

Waves Knowledge Questions for AQA GCSE Physics and Combined Science

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Transverse and longitudinal waves

State the two types of waves. One starts with L and the other T.

What type of waves are ripples on water?

Sketch a longitudinal wave showing areas of compression and rarefaction.

What type of waves are sound waves travelling through air?

What is the difference between a longitudinal wave and a transverse wave?

Can you write down the definition of a wave?

Does the matter the wave travels through travel with the wave? Does it become windy near your ear when you listen to a sound wave?

Properties of waves

Sketch a transverse wave and label the amplitude, crest and trough. Also, label the wavelength of the wave in two places.

Draw a line to represent the undisturbed position of the wave and label it clearly.

Copy these three important definitions.

The amplitude of a wave is the maximum displacement of a point on a wave away from its undisturbed position.

The wavelength of a wave is the distance from a point on one wave to the equivalent point on the adjacent wave.

The frequency of a wave is the number of waves passing a point each second.

What is meant by the period of a wave?

Write down an equation in terms of the period that can be used to work out the frequency of a wave.

What are units of frequency?

What are the units of the period of a wave - tick-tock?

Copy the following definition of a wave. The wave speed is the speed at which the energy is transferred (or the wave moves) through the medium.

Consider this equation:

wave speed = frequency × wavelength

$$[v = f \lambda]$$

Can you rearrange it so that speed, frequency and wavelength are all the subject of the equation? E.g. frequency =, wavelength =

Describe a method to measure the speed of sound waves in air.

Describe a method to measure the speed of ripples on a water surface.

What happens to the speed of sound waves when they enter a denser medium? E.g from air into water.

What happens to the frequency of sound waves when they enter a denser medium?

What happens to the wavelength of sound waves when they enter a denser medium?

Reflection of waves (physics only)

What three things can happen when a wave crosses a boundary between two different materials. Beginning with R, T and A.

Draw a ray diagram of a ray reflecting off a mirror. Label the normal clearly and label the angle of incidence and angle of reflection.

Sound waves (physics only) (HT only)

What happens when a sound wave travels into a solid?

Copy and fill in the blanks of the following paragraph. Within the ear, sound waves cause the _____ and other parts to vibrate which causes the _____ of sound. The conversion of sound waves to _____

of solids works over a limited _____ range. This restricts the limits of human _____.

What is the range of normal human hearing in Hertz?

Waves for detection and exploration (physics only) (HT only)

How can ultrasound be used to work out the distance to the sea bed?

How does the frequency of ultrasound waves compare to the upper limit of human hearing?

What happens to ultrasonic waves when it meets the boundary between two mediums e.g flesh and bone?

How can ultrasound be used to form the image of a baby?

What are Seismic waves produced by?

Are P waves longitudinal or transverse?

Are S waves longitudinal or transverse?

Can S waves travel through a liquid?

Write a sentence to discuss the speed of S waves and P waves in solids and liquids.

How can S and P waves be used to determine the structure and size of the Earth's core?

What is echo sounding and what can it be used for?

Types of electromagnetic waves

What type of waves are electromagnetic waves?

Write out the electromagnetic spectrum starting with the lowest frequency

Which part of the electromagnetic spectrum has the highest energy?

Which part of the electromagnetic spectrum has the longest wavelength?

What is meant by a continuous spectrum?

At what velocity do all parts of the electromagnetic travel?

What area of the electromagnetic spectrum do our eyes detect?

Do our eyes detect a wide range or limited range of the electromagnetic spectrum?

Give a few examples that illustrate the transfer of energy by electromagnetic waves.

Properties of Electromagnetic waves 1

When electromagnetic waves pass through a substance what four things can happen to them?

When light passes through glass it can refract. What happens to the speed, frequency and wavelength of the wave.

Draw a diagram of a ray of light being refracted passing from air into glass.

