The Electromagnetic Spectrum

The electromagnetic spectrum is comprised of various types of electromagnetic waves.

Although they vary in frequency and wavelength, they share the same features:

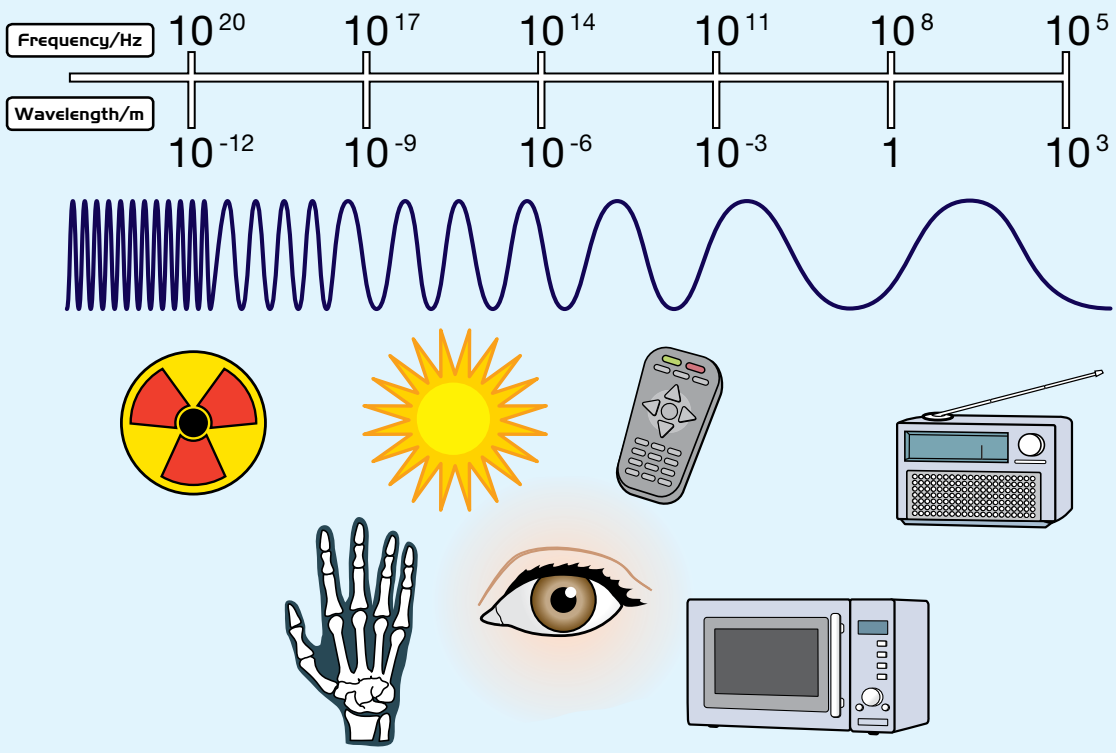
- All transverse waves
- Can all travel through a vacuum
- All travel at a speed of 300,000m/sec

Word Bank

- Electromagnetic radiation
- Electromagnetic spectrum
- Microwave
- Radio wave
- Wave energy
- Wave frequency
- Wavelength
- Wireless technology

1 Label this diagram of the electromagnetic spectrum, using the keywords below.

Gamma Ray	Infrared	Microwaves	Ultraviolet
Radio Waves	Visible	X-Rays	



2 Which wave type has the shortest wavelength?

3 Which wave type has the longest wavelength?

4 Which wave type has the lowest frequency?

5 Which wave type has the highest frequency?

Radio Waves

Radio waves have the lowest frequency of all electromagnetic waves. This means they also:

