

RADIO EXPLORERS

Wi-Fi Detective

What happened to my Wi-Fi signal?





Find a **Wi-Fi router** transmitting **radio waves**. Measure the Wi-Fi signal strength using the Wi-Fi Detector app. What happens to the signal as you get farther away from the router?



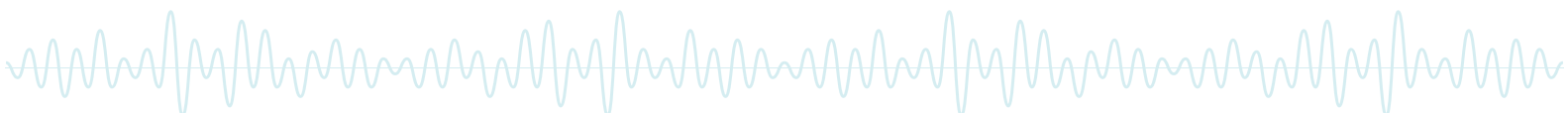
Try placing objects **in between the Wi-Fi router and the smartphone** running the Wi-Fi Detector app. How does the signal strength change? Does it matter what kind of material the object is made of?



Can you discover any ways to **increase** the Wi-Fi signal strength?



Where else can you place objects around either the Wi-Fi router or smartphone? **What causes the biggest change?**



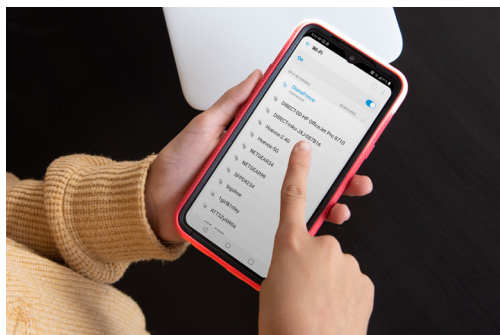
Radio waves are invisible and all around us.

When was the last time you went looking for a Wi-Fi network—how many popped up on your smartphone or laptop? Wi-Fi is one example of a radio technology that many of us use every day to play music, read web pages, or post photos of our lives on social media. In many cities and towns, Wi-Fi radio waves are everywhere, but that doesn't mean your connection always works. **Radio waves transfer energy that can be reflected or absorbed, or pass through materials**—just as you discovered in this activity by interfering with the signal from the Wi-Fi router. When your device is connected to the internet via Wi-Fi, you might have noticed the signal can't go very far and can easily be blocked by walls, curtains, and other obstructions.



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Many of the devices you see people using every day use Wi-Fi radio waves to connect to the internet.



2.4 GHz and 5 GHz Wi-Fi networks visible in the Wi-Fi settings on a smartphone.

This is because **different devices use different radio frequencies**. Wi-Fi uses higher frequencies than other radio technologies like AM and FM radio and TV broadcasts. Radio waves with higher frequencies travel shorter distances and are more often absorbed by their surroundings. This is one reason why you need only one transmitter for an AM station to reach across an entire city, but you need many Wi-Fi routers to sustain a Wi-Fi network in the same area. Wi-Fi most commonly uses the 2.4 GHz (ultrahigh frequency) and 5 GHz (superhigh frequency) radio bands. **Radio bands** are agreed-upon frequency segments of the **radio spectrum** for assigned radio technologies like Wi-Fi or satellite communications.

