Year 10 Science Revision Plan

Biology Topics

SB1 Key Concepts in Biology

SB2 Cells and Control

SB3 Genetics

SB4 Natural Selection and Genetic Modification

SB5 Health, Disease and Development of Medicine
NOTE: Topics A → F and I, J, K only

Chemistry Topics

SC1 States of Matter
2 Purifying substances

SC3 Atomic Structure

SC4 The Periodic Table

SC5 Ionic Bonding
6 Covalent Bonding
7 Types of Substance

SC8 Acids and Alkali

SC9 Calculations involving Masses

Physics Topics

SP1 Motion

SP2 Motion and Forces

SP3 Conservation of Energy

SP4 Waves

SP5 Light and the Electromagnetic Spectrum

SP14 Particle Model
15 Forces and Matter.

★ Study Plan 1 hour per Science each week ★

Week 1 13-19 May:

Week 2 20-26 May:

Week 3 27-2 June:

Week 4 3-9 June:

Week 5 10-16 June:

★ EXAMS ★ 17-21 June:

Draw an animal cell.

Draw a plant cell.

Describe the parts of the cell

Part of Cell	Function

Draw a bacterial cell and label the parts of the cell. Pg 11

Is the cell prokaryotic cell or eukaryotic cell? And why?

_____

What is an enzyme? Pg 13

_____

_____

_____

What enzyme is being used here?

Starch → _____ → Maltose

Active site theory describes enzyme action. Describe the lock and key model using a diagram (pg 19)

What does the word denatured mean? Pg 19

_____

Identify the food from the list below using the following food tests: pg 14

Egg Potato Lucozade Butter

Iodine turns blue/black? _____

Blue tissue paper remains transparent? _____

Benedicts solution turns brick red? _____

Biuret's solution turns purple? _____

Draw the Diagram of the breakdown of food molecules. Pg 12

Substances can be transported by different methods. Define each below pg 24

Diffusion_____

_____

_____

Osmosis_____

_____

_____

Active Transport

_____

_____

_____

What is a concentration gradient?

_____

_____

Why does active transport require energy?

_____

_____

_____

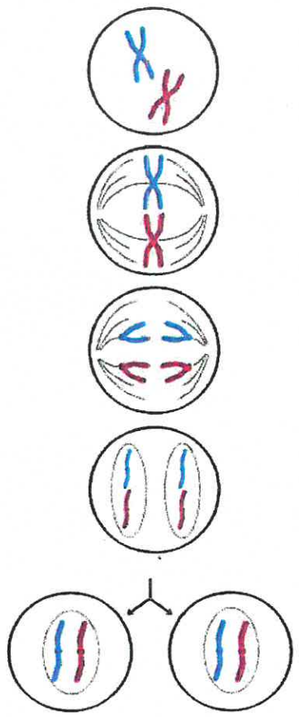
_____

Enzymes are affected by their environment. Draw a graph that shows the effect of pH and the effect of temperature? Pg20/21

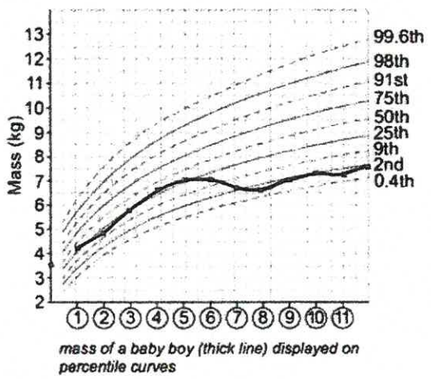
Effect of pH graph

Effect of Temperature

Identify the stages of Mitosis and what happens in each stage pg 30



Define growth pg 32:



mass of a baby boy (thick line) displayed on percentile curves

The mass of a boy was measured every month after birth for his first year, and recorded on percentile curves, as shown in the graph.

a The boy's mass lay on the 25th percentile when he was 3 months old. What does this mean compared with the mass of other 3-month-old baby boys? Explain your answer.

Draw a root hair cell and identify the 3 zones of growth pg 34

What is meristem tissue?

Name 2 types of stem cells pg 36:

Stem cells could dramatically improve outcomes for patients with organ failure or cancer. Discuss the difference between adult stem cells and embryonic stem cells in relation to improvements in health care and why they are not fully utilized.

Name the region of the brain and it's function pg 38:

Region	Function

Why do nerves have a blood supply? _____

Differentiate between PET and CT scans:

PET scan _____

CT scan _____

What does quadriplegia mean?

