

Noadswood Science



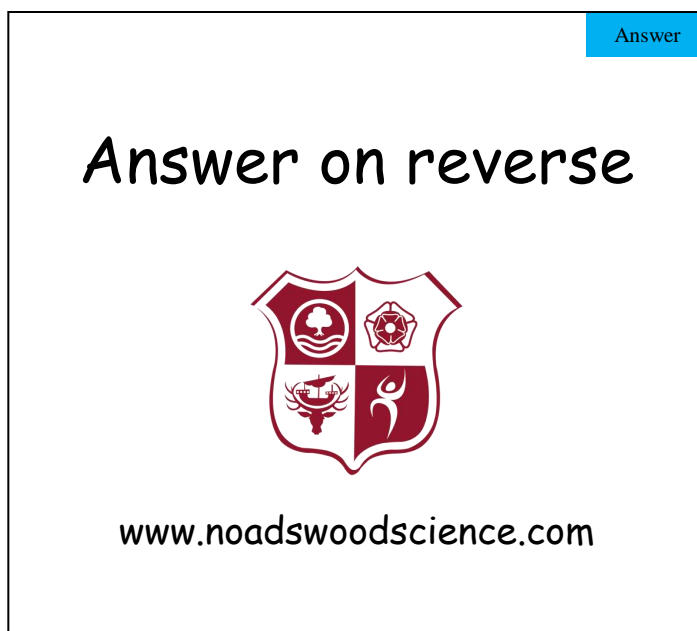
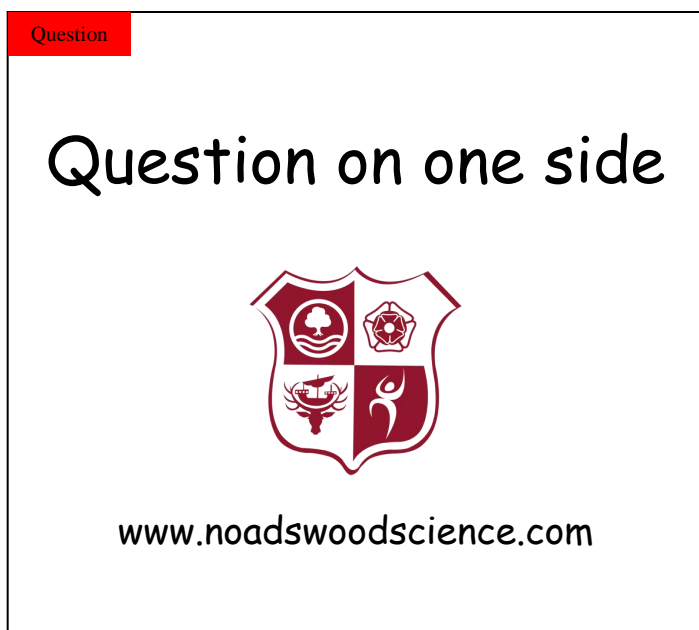
Revision Cards

Science A (Core) - Physics Basics

How to use the revision cards

It is suggested you cut the pack of cards out, so that there is a question on one side and the answer on the reverse...

Jumble the cards up and try to learn through them all (when you're 100% confident you know one of the cards you can tick it)



Question

How is heat energy (infrared radiation) given out by objects?

Question

What colours absorb and emit more heat than others?

Question

What are the 3 states of matter and how are the particles arranged?

Question

What is conduction and where does it occur best in?

Question

What is convection and where does it occur best in?

Question

What is the difference between evaporation and condensation?

