

## What is the Difference Between WiFi and Cellular?

Connecting to the internet for distance learning may involve familiar company names along with unfamiliar terms. This document breaks down the basic differences between connection types.

### Broadband Internet

Broadband refers to internet access that is always on and faster than dial-up access. Broadband connections still require a modem to facilitate the connection. But instead of a telephone line, broadband uses a connection provided by an Internet Service Provider (**ISP**) to the home or school site. Common private ISPs in California include Xfinity (Comcast), Spectrum, Consolidated, and more.

*In California, school districts connect to the network maintained by the K-12 High Speed Network (**K12HSN**), a state agency that facilitates the connection to the California Research and Education Network (**CaIREN**), which is supported by the California Education Networking Initiatives in California (**CENIC**).*

Broadband connections come in several forms, listed in general order of speed.

- Fiber Optic: pulses of light through connected fibers
- Cable: data given via coaxial cables
- Satellite: access via communication satellites
- Digital Subscriber Line (DSL): data over copper telephone lines

*In many rural parts of California, a lack of installed fiber, cable, and telephone lines due to geography mean that the only reliable option for schools is the use of satellite internet. Given the nature of satellite internet and interference, this may be affected by environmental factors outside of a district's control.*

### WiFi

WiFi refers to the internet provided via a wireless router. A router must connect to a Local Area Network (**LAN**) in order to operate. WiFi typically uses the 2.4 gigahertz (**GHz**) or 5 gigahertz radio bands to operate. WiFi works best at stable locations since the range is limited to distance from the router.

## Cellular Networks

Cellular data can be used to connect to the internet. Cellular systems use towers to transmit signals across their network. Plans to access this data must be purchased from carriers such as AT&T, T-Mobile, Verizon and more. While cellular networks are widespread, they depend on the location and density of towers. In addition, many plans are “capped” by the provider with how much data can be used per account. Hotspots are a mobile way to provide access to cellular internet without the use of a phone. However, speed and reliability are affected by how close a user is to cell towers.

Type of Frequency	Year of Deployment	Description of Capabilities
3G	2001	This frequency can do basic functions like call, text, and basic connections to the internet. It is not effective for heavy streaming, like using Zoom or video in distance learning. A 3G tower can support 60-100 people.
4G LTE	2009	The 4G frequency works with the 3G frequency and provides greater speed. LTE means “Long-Term Evolution” and is the name of a technology standard for higher and faster data. A 4G tower can support 300-400 people.
5G	2019	The 5G frequency is approximately 100 times faster than 4G and is more efficient.

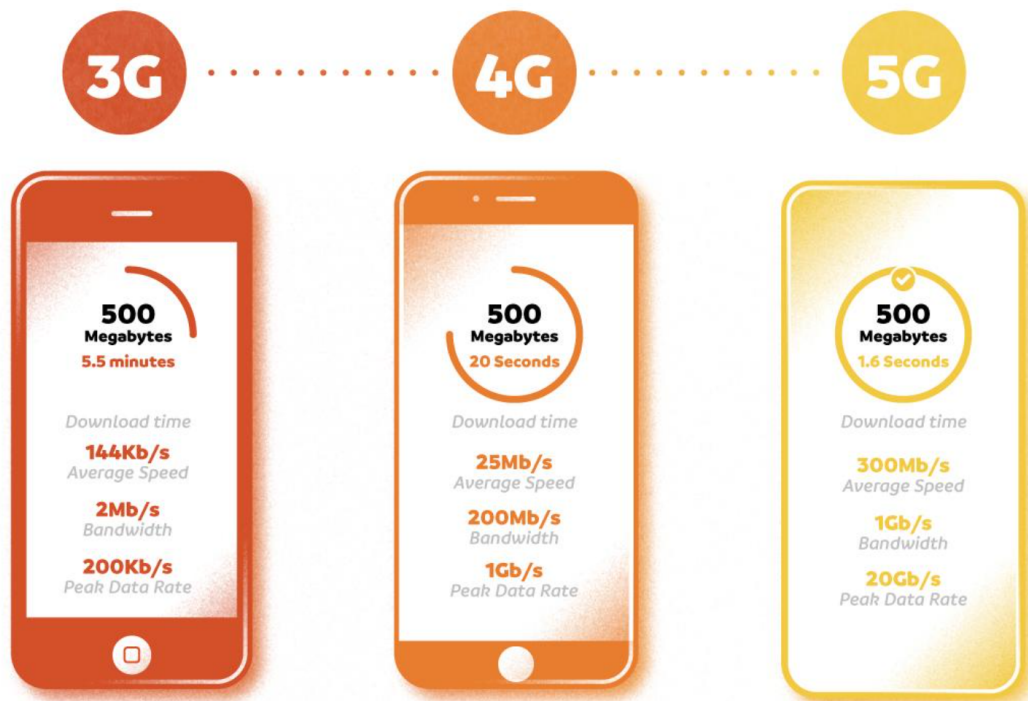


Image credit: <https://techblog.comsoc.org/2019/11/02/visual-comparison-of-3g-4g-and-5g/>

Sources: [Speedify](#), [Just Ask Thaless](#) [More details on 4G&LTE](#)