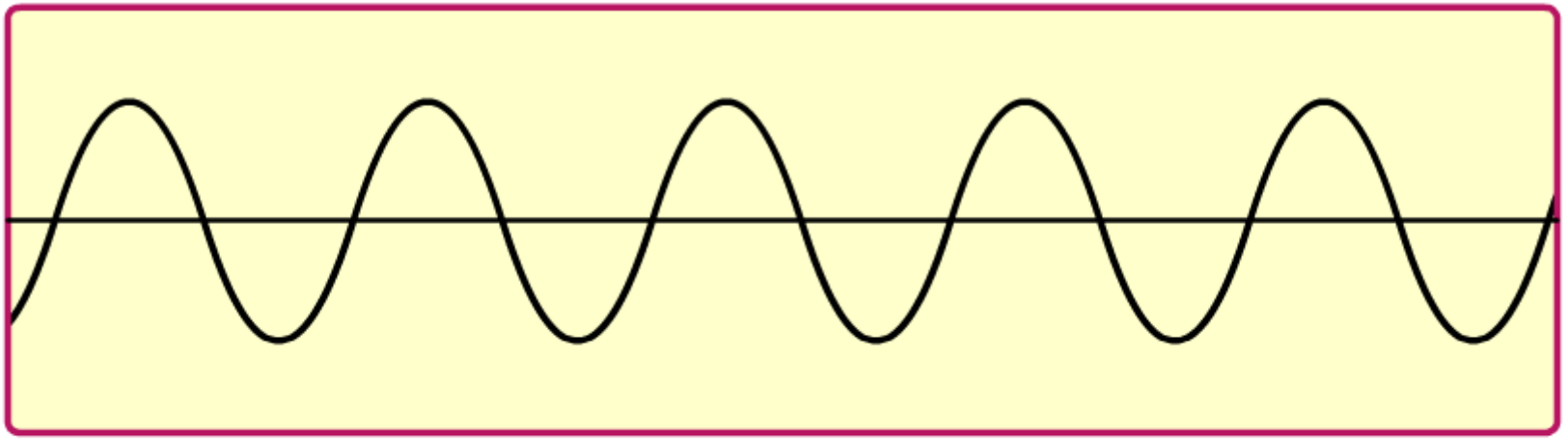
Which trace represents the sound with the highest pitch?



Sound B has the greater number of waves across the oscilloscope – it has the highest frequency and so has the highest pitch.

Amplitude and wavelength

How do amplitude and wavelength affect an oscilloscope trace?



amplitude

The height of the wave from the black line.

wavelength

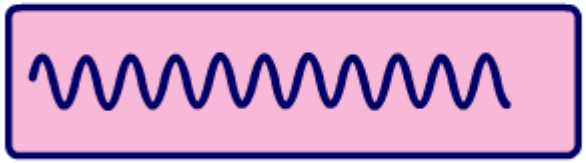
The distance between two identical points on the curve.

Describing sound waves

What is the description of each sound wave?

low amplitude, long wavelength

low amplitude, short wavelength



high amplitude, long wavelength

high amplitude, short wavelength

solve

Sound waves summary

Are these statements about sound true or false?

1.	Sound is caused by vibrations.	
2.	Sound can travel through space.	
3.	Amplitude means the number of waves per second.	
4.	A large amplitude means a quiet sound.	
5.	A high pitch sound has a high frequency.	
6.	Sound is a form of energy.	

true false

?

solve