Answer

Dark, matt colours are good absorbers and emitters

Light, shiny colours are bad absorbers and emitters

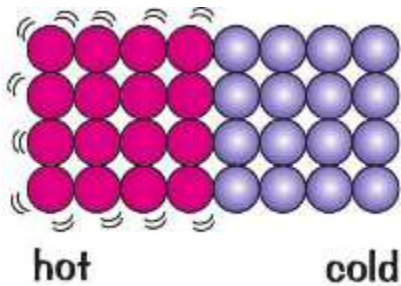
Answer

All objects emit and absorb heat (hot objects emit more than they absorb and cold objects absorb more than they emit)



Answer

Conduction is the transfer of energy by particles vibrating (mainly in solids and especially in metals)



Answer

Solids: particles close together and fixed

Liquids: particles quite close but can move around

Gases: particles spread apart and move freely around

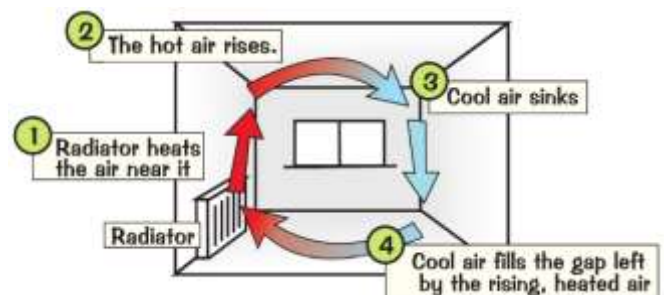
Answer

Evaporation is when a liquid changes into a gas

Condensation is when a gas changes into a liquid

Answer

Convection is the transfer of energy by particles moving around (in gases and liquids)



Question

What can affect the rate of heat transfer?

Question

How can heat transfer be reduced?

Question

How is heat loss reduced in the home?

Question

What is a U-value?

Question

How can insulation save you money?

Question

What is specific heat capacity?

Answer

Conduction,
convection and
radiation can all be
reduced

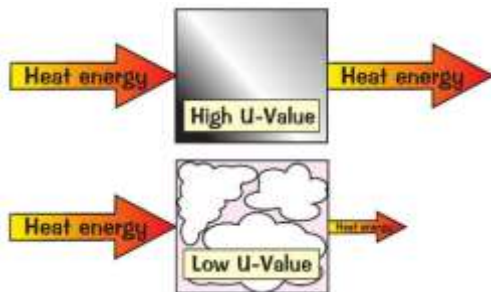
Answer

Heat transfer is affected
by: surface area; material
type (conductor / insulator);
the temperature difference
(a big temperature
difference means a faster
energy transfer)

Answer

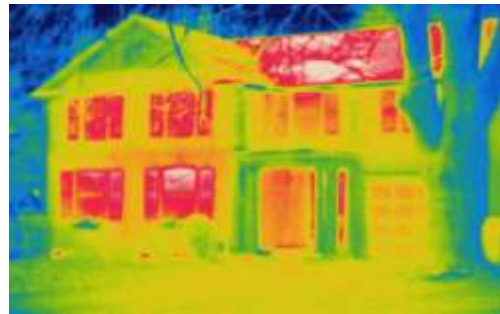
A U-value is a measure of how well
heat can pass through a material

High U-value = lots of heat loss



Answer

Insulation (cavity wall; loft;
double glazing etc...)



Answer

How much energy
something can store
(the amount of energy
needed to raise 1kg of
material by 1°C)

Answer

Payback time = initial cost
÷ annual saving

Payback time is the time it
takes to save the amount of
money spent on the
insulation

Question

How can you calculate how much energy is stored in a material?

Question

What are the 9 types of energy?

Question

What is the rule with energy?

Question

What is efficiency?

Question

What is a sankey diagram and what does it show?

Question

How can you work out how much electrical energy is transferred by an appliance

Answer

Electrical
Light
Sound
Kinetic (movement)
Thermal (heat)
Nuclear
Gravitational potential
Elastic
Chemical

Answer

$$E = m \times c \times \Theta$$

Energy (J) = Mass (kg) x
specific heat capacity
(J/kg°C) x temperature
change (°C)

Answer

All machines waste energy
(usually as heat)

Efficiency is how much energy is
transferred usefully

Efficiency = useful energy out ÷
total energy in

Answer

Energy cannot be created
or destroyed, only
transferred

Electrical > light + sound

Chemical > kinetic > gravitational

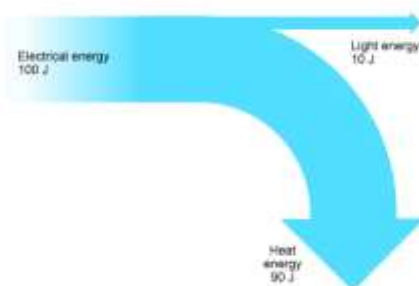
Answer

$$E = P \times t$$

Energy transferred =
power of the
appliance x time it is
used for

Answer

A sankey diagram shows how much energy
of the input is changed into different types
of energy - the wider the arrow the more
energy it shows



Question

What is electricity measured in?

