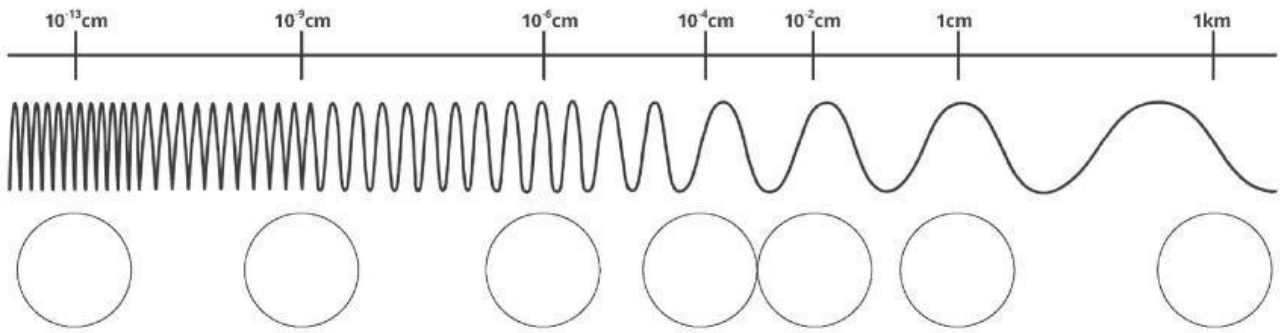


Place the elements in the correct place on the diagram.





ultraviolet	radio wave	gamma ray	infrared	microwave	x-ray	visible
Used for radio and TV broadcasting and satellite communication.	Used for sterilising medical equipment and food, and detection and treatment of some cancers	Used for short-range communications, e.g. TV remotes. Also for electrical heaters, cooking food, optical fibres and thermal imaging cameras.	Used for sterilising water and killing bacteria. Also used to detect forged bank notes.	Used for medical imaging and airport security scanners.	Used for satellite communications and cooking food.	Used for lighting, photography, and fibre optic communications.

Draw one line to match each type of electromagnetic wave to the correct description.

radio waves

Low frequency waves used for satellite communications and cooking food.

microwaves

Used for energy-efficient lamps and sun tanning. It can cause skin to age prematurely and increase the risk of skin cancer.

infrared

Electromagnetic waves with the longest wavelengths, used for television and radio communications.

visible light

The portion of the electromagnetic spectrum that our eyes can detect. It is used for fibre optic communications.

ultraviolet

Used for electrical heaters, cooking food and infrared cameras.

X-rays

Electromagnetic waves with the shortest wavelengths, used for medical imaging and treatments. They can cause the mutation of genes and cancer.

gamma rays

High frequency waves used for medical imaging and treatments. They can cause the mutation of genes and cancer.

1. Which statement about radio waves is correct?
- A They travel as longitudinal waves.
 - B They travel at the same speed as sound waves.
 - C They travel by means of molecular vibration.
 - D They can travel through a vacuum.
2. Different parts of the electromagnetic spectrum are used for different purposes. Below are four statements about parts of the spectrum.
- statement 1: Infra-red waves are used in television remote controllers.
 - statement 2: Radio waves are used to transmit television pictures from satellites to Earth.
 - statement 3: Ultra-violet waves are used for intruder alarms.
 - statement 4: X-rays are used for security checks.

Which statements are correct?

- A 1 and 2 B 1 and 4 C 2 and 3 D 3 and 4
3. Which group of electromagnetic radiations is arranged in order of increasing frequency?
- A infra-red, visible light, ultraviolet
 - B γ -rays, X-rays, infra-red
 - C ultra-violet, visible light, radio waves
 - D X-rays, radio waves, γ -rays
4. An electronic engineer makes devices which can receive television pictures from satellites.
- Which type of electromagnetic radiation must these devices be able to receive?
- A infra-red waves
 - B microwaves
 - C radio waves
 - D ultra-violet waves
5. The table gives common uses for three types of electromagnetic wave.

Which row correctly identifies the waves?

	satellite television	terrestrial television (not satellite)	television remote controllers
A	infra-red waves	microwaves	radio waves
B	microwaves	radio waves	infra-red waves
C	radio waves	infra-red waves	microwaves
D	radio waves	microwaves	infra-red waves

6 Infra-red waves, microwaves, radio waves and sound waves are all used for communications.

Which waves travel at the same high speed in a vacuum?

- A infra-red waves, microwaves and radio waves
- B infra-red waves, microwaves and sound waves
- C infra-red waves, radio waves and sound waves
- D microwaves, radio waves and sound waves

7 Which type of electromagnetic wave is used in airport security scanners?

- A infra-red
- B microwaves
- C radio waves
- D X-ray

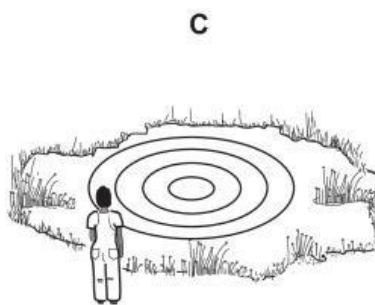
8 Which waves are longitudinal?



light waves
from a lamp



microwaves
in an oven



water waves
on a pond



sound waves
from a trumpet

9 An intruder alarm sensor detects that a human is warmer than his surroundings.

Which type of electromagnetic wave does the sensor detect?

- A infra-red
- B radio
- C ultraviolet
- D visible light

10 Which statement about ultraviolet waves is correct?

- A They are used in television remote controllers.
- B They can be detected by the human eye.
- C They travel as longitudinal waves.
- D They have the same speed in a vacuum as radio waves.