Introduction

Diffraction and interference patterns are key mechanics used in physics and modern technology. Today noise cancelling headphones are commonplace, which produce soundwaves to interfere destructively with other surrounding waves to block them out for the user. Diffraction is a key part in studying interference and in particular self-interfering waves.

Diffraction occurs when a wave hits a barrier or object with a similar width or sized opening to its wavelength. Every point on a wavefront can be seen as a source for a new wave. This means that waves themselves are made up of an infinite number of waves which interfere in such a way as to create one large wave. This principle is what explains how waves can bend around slits and objects.

This effect can be observed with soundwaves but also light which makes studying either one a good source for understanding the other. Light diffracting and interfering with itself can be seen every day. Like the colourful way CDs diffract and reflect light to make a rainbow pattern. Likewise, sound diffracts when hearing a distant thunder. All that is left is a low rumble, but when the lightning strikes close to you the higher frequencies haven't been filtered out yet from other objects in the way which is why a higher pitched crackle can be heard.

Therefore, by studying the diffraction of sound waves much can be applied to other fields of science and many every day phenomena can be explained. The objective of this experiment will be to analyse and compare predicted interference patterns with the ones measured using a sound generator, a receiver and grating which can be adjusted to modify the number of slits.