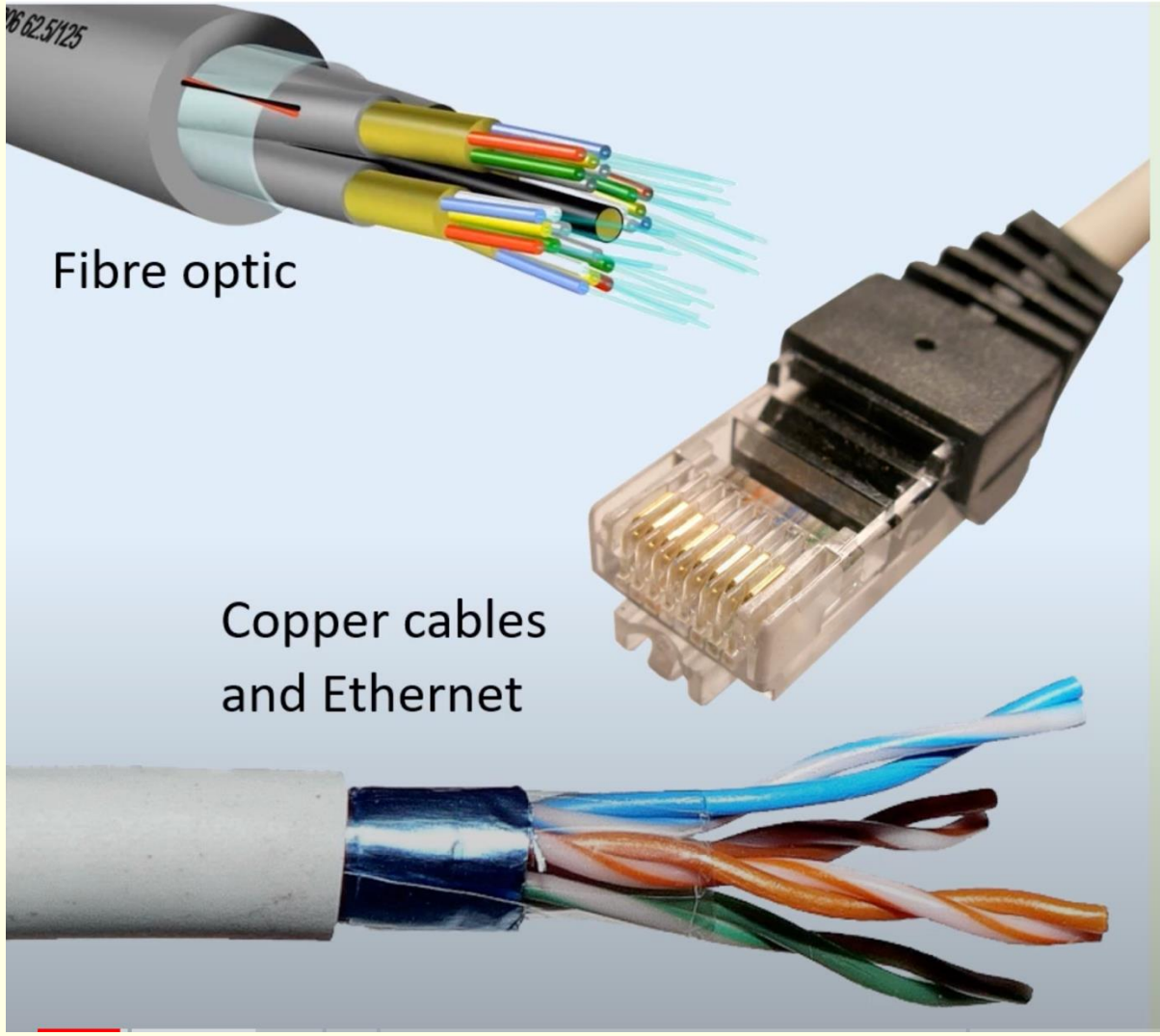
Learning Aims

- Identify different ways of transmitting data between devices?
- Summarise the characteristics of Wired, Wi-Fi, Bluetooth®, RFiD, Zigbee and NFC and give examples of their use.