Question

How is the cost of electricity calculated?

Question

How is electricity transferred across the UK?

Question

What is a non-renewable energy resource?

Question

How are energy sources used to generate electricity?

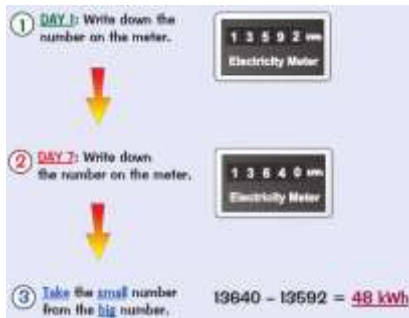
Question

How does the start-up time for power stations vary?

Answer

Cost = energy transferred (kWh) x price per kWh

This is often shown on an electricity meter



Answer

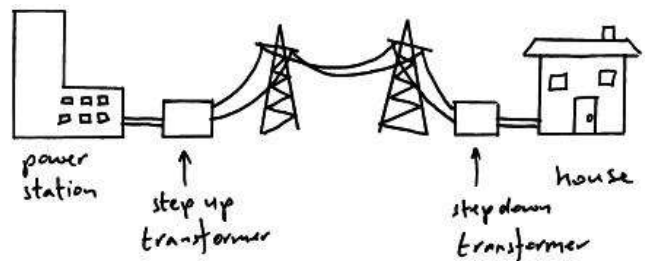
Kilowatt-hours (kWh)

Answer

An energy resource that will run out one day (e.g. coal, oil, gas and nuclear fuel)

Answer

The National Grid



Answer

Gas - quickest

Oil

Coal

Nuclear - longest

Answer

Fuel is burnt / reacted releasing heat which turns water to steam turning turbines and generators which generate the electricity

Question

What is a renewable energy resource?

Question

What are the benefits and disadvantages of non-renewables?

Question

What are the benefits and disadvantages of renewables?

Question

What are the good and bad points for biofuels?

Question

What is carbon capture and storage?

Question

What are the basic properties of a wave?

Answer

Fossil fuels are quick and reliable and relatively cheap however they release CO_2 as well as oil spills / mining is ugly and dangerous

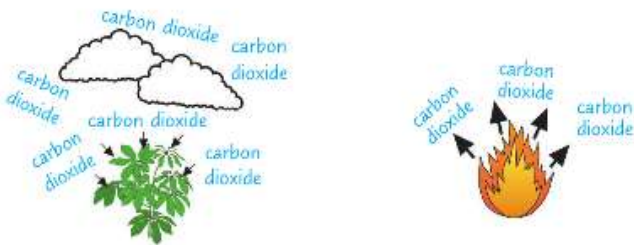
Nuclear is very reliable but the waste is very dangerous

Answer

An energy resource which will never run out (wind, wave, tide, hydroelectric, solar, biofuel etc...)

Answer

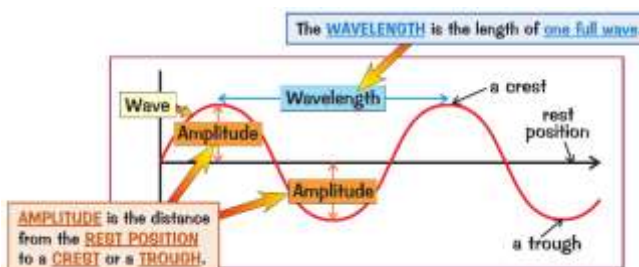
Biofuels are carbon neutral however trees still need to be deforested



Answer

Renewables will never run out and are generally clean and good for the environment, however they are not reliable (no wind then no turbine / no sun then no solar panel)

Answer



Answer

Amplitude = energy of wave
Wavelength = length of one full wave
Frequency = number of waves per second (Hz)

Carbon dioxide can be 'caught' and put into holes in the North Sea where oil and gas used to be (reducing global warming risks)

Question

What is the difference between a transverse and longitudinal wave?