1 have the lowest _____ 2 and the longest _____

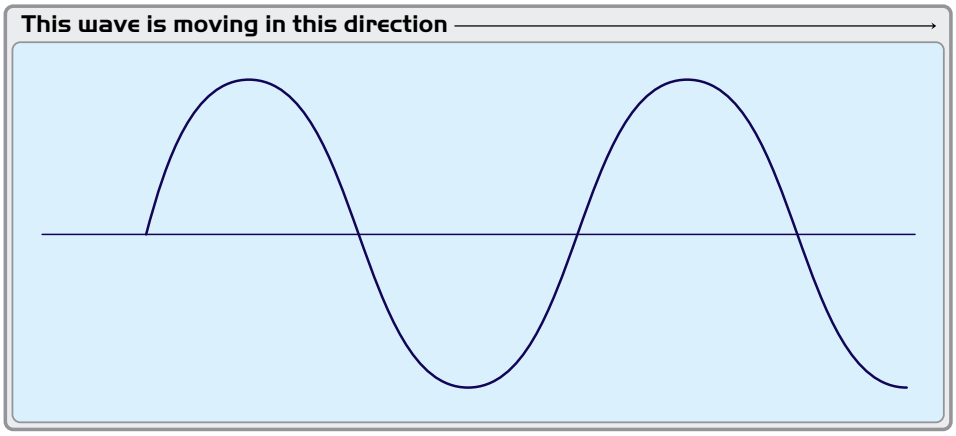
3 Label this diagram of a radio wave:

Keywords:

Wavelength

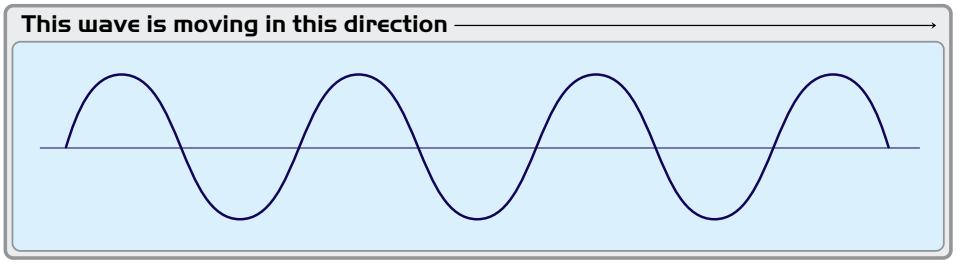
Amplitude

Undistrurbed position

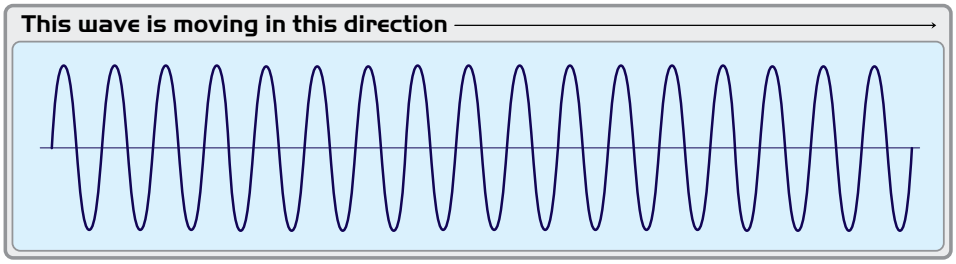


Diagrams to show the main differences between three types of radio waves:

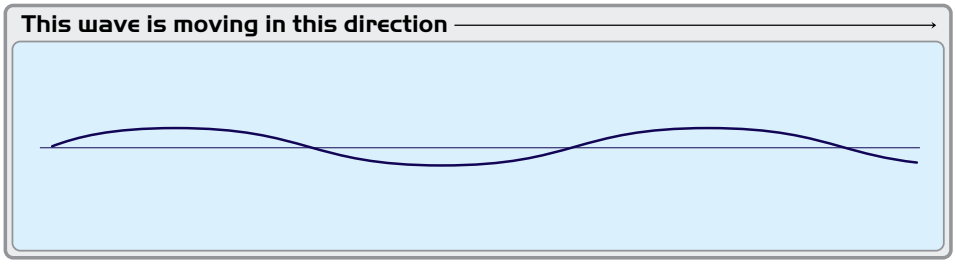
Medium Frequency used in older military radios



