Use of a CRO to visualise sound waves – transcript

One way of measuring sound waves is by the use of a Cathode ray oscilloscope, or ‘oscilliscope’ for short.

An oscilloscope measures electrical signals. To do this a microphone is used. This turns the sound waves into an electrical signal which we can see on the oscilloscope.

First the oscilloscope is turned on.

You can see as I’m talking that there are waves being formed. However, because there are many different frequencies in my voice it doesn’t look like a perfect wave.

We can use it to show two things.

When a high pitched sound, like a whistle is produced, the waves bunch up. This means this is a high frequency sound.

As a lower pitched sound is produced, the waves spread out, this is ‘low frequency.’

Loud sounds, like shouting create a different effect.

Notice that the amplitude of the wave, that is the height of the wave from the point of equilibrium, is too big for the screen.

Quiet sounds, like whispering create small amplitude waves.

Higher frequency sounds mean the waves are closer together. This means they have a short wavelength.

The lower the frequency the further apart the waves are. These have a longer wavelength.

The louder the sound the bigger the amplitude.

The quieter the sound the lower the amplitude.

While these different waveforms show us how loud, quiet, low pitched or high pitched waves are, they cannot be accurately measured.

To see a wave of a single amplitude and frequency a signal generator could be used. It can generate a sound of a single amplitude and frequency.

Instead of the microphone, the signal generator is connected to the oscilloscope.

On a low frequency, this noise is produced. Notice it has a very low pitch and it is constant

A high frequency, creates a very high pitch noise which is constant

This time a perfect waveform is generated.

As the volume gradually rises, the amplitude begins to increase until it goes off the screen.

As the volume is reduced the amplitude decreases.

As the frequency is increased the waves get closer together.

When the frequency is reduced the waves become further apart.

By understanding sound waves, tests can be planned to show how they move through different mediums. For example, how could the speed of sound in air be tested experimentally?