Name 3 neurones: _____ _____ _____

Fill in the blanks pg42/43:

Muscles stimulus sensory motor environment response CNS synapse receptor cells effector cells impulse dendrite transmits dendron axon chemical

Sense organs take in changes to our _____, this is called a _____. Each sense organ has _____ _____ which detect these stimuli and create an _____ that travels to the _____. This impulse is called a _____ and travels along a _____ neurone.

The _____ of a sensory neurone takes information from receptor cells and _____ the electrical signal along the _____, past the cell body and along the _____. At the axon terminal, there is a gap before the next neurone, called a _____. Here the signal must change from electrical to _____ to pass through.

The signal continues to the brain where a new signal may be generated to cause a _____. The response is sent along a _____ neurone to the _____ _____ which cause our _____ to move.

Draw a sensory neurone pg 43:

What is a reflex arc? How is it different to a normal response pg 46/47?

Differentiate between long and short sightedness pg 44/45

What are cataracts? _____

What are the receptor cells in the eye and give their functions:

Pg 50 Sexual and Asexual Reproduction

Reproduction is the process of generating new _____.
This can occur through _____ reproduction, which is the fertilisation of a female egg call by a _____ _____, or _____ reproduction, where one cell _____ into two cells.
Asexually produced offspring are genetically _____.

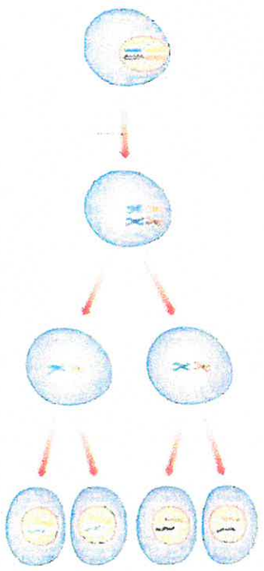
Define Variation.

List an advantage and disadvantage of sexual and asexual reproduction.

	Advantage	Disadvantage
Sexual		
Asexual		

Define Meiosis

Describe the stages of Meiosis: pg 53

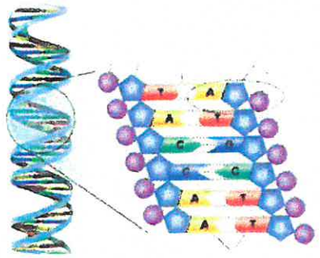


Define each of the following:

Zygote	
Fertilisation	
Genome	
Chromosome	
Gene	
Diploid	
Haploid	
Daughter Cell	

DNA stands for: _____

Label the Diagram pg 54:



Each complimentary base pair is attached to a _____ sugar and _____ group which makes up a _____.
There are two hydrogen bonds between _____ and _____ and three hydrogen bonds between _____ and _____.

DNA extraction requires salt and washing up liquid to _____ and protease enzyme to breakdown _____. Pg 56

Protein Synthesis occurs in the _____.
Name and define the 2 processes involved in Protein Synthesis.

_____
_____

What is the function of RNA polymerase?
What is the function of mRNA and tRNA?

Define each of the following:

Allele	
Mutation	
Homozygous	
Heterozygous	
Dominant	
Recessive	
Genotype	
Phenotype	

In dogs, black fur is a recessive trait and white fur is the dominant trait. Brown fur shows co-dominance. What are the outcomes for offspring from a black dog with a brown dog?

% Genotypes: _____ % Phenotypes: _____

What is a genetic mutation? Pg 70

_____
_____

Describe the Human Genome project.

_____
_____

Differentiate between genetic variation and environmental variation pg 72

_____
_____
_____

Differences between continuous and discontinuous variation:

Continuous	Discontinuous

Evolution pg 76 - 81

Define Evolution

_____

Fill in the table on the evolution of humans

Fossil Type	Skull Volume	Features

What evidence is there to suggest that skull volume increase is linked to an increase in intelligence? _____

Other than carbon dating, how do we know that Ardi is older than Homo erectus? _____

Define each of the following:

Genetic Variation	
Competition	
Natural Selection	
Inheritance	
Ancestor	
Pentadactyl limb	

Classification pg82

5 Kingdoms of Life	4 Domains

The term binomial name refers to what 2 parts of the classification process?

