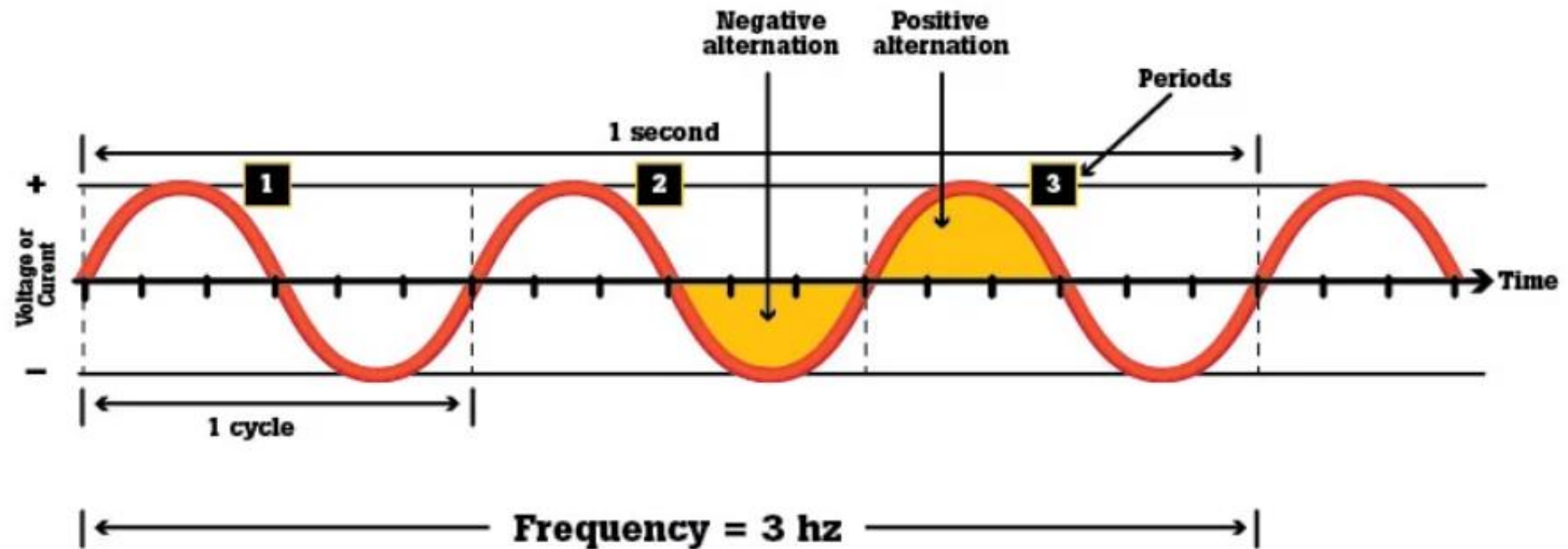


# WHAT IS FREQUENCY?



# WHAT IS FREQUENCY?

- Alternating current (ac) frequency is the number of cycles per second in an ac sine wave. Frequency is the rate at which current changes direction per second. It is measured in hertz (Hz), an international unit of measure where 1 hertz is equal to 1 cycle per second.
- Hertz (Hz) = One hertz is equal to one cycle per second.
- Cycle = One complete wave of alternating current or voltage.
- Alternation = One half of a cycle.
- Period = The time required to produce one complete cycle of a waveform.
- At its most basic, frequency is how often something repeats. In the case of electrical current, frequency is the number of times a sine wave repeats, or completes, a positive-to-negative cycle.
- The more cycles that occur per second, the higher the frequency.

# WHAT IS FREQUENCY?

- Power line frequency (normally 50 Hz or 60 Hz).
- Variable-frequency drives, which normally use a 1-20 kilohertz (kHz) carrier frequency.
- Audio frequency range: 15 Hz to 20 kHz (the range of human hearing).
- Radio frequency: 30-300 kHz.
- Low frequency: 300 kHz to 3 megahertz (MHz).
- Medium frequency: 3-30 MHz.
- High frequency: 30-300 MHz.

# WIFI FREQUENCY

- **The difference between 2.4 GHz and 5 GHz WiFi**
- Your wireless router uses radio frequencies to transmit internet to your WiFi-connected devices like smartphones, laptops, tablets and more. The difference between 2.4 GHz and 5 GHz WiFi comes down to speed and range. Let's take a closer look at the differences.
- **2.4 GHz vs. 5 GHz pros and cons.**

# PRO AND CONS

## 2.4 GHz vs. 5 GHz pros and cons

	Pros	Cons
2.4 GHz	<ul style="list-style-type: none"><li>• Larger coverage area</li><li>• Better at penetrating solid objects</li></ul>	<ul style="list-style-type: none"><li>• Lower data rate</li><li>• More prone to interference</li><li>• Usually more devices using this frequency</li></ul>
5 GHz	<ul style="list-style-type: none"><li>• Higher data rate</li><li>• Less prone to interference</li><li>• Usually fewer devices using this frequency</li></ul>	<ul style="list-style-type: none"><li>• Smaller coverage area (except 802.11 ac)</li><li>• Worse at penetrating solid objects</li></ul>

