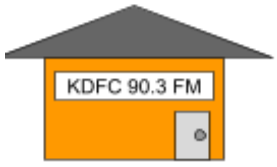
From Waves to Music: How Radios Work

Have you ever wondered how a radio can take invisible radio waves traveling through the air and turn them into the sounds you hear? Read the text to see if you can find clues to this question. As you read, draw a flow diagram that shows the journey of a radio signal, from when it is first created at a radio station to when it turns into sound you can hear from a speaker. Use arrows to show how the signal moves and changes at each stage. Can you label what happens to the signal as it passes through each part?

Use this space for your flow diagram:



RADIO STATION

SOUND SPEAKER

Reading

When a radio station broadcasts, it starts with a **carrier wave generator**, which produces a high-frequency radio signal. This signal, called the carrier wave, is much higher in frequency than the audio signal (music or speech) it will carry. The carrier wave acts like a vehicle that transports the audio information over long distances. Before the signal is sent out, a **modulator** alters the carrier wave's amplitude to reflect the variations in the audio signal's amplitude. Essentially, the shape of the audio signal is superimposed onto the carrier wave, allowing it to carry sound information.

The modulated signal is then sent to a **transmitting antenna**, where it creates an electromagnetic field — the radio wave. This radio wave spreads out in all directions, traveling through the air. As the radio wave reaches a **receiving antenna**, it picks up the signal, although the signal might be weak if the receiver is far from the transmitter. To make the signal usable, it is passed through an **amplifier** to strengthen it.

Next, a **demodulator** inside the radio translates the signal by cutting it in half and extracting the audio information embedded within it. Since both halves of the signal contain the same information, only one half is needed for the final output. The signal is then sent through a **filter** to remove the carrier wave, leaving behind the pure audio signal.

Finally, the audio signal is sent to the **speaker**, where it causes the speaker's diaphragm to vibrate, producing sound waves. These sound waves are equivalent to the original audio signal, such as a singer's voice or music, allowing you to hear the broadcast.

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