Differentiate between domain and kingdom (refer to nucleus)

_____

Breeding and Varieties pg 84

Define each of the following

Artifical Selection	
Selective Breeding	
Disease Resistance	
Yield	
Genetic Engineering	
Genetic Modification	
Genetically modified organisms	

Fill in the table in reference to GMOs:

Advantages	Disadvantages

GM in Agriculture and Medicine pg 88

Identify and explain a risk associated with selective breeding.

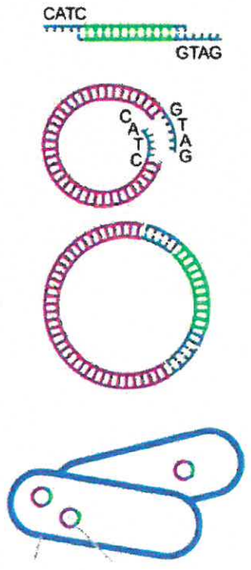
_____

Crops can be genetically engineered. How can this improve yield of product when considering pests.

_____

_____

Describe each part of Genetic Engineering



GM and Agriculture pg 90

Insecticides and herbicides are used to control pests and weeds. How has genetic engineering reduced the amount of these chemicals being used?

_____

_____

_____

_____

Why is there resistance to using GM crops?

_____

Fertilisers and Biological Control pg 92

Define Biological Control.

_____

Give an example, from your book, of how biological control can control pests. Include a comment on the impact of using biological control, rather than chemicals, on the environment.

_____

_____

_____

_____

Define fertiliser and it's function.

_____

_____

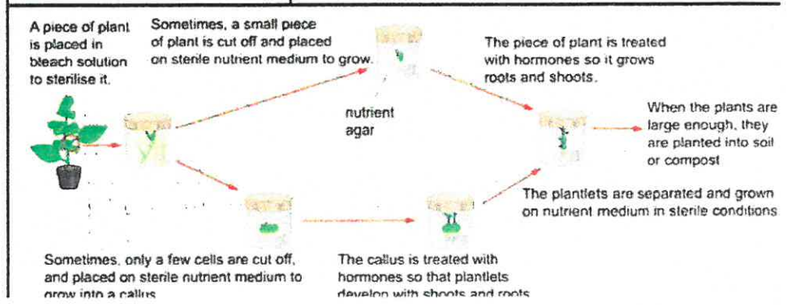
Comment on how fertilisers can cause pollution

_____

Tissue Culture pg 86

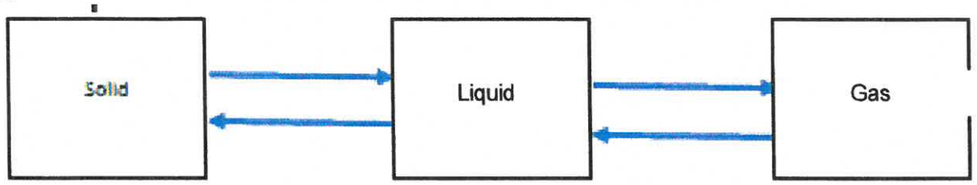
Define each of the following

Tissue Culture	
Callus	
Stem Cells	
Differentiate	
Extinction	
Clones	



Paper 1 Topic 2: States of Matter

Label all the changes of state, add particles to show the states of matter pg 146



If you have a mixture of salt, water and sand, how would you purify the: pg 150

a.Sand?

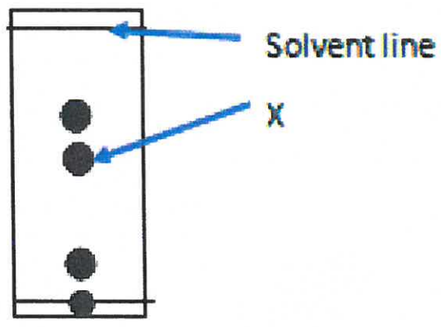
b.Salt?

c.Water?

Describe how to carry out a simple chromatography experiment pg 152

	Melting point / °C	Boiling point / °C	State at 35 °C	State at 85 °C
A	0	100		
B	-20	-5		
C	560	1237		
D	25	80		

Use this chromatogram to calculate the Rf of the spot marked X pg 152



What steps are used to make ground water potable? Briefly describe each stage Pg 158

Keywords: chromatography, states of matter, solid, liquid, gas, potable, filtration, evaporation, crystallisation, distillation

CC3 and 4: Atomic Structure and the Periodic Table

Draw the structure of an atom and label it's subatomic particles giving their mass and charge pg 163

What do the periods and groups tell you about the electron structure? pg175

Period

Group

What are the atoms arranged in order of in the periodic table?