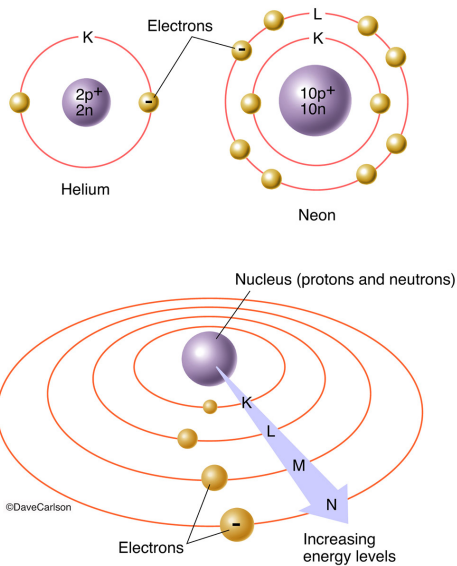
Why does the light slow down and which way does it bend?

What is a wavefront?

Draw a refraction diagram showing what happens to the wavefronts.

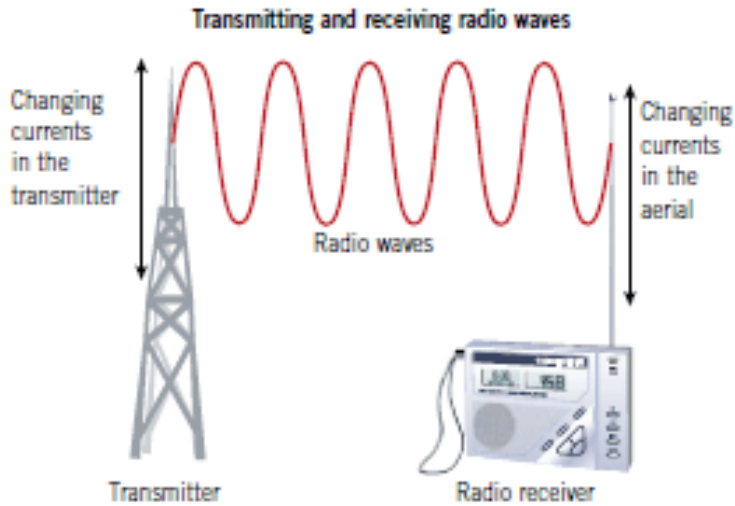
Properties of Electromagnetic Waves 2

In terms of the movement of electrons between energy levels of an atom explain how electromagnetic waves such as ultraviolet, visible and X rays are made?



How are gamma rays produced?

How are radio waves made, how are they transmitted and how are they received?



Which three types of electromagnetic waves have hazardous effects on human body tissue?

Which type of Electromagnetic radiation can cause the skin to age prematurely and can increase the risk of skin cancer?

Which two types of electromagnetic radiation can cause ionisation and can cause the mutation of genes and cause cancer?

What is meant by the term ionisation?

What is meant by radiation dose?

What is the unit of radiation dose?

How many Sieverts is 1000 millisieverts (mSv)?

Uses and examples of Electromagnetic Waves

Copy and complete the following practical applications

Radio waves are used for television and _____.

Microwaves are used for cooking food. What else are microwaves used for?

State three things infrared radiation is used for.

Give an example in the home and hospital use for visible light.

State two uses of ultraviolet

Give some uses for X-Rays and gamma radiation.

Lenses (physics only)

How does a lens form an image?

For a convex lens where are parallel rays of light brought to a focus? Can you draw a diagram to show this?

What is the distance from the lens to the principal focus called?

Complete the following - The image produced by a convex lens can be either _____ or _____. The image produced by a concave lens is always _____.

Draw the symbols used to represent convex and concave lenses.

State the equation to calculate the magnification of an object.

What are the possible units for image height and object height?

Why does magnification have no units?

Watch the two videos below and make sure that you can construct all the ray diagrams. Thank you for the brilliant free science lessons YouTube Channel.

