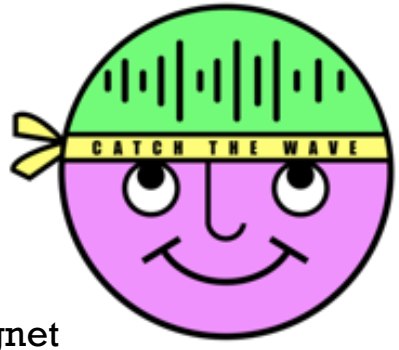
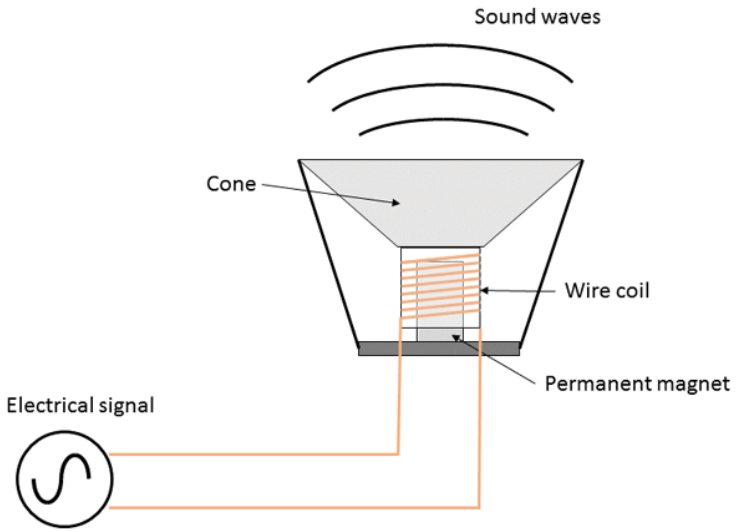
#3 - Blue - Fast changes make sound



Humans can only change the polarity of an electromagnet **once or twice every second or two** at the fastest because it as fast as we can move a switch. But electric circuits can change direction **hundreds or thousands of times a second** because they are computer-controlled.

When certain amounts and directions of electricity are moved through an electromagnet more than about **100 times per second** or less than about **20,000 times per second**, it can move thin materials like paper or plastic in the same ways. The materials then move the **air** near them, and if we are close enough, the moving air gets sensed inside our ears as **sound**.



Try changing the number of times per second, or **frequency**, that the speaker is vibrated by the electrical signal by turning the **dial** on the **right**. What happens to the sound that you hear?

Try changing the shape or **waveform** of the wave that is used to vibrate the speaker by turning the **dial** on the **left**. How does that change the sound that you hear?