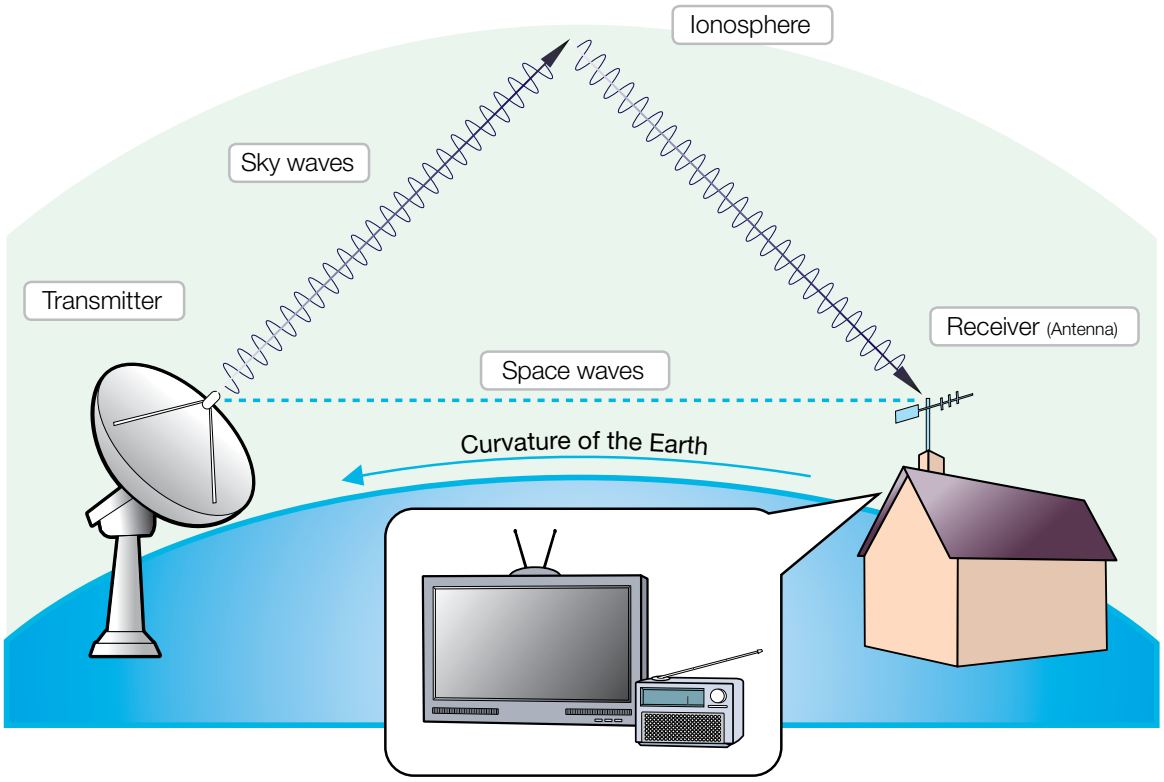
Very High Frequency (VHF) or Ultra High Frequency (UHF) used by commercial radio or TV bands



Extremely Low Frequency (ELF) used by submarines



How do radio waves work?



4 Use the words below to complete the following sentences:

a Radio waves are produced through a _____ aerial in the form of _____ _____, which travel through the atmosphere. Another _____ is used as a _____ (usually a radio or a television). The receiving aerial picks up the waves and converts them into an alternating current with the same _____ as the radio waves.

alternating currents, aerial, receiver, transmitting, frequency

b Radio waves can experience _____ caused by _____ such as mountains. Other broadcasts, tuned to a similar _____ can also interfere.

interference, frequency, obstructions

c Radio waves cannot be _____ or _____ but when they reach a _____, they are converted into _____ or _____.

receiver, heard, sound, pictures, seen

Microwaves

1 Describe the properties of microwaves using some of the prompt words listed below:

Reflected	Glass	Plastic	Atmosphere	Ionosphere
Absorbed	Frequency	Wavelength	Heat	Vibrate

2 Looking at your descriptions of their properties, why do you think microwaves might be suitable for the uses shown in these photographs?

3 Complete the table below with as many applications of microwave-based technology as you can think of. Try to include some examples of military applications.

Activity	Examples
Communication	
Travel	
Others	

Wireless technology

1 Explain what is wireless technology.

2 Think of as many examples of wireless technology in the home or at school as you can and write your answers below (if required, continue on a separate sheet of paper).

3 What do you think the advantages of wireless technology are in the following circumstances:

a To a business person who travels a lot for work?

b To phone operators?

c To soldiers in a combat situation in a foreign country?