Modes of transmission

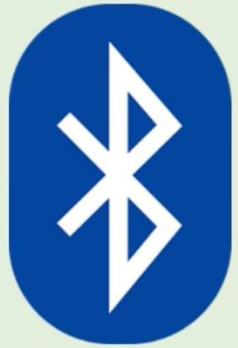
Wired



Wireless

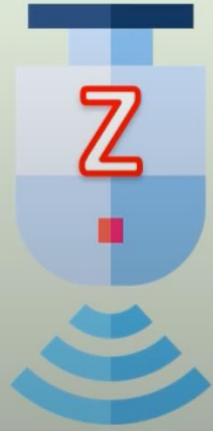
Wireless

Bluetooth



RFID/NFC

ZigBee



Wired vs wireless

All methods of transmitting data can be considered as either **wired** or **wireless**.

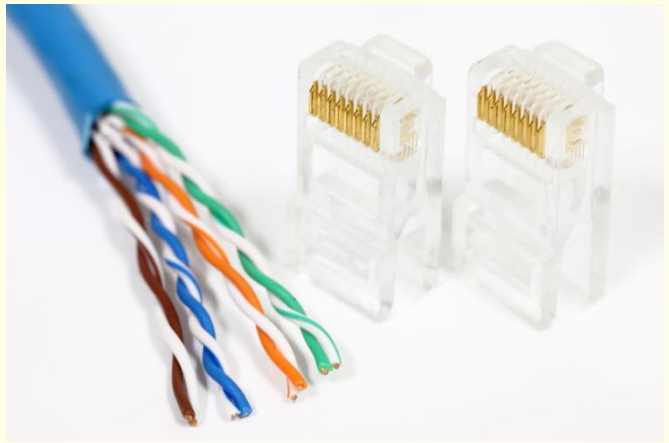
The difference is simple:

- Wired transmission involves making a physical connection from one device to another, for example using a USB or ethernet cable
- Wireless transmission uses no physical connection. Instead it uses **radio waves**, for example **Bluetooth®, Airdrop, and NFC**.

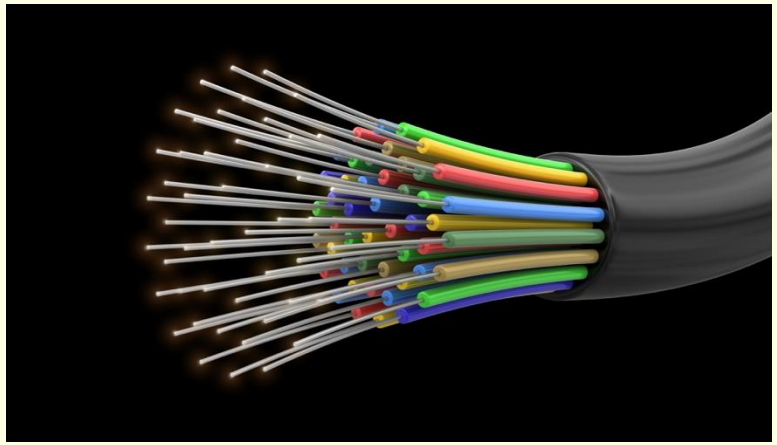
Wired

Wired transmission commonly uses copper or fibre-optic cables.

Copper is more common as it has been used to transmit data since the telegraph was invented over 150 years ago.



Fibre-optic cable is a modern alternative that has vastly higher bandwidth and lower latency.



Wi-Fi is not the only common wireless data transmission technology.

Other connection types including:

- **Bluetooth®**
- **Radio Frequency Identification (RFID)**
- **Near Field Communication (NFC)**

And less commonly, if you have a digital personal assistant device such as Alexa, a communication technology called **Zigbee.**

How the characteristics of wired and wireless networks impact performance

Speed

The transfer rate of data from source measured in bits per second

Range

Maximum distance a transmission can travel

Latency

Length of time it takes between a transmission being sent and received

Bandwidth

The maximum amount of data that can be transferred per second