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ELECTRO- MAGNETISM

0:12–1:19 Human vocal cords produce sound by disturbing the molecules in the air around them. The molecules begin to vibrate in a distinct pattern known as a sound wave. The farthest a human voice can travel is about 600 feet before the sound wave runs out of energy. If we want to communicate over longer distances, our voices have to hitch a ride on another type of wave that relies on a force almost as old as the universe. Big History brings in astrophysics to connect us back to the beginning of time.

1:19–1:31 The Big Bang: the birth of all the matter and energy that will ever exist in the universe and the forces that govern how it all works.

The forces of nature we know now began to distinguish themselves and separate out. One of the forces that resulted from that process is electromagnetism. Electromagnetism gives sound a way to travel that's more powerful than air molecules bumping into each other: radio waves. These waves are transmitted by the vibration of electric and magnetic fields, and unlike the simple sound wave, radio waves can travel vast distances.

NASA's Voyager 1 spacecraft can send radio transmissions to Earth from the very edge of the solar system, 12 billion miles away. So a cell phone extends the reach of the sound waves our voices make by converting them into radio waves and transmitting them through the atmosphere.

1:31–2:09

RADIO WAVES

2:09–2:40

VOYAGER 1