

Teaching notes

There are two starters in this resource.

1) Where on the spectrum?

This is a starter, plenary or revision activity to give students an understanding of the position of different parts of the electromagnetic spectrum.

As a quick starter they could simply write out the numbers in what they think is the correct order. At the end there are three questions for the quick finishers.

As a plenary or revision task students could be presented with the boxes already filled in. Their task would be to decide if the order is correct, and, if it is not, to alter it accordingly.

There is an interactive version where students can move the EM waves to their correct position on the electromagnetic spectrum.

2) Waves equation – Mix and Match

This follows on from the last question in the previous activity. Students practice writing and rearranging a simple equation.

The aim of this starter activity is to familiarise students with the units used in this equation and to encourage them to alter the subject of the equation by manipulating the different parts.

There is an interactive version with tiles that can be rearranged and grouped to show the different equations.

e.g.

wave speed	=	frequency	X	wavelength
v		f		λ
metres/second		hertz		metres
m/s		Hz		m

frequency	=	wave speed	÷	wavelength
wavelength	=	wave speed	÷	frequency

Task – Where on the spectrum?

- a. Where on the electromagnetic spectrum would you find these different areas? Write the correct number in each box.

- | | |
|---------------------|-------------------|
| 1. long wave radio | 6. infra-red |
| 2. ultra-violet | 7. television UHF |
| 3. microwaves | 8. visible light |
| 4. short wave radio | 9. x-ray |
| 5. gamma rays | |

short wave
high frequency

long wave
low frequency

- b. In the box above draw the wave you would expect as it's frequency and wavelength change.

- c. Which number represents the radiation emitted by an LED?

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- d. All electromagnetic waves travel at the same speed, 3×10^8 m/s; the speed of light. How many million metres a second is this?

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- e. Rearrange these terms into an equation which can be used to calculate wave speed.

frequency wave speed wavelength

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Answers

a.

5	9	2	8	6	3	7	4	1
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short wave
high frequency

long wave
low frequency

- b. Which number represents the radiation emitted by an LED?
Number 8 is visible light
- c. All electromagnetic waves travel at the same speed,
 3×10^8 m/s; the speed of light. How many million metres a second is this?
300 million metres a second
- d. Rearrange these terms into an equation which can be used to calculate wave speed.
wave speed = frequency X wavelength

Wave equations

Task

Cut out the tiles and rearrange to show the following. Write down your answers.

1. All of the symbols.
2. All of the units.
3. Match the symbols with the correct units.
4. The equation for wave speed.
5. The equation for frequency.
6. The equation for wavelength.
7. An equation triangle using as many tiles as possible.

units	symbol
÷	÷
X	X
=	=
wave speed	hertz
λ	m
Hz	f
v	m/s
metres/second	frequency
wavelength	metres