<https://www.youtube.com/watch?v=KNUcS4NaqDw>

<https://www.youtube.com/watch?v=xmE54tohTsc>

Visible Light (Physics Only)

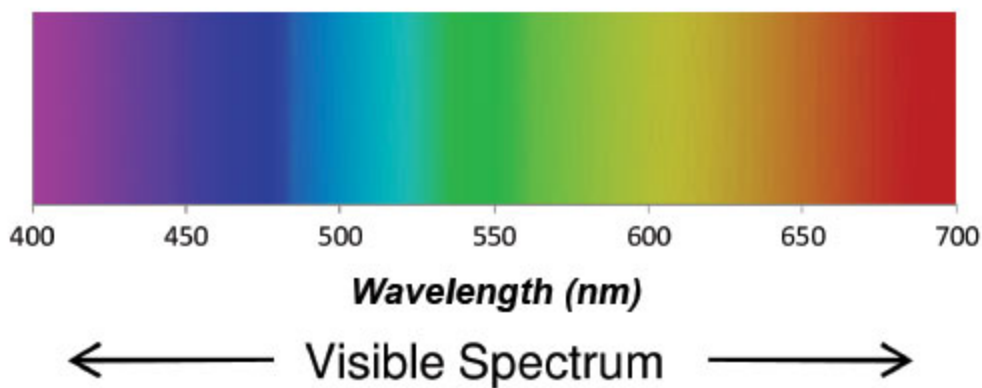
For some of these questions, it is useful to be able to answer them using ROYGBIV diagrams.

Write down the colours that make up the visible spectrum.

What is meant by the phrase '*Each colour within the visible light spectrum has its own narrow band of wavelength and frequency?*

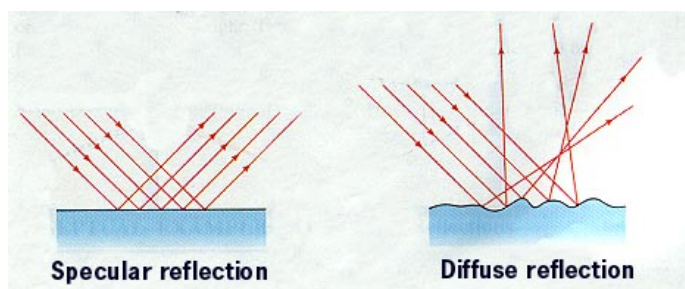
Which colour has the longest wavelength?

Which colour has the highest frequency? Can you explain why using the wave equation?

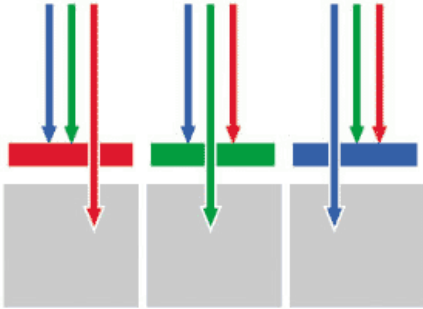


What is reflection from a smooth surface in a single direction called? What can you say about the angle of incidence and angle of reflection?

What is reflection from a rough surface called? What happens to the light in this case? What can you say about the angle of incidence and angle of reflection in this case?



How do coloured filters work? Use the words absorbing and transmitting in your answers.



What does the word opaque mean?

Why do blue objects look blue in white light? Use a diagram to help explain your answer.

Why do some objects look white in white light?

Why do some objects look black in white light?

What do you understand by the terms transparent and translucent?

Give an example of a translucent and transparent object. What would sea water be?

What does a red object look like through a red filter in white light? Explain your answer.

What does a red object look like through a blue filter in white light?

What do you see if you place a blue filter on top of a yellow filter in white light?

Black body radiation (Physics only)

What do all bodies do no matter what temperature they are at?

Copy and Complete: The hotter the _____, the more infrared radiation it radiates in a given _____.

What does a perfect black body do?

What does a black body not do?

Copy and complete the following: Since a good absorber is also a good _____, a perfect black body would be the best possible _____.

All bodies (objects) emit _____.

Sketch a graph of wavelength distribution against intensity for a black body.

Copy and complete the following paragraph: A body at _____ is absorbing radiation at the _____ as it is emitting radiation. The temperature of a body _____ when the body absorbs radiation _____ than it emits radiation.

Copy and complete the following paragraph: The temperature of the Earth depends on many factors including: the rates of _____ and _____ of radiation, _____ of radiation into space.

State the factors that affect the temperature of the Earth's surface and atmosphere.