Optimizing Your WiFi Setup

Optimize Bandwidth

1. **Internet Speed**
    - Run a **speed test** using your Internet Service Provider (ISP) website or official app to determine whether you're getting the correct speed from the company's infrastructure into your home. You may need to log into your router's admin webpage to do this – credentials can often be found on the router itself or in your user manual. If there is a discrepancy during this test, follow up with your ISP before doing anything else.
    - Typically, service providers display your internet speed plan on the bill and your online account. Your speed contains two numbers: an upload speed and a download speed.
    - Unplug or disconnect any unnecessary devices from your network.
    - Use Ethernet cables to connect fixed devices when possible (for example, smart TV, Blu-ray/DVD, smart speakers or video game consoles).
    - Keep in mind that you will likely not see the same speed as listed on your bill, due to your device's possible limitations as well as signal environment – which we will discuss below.
2. **Router**
    - The router itself can be a bottleneck, particularly if it was made for a previous generation of WiFi standard. Your ISP can help determine if this is the case and might have upgrade options. Depending on the setup, you may also be able to provide your own equipment and upgrade it yourself.

Router Placement

3. **Place your router in a central location, preferably:**
    - Off the floor, mounted on the wall or on a high shelf.
    - Avoid metal, concrete and electronics (especially microwaves, baby monitors, garage door openers, etc.) when possible. Those devices emit strong signals on the 2.4GHz frequency.
4. **Single Band vs Dual Band**
    - If your router is **single band**, it is creating a single network on the **2.4 GHz frequency**.
    - Many modern routers are **dual band**, meaning that they simultaneously create a second network on the **5 GHz frequency**. Both of those frequencies are split up into smaller sections called **channels**, and your router will typically communicate on one of those channels.
    - On the 2.4 GHz frequency most users default to channels 1, 6 or 11 as they provide the least signal overlap. At present, 2.4 GHz is the more commonly used frequency and users can experience more signal **interference** on one or more channels – particularly in densely populated areas. 5 GHz provides a higher speed than 2.4 GHz but has a shorter

range, as it's harder for higher frequencies to pass through solid objects. However, it has more channels to choose from and generally sees less overall use.

5. **Select the clearest channel**
    - Many routers have an option to automatically select the clearest channel in the router's online control panel. You can also change this manually if you so choose.
    - **Network analyzer** apps can be a useful tool in determining frequency interference and signal strength. It is recommended to use one that clearly shows the relative signal strength and distance of the local routers.
        i. Wireless signal strength is measured in dBm (decibel milliwatts), expressed in negative numbers – for example, -30dBm represents an extremely strong signal, like if your router were nearby. After -60dBm, video transmission starts to degrade significantly, so it is recommended to target a signal strength in between those two numbers for distance learning or teleworking, if possible.
    - Some routers allow automatic switching between 2.4 GHz and 5 GHz depending on which is best for your device in its current location.

Extending Your Network

6. **Repeaters** connect to your wireless network and rebroadcast the signal in the area where the device is plugged in. This process can reduce the overall speed of the connection, but is an easy and cheap way to eliminate WiFi dead zones.
    - Another commonly used device is called a **Powerline adapter**. This is a series of (at least) two adapters that uses the cabling in your walls to transmit your signal to another area of the house.
7. **Extenders** enlarge the network by connecting directly to the router with a hardline (e.g. coax wall input or direct Ethernet connection). Depending on the configuration, this can be more challenging to set up.
8. **Hotspots**
    - Some hotspots are available through LCPL for one week check-out periods.
    - Many phones are able to function as a hotspot, which can be set up to access the internet just like a wireless network. Check with your device manufacturer and/or telecom provider to see if you have that option.
    - Keep in mind that you will be using your phone's data plan while connected.
    - It is advisable to set up password protection if available.
    - Hotspot usage can quickly drain your phone battery. Consider plugging it in when using this mode.