

The Electromagnetic Spectrum

What is the electromagnetic spectrum?

Light we can see – in every colour of the rainbow – is a type of energy that travels in waves called ‘electromagnetic waves’. But most electromagnetic waves are invisible to us humans. There are different forms of light all around us – and together they make up the ‘electromagnetic spectrum’.

THE LONG AND SHORT OF IT

Electromagnetic waves travel at the same speed, but they behave in different ways – like you and your classmates. How they behave depends on their wavelength. This can be as big as a building or as small as an atom – and the shorter the wavelength, the higher the energy of the waves. Their different qualities make them useful for a huge variety of things . . .

- Types of electromagnetic waves**
- INFRARED
 - X-RAYS
 - RADIO WAVES
 - ULTRAVIOLET
 - MICROWAVES
 - VISIBLE LIGHT
 - GAMMA RAYS

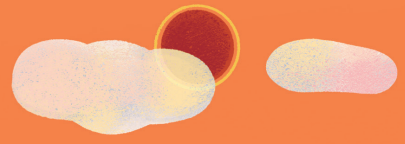
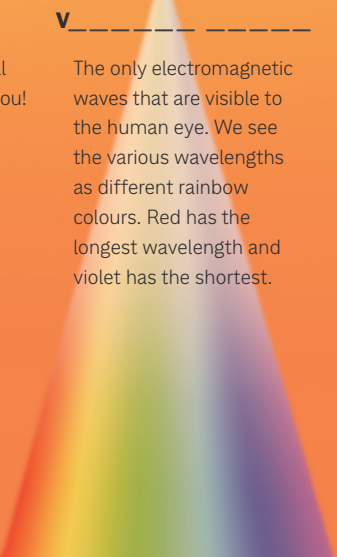
Unlike sound waves, all electromagnetic waves can travel through empty space - which is why light from the Sun can reach us on Earth. If the sound could get here too, it would be deafeningly loud!



Here's your own electromagnetic spectrum. Fill in the correct names from the list in the red circle.



R _____	M _____	I _____	V _____	U _____	X _____	G _____
They can carry information over long distances – so are used to send radio and TV signals. They can also guide radio-controlled toy vehicles.	They can make water in food jiggle around, which heats and cooks it. And they make corn kernels pop. They're also used for satellite TV, mobile phone signals, WiFi and GPS.	They are released by all warm objects – even you! We feel them as heat and they're used for cooking food in ovens, grills and toasters. They can also send signals to a TV from a remote control.	The only electromagnetic waves that are visible to the human eye. We see the various wavelengths as different rainbow colours. Red has the longest wavelength and violet has the shortest.	These are emitted by the Sun. They help our bodies make vitamin D, but too much can cause sunburn. They can be absorbed by fluorescent inks in highlighter pens, which then re-emit them as visible light, making them glow. They can also be used as a medical disinfectant.	These waves can pass through flesh, but are blocked by bones – so can be used to spot broken bones. They can also peer into luggage in airport security scanners and kill bacteria on medical equipment before it's used in an operation.	In science fiction, they give characters superpowers, but in the real world, gamma rays have superpowers of their own: they can help detect and treat cancer, kill bacteria in fresh fruit and vegetables to make them last longer, and also disinfect medical equipment.



FORCES of the DAY

Samantha Lewis & Hao Hao

A) Use the first letters of each word of the silly sentences to spell out the different forces.

For example: **Keeps you in bed** (p8 *Forces of the Day*)
Grumpy rabbits are very interesting to yaks.

G r a v i t y

1. Slows you down on the slide (p26 *Forces of the Day*)

Fluffy robots invent cheesy tangy incredibly orange noodles.

2. Helps you close the door (p15 *Forces of the Day*)

Tiny octopuses race quickly using energy.

3. Makes bubbles round (p36 *Forces of the Day*)

Super underwater racoons find amazing cakes everywhere. Then eat nutty snacks in owl nests.

B) Work out what each scientist is linked to, using the code A = 1, B = 2, C = 3, D = 4, E = 5, F = 6, G = 7, H = 8, I = 9, J = 10, K = 11, L = 12, M = 13, N = 14, O = 15, P = 16, Q = 17, R = 18, S = 19, T = 20, U = 21, V = 22, W = 23, X = 24, Y = 25, Z = 26

For example:

SIR ISAAC NEWTON

7 18 | 22 9 20 25

G R A V I T Y

1. WILLIAM HERSCHEL

(p11 *Forces of the Day*)

9 14 6 18 | 18 5 4 |

12 9 7 8 20

3. PERCY SPENCER

(p12 *Forces of the Day*)

13 9 3 18 15 23 | 22 5 |

15 22 5 14

2. GLADYS WEST

(p21 *Forces of the Day*)

7 16 19

4. WILHELM RÖNTGEN

(p29 *Forces of the Day*)

24 18 | 25 19



Light is the fastest thing in the Universe!



I'm reading a book on anti-gravity.

I can't put it down!

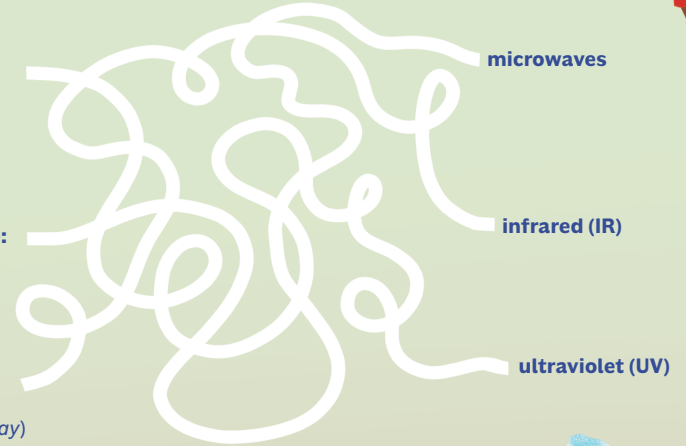


C) Discover electromagnetic waves in every part of your day! Follow the maze to connect the items to the related part of the spectrum.

Getting ready:
sunscreen
 (p15 *Forces of the Day*)

Journey time:
GPS
 (p20 *Forces of the Day*)

Chill time:
remote control
 (p30 *Forces of the Day*)



D) Get creative! Imagine you could press a switch that could turn off the force of gravity on Earth. What would it look like? Draw it in the space below.

E) If you pressed the button, what might happen?

Answers

- C) sunscreen = ultraviolet (UV)
 GPS = microwaves
 remote control = infrared (IR)
 B) 1. INFRARED LIGHT
 2. GPS
 (Global Positioning System)
 3. Surface tension
 2. Torque
 4. X-RAYS
 3. MICROWAVE OVEN



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