

Forms part of the Gr 10 Physical Sciences 3-in-1 Class text and Study Guide.
See p. 94 MODULE 2 TOPIC 4 Unit 2 for the theory.



PRACTICAL ACTIVITY

Comparing sounds of different frequencies and amplitudes produced by various instruments

Materials

- tuning forks of different frequencies
- loudspeaker
- microphone
- oscilloscope
- vuvuzelas of different sizes
- different flutes
- cables
- function generator

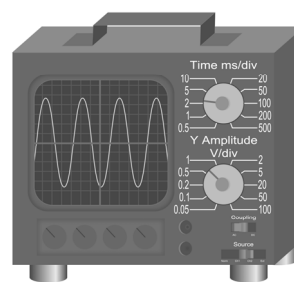
Method

- 1 Tap the tuning forks one at a time in the order of increasing frequency **OR** blow on vuvuzelas of different sizes **OR** blow on different flutes.
- 2 Carefully listen to the sounds produced by the same type of instrument.
- 3 Compare the sound produced by blowing on a vuvuzela versus the sound produced by a flute.
- 4 Produce various sounds into the microphone by using these instruments **OR** by connecting a function generator to a loudspeaker to generate a variety of sounds with different frequencies and amplitudes.
- 5 Connect the microphone to an oscilloscope to display the waveforms picked up by the microphone and the impact that the changes have on them.

NOTE



A microphone can pick up the sound and convert it into an electrical signal, which can be displayed on the oscilloscope.



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An oscilloscope

Observations and discussion

- Although sound waves are longitudinal waves, an oscilloscope can process the information and each sound wave can be represented by a transverse wave pattern.
- In this way, the different properties of the sound waves, such as the frequency, the amplitude, and the quality of each, can be indicated.
- The **distance** between **two wave crests** indicates the **wavelength** of the wave.
- the **number of waves per second** indicates the **frequency** and thus the **pitch** of the sound.
- The **maximum displacement** from the equilibrium position indicates the **amplitude** of the wave and thus the **loudness** of the sound.
- Different instruments produce sounds that differ in **quality** and will produce different **waveforms** / mixtures of frequencies.