



11.3 How sound travels

How sound travels – Дуу хэрхэн тархдаг вэ?

When a musician plays, sound spread outwards from their instrument. Anyone nearby can hear the sounds. This shows that sound can travel through air.



How sound travels

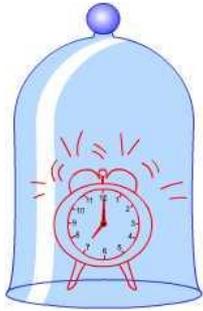
Sound can also travel through solids and liquids. For example, place your ear against a table. Ask someone to tap the table-you will hear the tapping sound very clearly.



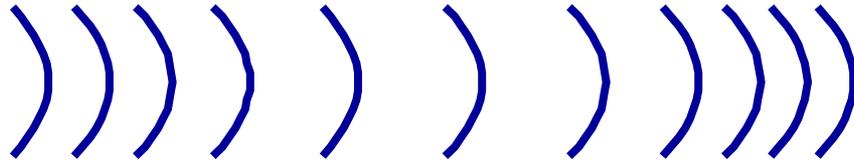
The bell-jar experiment



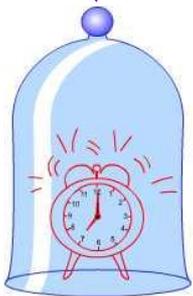
Place a ringing clock inside the bell jar and what happens?



There is **air** inside the bell jar so the sound can travel and be heard.



vacuum
pump on



Remove the air from the bell jar and what happens to the sound?

The sound **cannot** be heard because there is no air inside the bell jar (a **vacuum**).

Sound and a vacuum

Sound needs a material to travel through. The material can be solid, liquid or gas. Sound cannot travel through a vacuum.



Solid



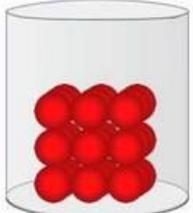
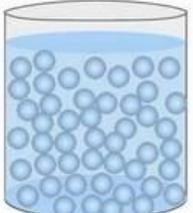
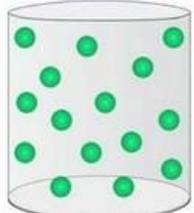
Liquid



Gas

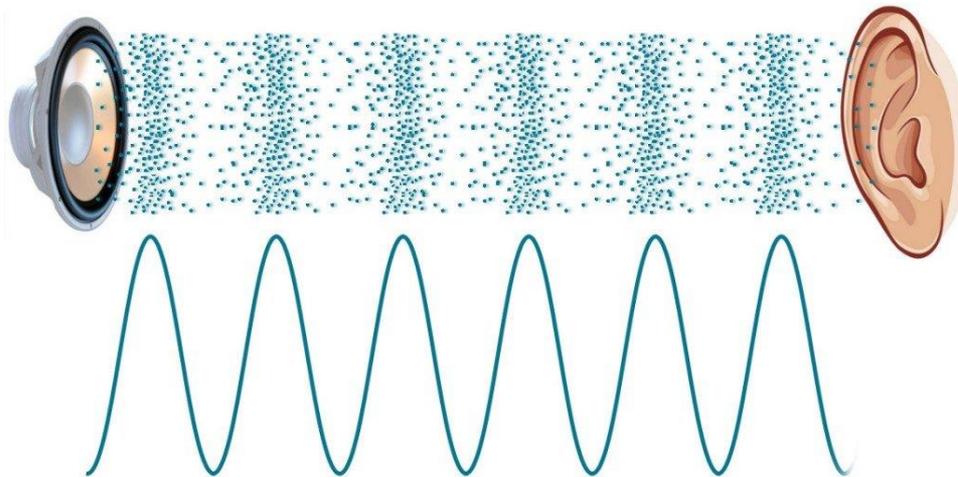
Sound travelling

You should remember that air is made up of tiny particles called molecules. By thinking about these particles, we can explain how sound travels.

solid	liquid	gas
		
 rigid  fixed shape  fixed volume	 not rigid  no fixed shape  fixed volume	 not rigid  no fixed shape  no fixed volume
cannot be squashed	cannot be squashed	can be squashed

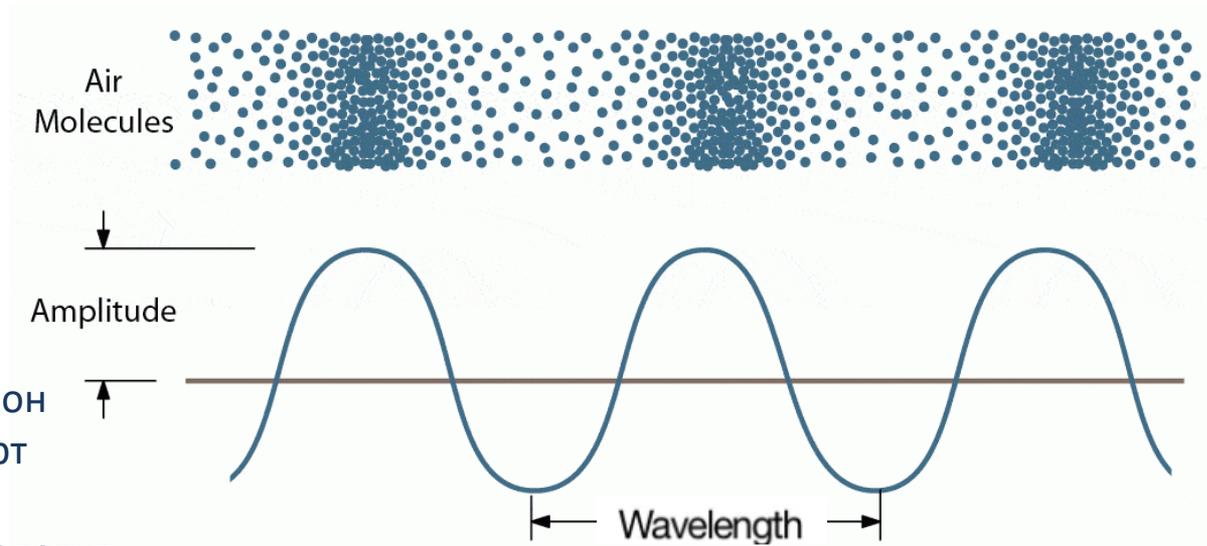
Sound travelling

When a loudspeaker makes a sound, its cone vibrates back and forth. This pushes the air molecules next to the cone so that they move back and forth with the same frequency. These molecules then push on the next layer of molecules so that they also start to vibrate.



Sound travelling

These molecules push on the next ones, and so on. The molecules only vibrate from side to side, but the vibration travels outwards through the air. We call this a **sound wave**.



Sound wave- Дууны долгион

Wavelength - Долгионы урт

Amplitude- Далайц

Air molecules- Агаарын молекул

Summary

- **Sound needs a material to travel through. Sound cannot travel through a vacuum.**
- **Sound travels when particles push each other back and forth. This is a sound wave.**

