

EXTRA WAVE TOPICS

Name _____

Part B: Wave Front Diagrams of Sound

Wave Front

The points affected by the wave.

Sound is a longitudinal wave

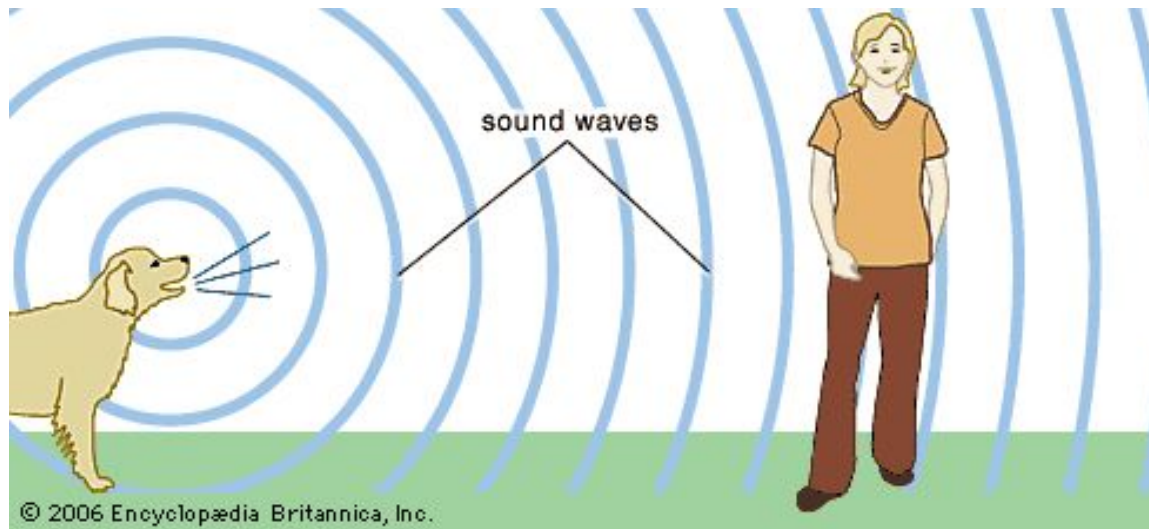
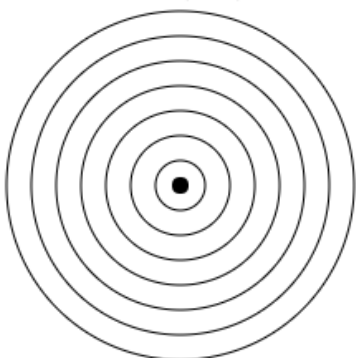
A sound wave is made from *compression zones* and *rarefaction zones*.
The *wave front* of sound is the location of the *compression zone*.

Wave front Diagram

We can draw diagrams of sound waves by drawing *circles* showing the front of a wave. They correspond to the location of the *compression zones* of the sound wave.

Diagram of Sound Waves Made by a Stationary Object

Stationary Object



The blue circles indicate the sound *wave fronts* made by the dog. (The compression zones of the dog's sound wave.)

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Part B-2: The Doppler Effect

The Doppler Effect

When there is motion between a sound maker and sound observer, the FREQUENCY seems either higher or lower.

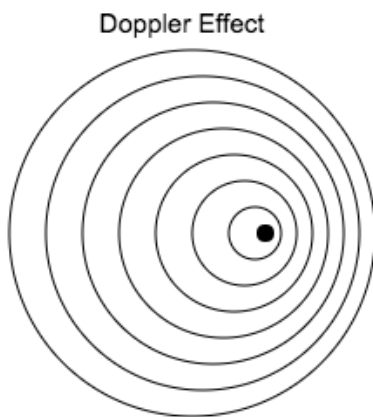
Doppler Effect Rules:

- When something moves TOWARDS you, frequency seems HIGHER.
- When something moves AWAY from you, frequency seems LOWER.
- When you move TOWARDS something, frequency seems HIGHER.
- When you move AWAY from something, frequency seems LOWER.

TOWARDS = higher apparent frequency

AWAY = lower apparent frequency

Diagram Representing the Doppler Effect:



Why the Doppler Effect Happens:

This object is moving to the *right*.

If you are on the right side (it is moving *towards* you), then the wavelength is *shorter*, which means the frequency is *higher*.

If you are on the left side (it is moving *away from* you), then the wavelength is *longer*, which means the frequency is *lower*.

Apparent Frequency

The Doppler effect changes the *apparent frequency* of a sound wave. It does not actually change the frequency, but the frequency *seems* to change.

B.1 Which element of a sound wave appears to change when during the Doppler Effect?

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In problems **B.2 – B.8**, state whether the frequency seems to *increase* or *decrease*.

B.2 A fire truck, with sirens blaring, is coming at me.

B.3 A train with its horn blowing is moving away from the station.

B.4 I'm running (FAST) away from a loud blow horn.

B.5 Someone with a loud blow horn is running at me!

B.6 The loud blow horn is to advertise free ice cream, so I run towards it.

B.7 I'm staring at the highway looking at the cars. When they move towards me....

B.8 When they move away from me....

B.9 Draw two situations when sound appears to seem HIGHER:

B.10 Draw two situations when the frequency of sound seems LOWER:

B.11 Write any TWO real life situations when you might observe the Doppler effect:

B.12 Which do you think will create a bigger Doppler effect, a very fast moving fire truck or a slow moving fire truck?

