

Waves and Light (Chapter 4 notes)

Name _____

Date _____

Block _____

Features of a wave

- Waves do not transfer matter, they transfer _____. For example, a duck on water will move _____ and _____, but not _____ as the waves go by.
- Energy is the ability to apply a _____ over a _____.
- Force is a '_____ or _____'.
- Parts of a wave...

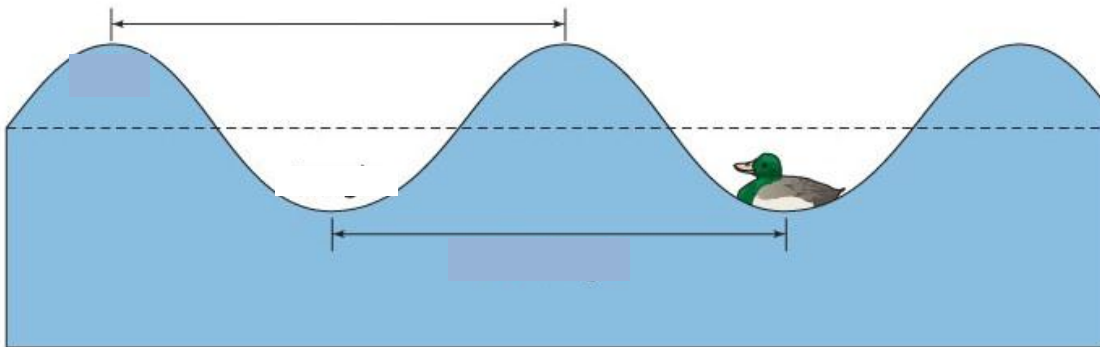


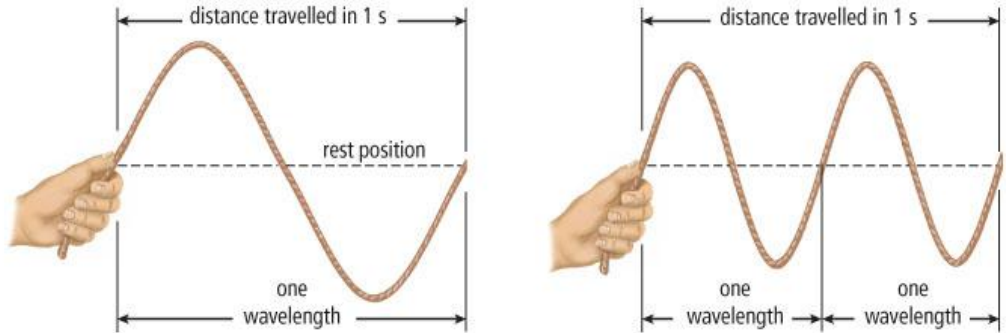
Figure 4.3 A wavelength is the distance over which the wave repeats.

- The '_____ ' is otherwise known as the '_____ ' in sound waves – the distance from rest position to the _____ or _____.
- Higher amplitude = higher _____.
- The '_____ ' is otherwise known as the number of _____ that pass in _____.
Eg. If 10 ducks pass in 5 seconds, the frequency is _____ hertz
Frequency = # of _____ / _____.
- Higher frequency = higher _____.

Wavelength

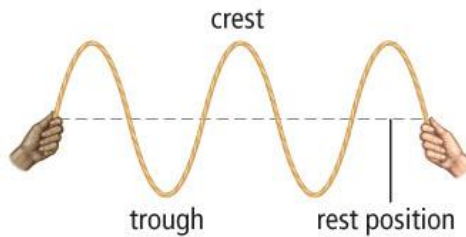
- The distance from _____ to _____ or Trough to trough
- Higher frequency = _____.

Figure 4.5 The wavelength of a wave decreases as the frequency increases. All waves share this property.



Two types of waves...

- _____ = matter moves up and down eg. light, x-rays



- _____ = matter is squeezed and then stretched out eg. Sound

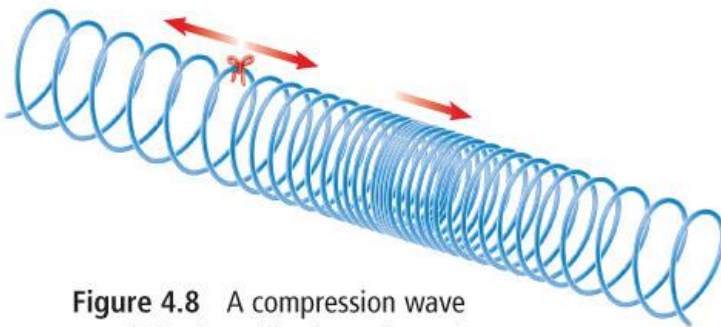


Figure 4.8 A compression wave

The Electromagnetic Spectrum

- We are surrounded by waves – most of which we can't see, but sometimes we can sense the effects.