## RANGE

Number of cycles or waves per second	Frequency (SI units)
1	1 hertz (Hz)
1,000	1 kilohertz (kHz)
1,000,000	1 megahertz (MHz)
1,000,000,000	1 gigahertz (GHz)
1,000,000,000,000	1 terahertz (THz)
1,000,000,000,000,000	1 petahertz (PHz)
1,000,000,000,000,000,000	1 exahertz (EHz)

# RADIO FREQUENCY SPECTRUM BAND

## Radio frequency spectrum bands

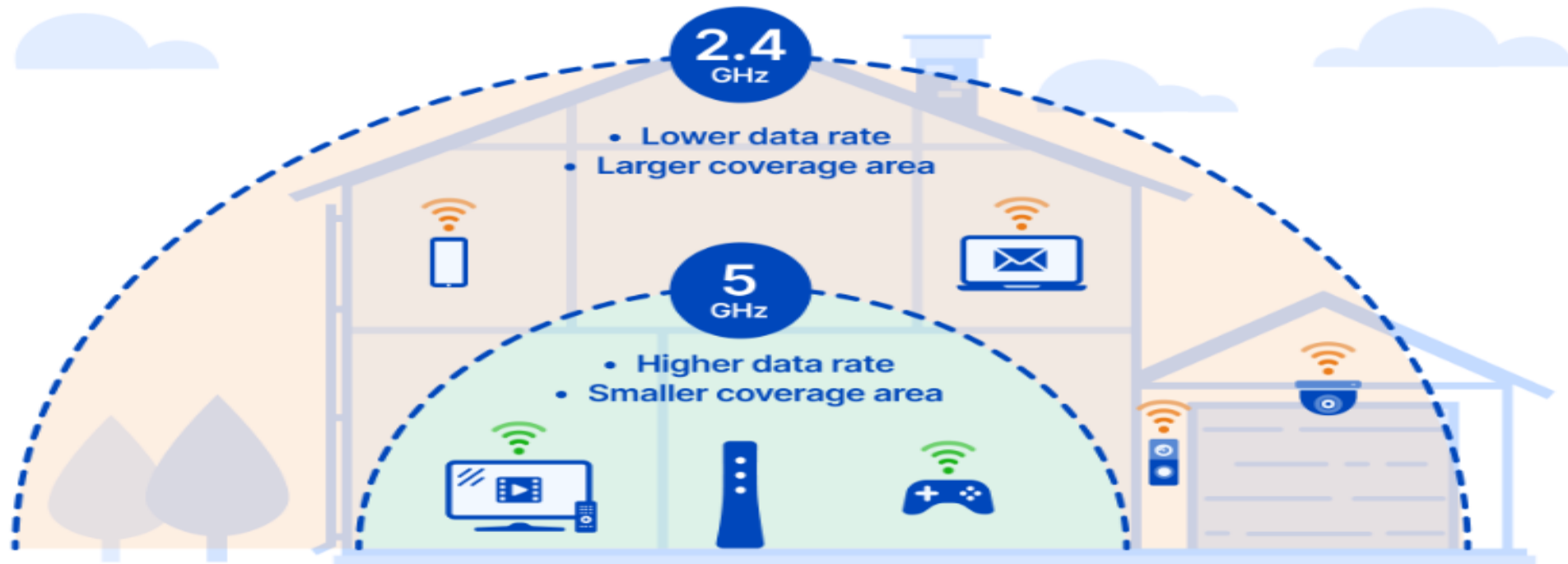
DESIGNATION	ABBREVIATION	FREQUENCIES	FREE-SPACE WAVELENGTHS
Very low frequency	VLF	3 kHz to 30 kHz	100 km to 10 km
Low frequency	LF	30 kHz to 300 kHz	10 km to 1 km
Medium frequency	MF	300 kHz to 3 MHz	1 km to 100 m
High frequency	HF	3 MHz to 30 MHz	100 m to 10 m
Very high frequency	VHF	30 MHz to 300 MHz	10 m to 1 m
Ultrahigh frequency	UHF	300 MHz to 3 GHz	1 m to 100 mm
Super-high frequency	SHF	3 GHz to 30 GHz	100 mm to 10 mm
Extremely high frequency	EHF	30 GHz to 300 GHz	10 mm to 1 mm

# FREQUENCY

- **2.4 GHz vs. 5 GHz: Which frequency should you choose?**
- A 2.4 GHz connection travels farther at lower speeds, while 5 GHz frequencies provide faster speeds at shorter range. Your choice of 2.4 GHz or 5 GHz will depend on where and how you use your WiFi connection most.
- A lot of electronic devices and appliances use the 2.4 GHz frequency, including microwaves, baby monitors, security cameras, and garage door openers. If you have many of these in your home, or if you live in an apartment or condo, that 2.4 GHz band is likely to be congested, which can damage speed and signal quality.



# RANGE



5 GHz will give you more signal strength and faster speed over a shorter range, compared to 2.4 GHz.