Question

How can wave speed be calculated?

Question

What are the laws of reflection?

Question

How does a mirror work?

Question

What is diffraction?

Question

What is refraction?

Answer

Wave speed =
frequency x
wavelength

$$V = f \times \lambda$$

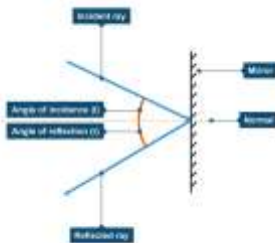
Answer

A transverse wave has
vibrations up and down the wave
direction

A longitudinal wave has
vibrations along the direction of
the wave (with compressions and
rarefactions)

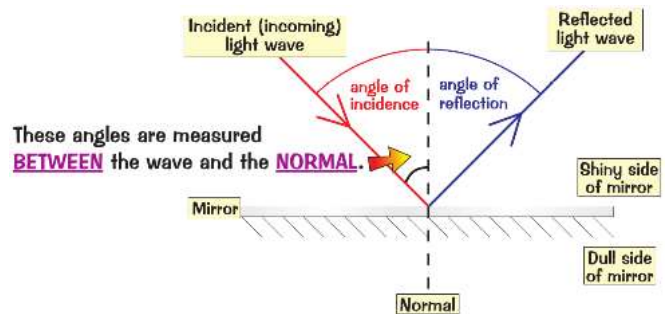
Answer

A virtual image is shown in
a mirror



Answer

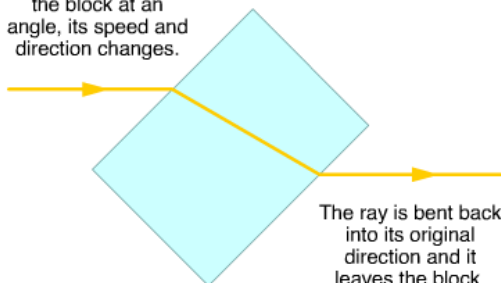
Angle of incidence = angle of reflection



Answer

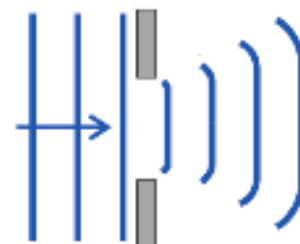
Waves changing direction
(due to different mediums)

If the light ray hits
the block at an
angle, its speed and
direction changes.



Answer

The spreading out of
a wave



Question

What is the electromagnetic spectrum made of?

Question

What are the different electromagnetic waves used for?

Question

How do we hear?

Question

What is the pitch of a sound wave?

Question

What is the Doppler effect and red-shift?

Question

How did the universe begin?

Answer

Gamma - cleaning medical equipment
X-rays - medical imaging
Ultraviolet - bank notes authenticity
Visible light - optical fibres
Infrared - remote controls
Microwaves - food cooking / phones
Radio waves - television and radio

*Some waves such as gamma, x-rays and ultraviolet are bad for health

Answer

Gamma rays (high frequency)
X-rays
Ultraviolet
Visible light
Infrared
Microwaves
Radio waves (low frequency)

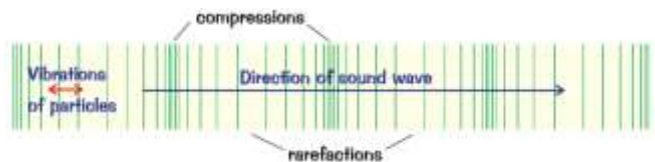
*High frequency = short wavelength

Answer

Higher frequency =
higher pitch (a
squeaking mouse
versus a mooing cow)

Answer

Sound waves travel
and vibrate



Answer

Big bang - the
universe is still
expanding



Answer

Wavelength and frequency
change if the wave source
moves

Galaxies are moving away
from us and their light is
red-shifted