Eg. Radio waves
Ultraviolet waves
X-rays

_____ – comes from the _____, and spreads out in all directions.

- Electromagnetic Radiation

- All the invisible forms of radiant energy can be placed on the 'Electromagnetic Spectrum'.

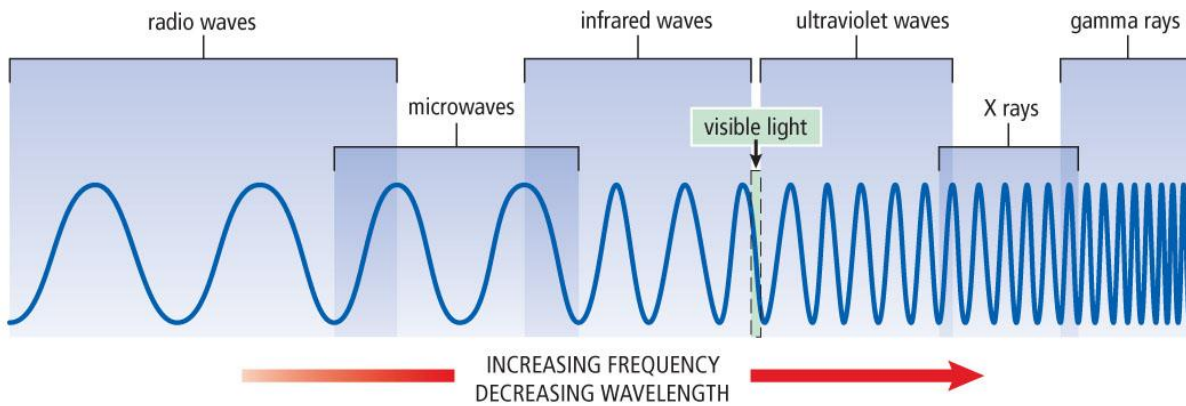


Figure 4.20 Electromagnetic waves are described by different names depending on their frequency and wavelength.

- Longer Wavelengths = _____

- We use these types of waves in our daily lives – they have a _____, and _____.

eg. *radio waves* (3 m to 300 m)

television (30 m)

Microwaves (0.3 cm to 30 cm)

– Highest energy radio waves

- cause water molecules to vibrate, causing heat

- _____ - are also used for

_____ – satellites, cell phones.

Radar – shorter wavelength microwaves

-
- otherwise known as ‘ _____ ’
 - Just below ‘visible light’ – lower _____, less _____.
 - Used in remote controls, CD/DVD readers, search and rescue heat seekers

All the previous forms of energy are relatively harmless because they have longer wavelengths, and less energy than visible light.

Visible Light

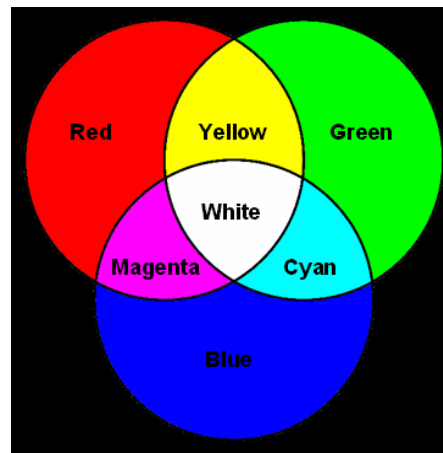
- If you combine all the colours of light together, you get ‘ _____ ’ light
- You can split up white light into all the _____ it’s made up of using a ‘ _____ or a ‘ _____ ’. Even the grooves on a CD are so close, that they will split the light hitting them.
- The colours of the visible spectrum are...

- _____
- _____
- _____
- _____
- _____
- _____
- _____

As you go from red to violet, the wavelength _____, and energy/frequency _____.

- We see colours because white light is hitting an object and all colours are absorbed except for the one that is being _____.
eg. The background of this slide is blue because white light is hitting the screen, and everything except blue is _____. The blue bounces off and travels to your eyes.

- Only three colours are needed to form all the other colours – _____
_____ (primary colours).



Wavelengths shorter than visible light...

- These waves have higher _____, and much more _____ than visible light
- Harmful to _____ – eg. Ultraviolet waves (just above ‘violet’ on the spectrum) damage our skin cells, and cause them to produce ‘_____’ in response = Tanning, or in extreme cases, ‘_____’.

X-Rays

- Shorter _____, and higher _____ than ultra violet.
- Used to look at _____ and _____ in the body – X-rays will pass through soft tissue, but will be blocked and absorbed by bone.
- Over exposure causes _____ – people who work with X-rays a lot use protection.

Gamma Rays

- Very damaging, highest frequency/energy, shortest wavelength
- Produced in _____.
- Used in cancer therapy – target _____.