Isotopes Pg 166	12 C	13 C	14 C
Protons			
Neutrons			
Electrons			

Nuclear Fission is

_____

Define Relative Atomic Mass pg 167.

How can you use the following numbers to give you the amount of protons, neutrons and electrons?

$^{27}_{13}Al$

Proton:

Neutrons:

Electrons:

Describe how Mendeleev arranged the periodic table pg 170.

Why did he sometimes leave gaps?

What do the isotopes have in common?

How are the isotopes different?

Electron Structure

Draw the electron structure of:

Na

Cl

Al

Chlorine has a RAM of 35.5. Show why this is the case if there is 75 % Chlorine-35 and 25% Chlorine-37. pg 167

Keywords: proton, neutron, electron, shells, negative, atomic number, mass number, period, group

Paper 1 & 2 Topic 1: Ionic Bonding

Give Definitions for the following, pg 178 -179

ION

CATION

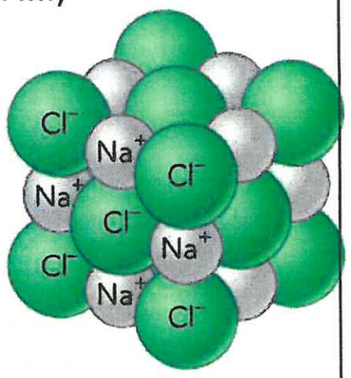
ANION

IONIC BONDING

Show the ionic bonding of NaCl (don't forget your charges!). Then describe what is happening, in words pg 178

Using the structure of ionic compounds can you explain why

1) They have high boiling/melting points pg 182



2) They can conduct when molten but not when solid pg 182

Keywords (electrostatic forces, position, negative, ions, lattice)

Write the formula for

1. Sodium chloride
2. Magnesium hydroxide
3. Potassium nitrate
4. Calcium carbonate
5. Copper nitrate
6. Aluminium oxide
7. Magnesium oxide
8. Calcium hydroxide

Keywords: anion, cation, shells, current, ions, stable, full shell, positive, negative, transfer, molten, bonds

Paper 1 & 2 – Topic 1 Covalent Bonding

What is covalent bonding and why does it occur? Pg 184

Simple Covalent Bonding

Draw the covalent bonding in pg 184

Water H_2O

Hydrogen H_2

Chlorine Cl_2

Hydrogen chloride HCl

Methane CH_4

Carbon dioxide CO_2

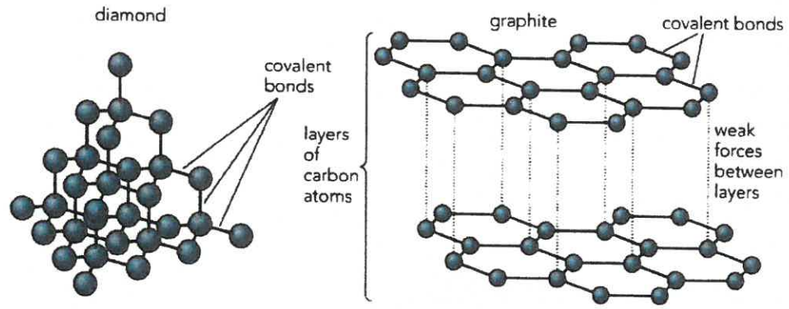
Name a use of: pg 188

Graphite

Diamond

Giant molecular covalent structures pg 188

Explain the differences in diamond and graphite, make reference to their structures.



How are graphene and buckminsterrfullerene different/the same to diamond and graphite? Pg 184

What are the properties of covalent compounds and how do they compare to ionic compounds?

Ionic Compounds	Covalent Compounds

Keywords: strong, delocalised electrons, conduct, slide, layers, stable, full, shell, sharing, non metals

Paper 1 & 2 – Topic 1 Properties of Substances

Metallic Bonding - draw a diagram to show how metals bond pg 190

Why can metals conduct?

What is a polymer? Pg 187

Why do polymers have higher melting points than other simple molecules? Pg 187

Why do fullerenes have low boiling points? Pg 188

	Ionic	Simple Covalent	Giant Covalent	Metallic
Melting and boiling point				
Solubility in water				
Conduct as solid				
Conduct in solution or molten				

Why does chlorine have a low boiling points and is a gas at room temperature while sodium chloride is a solid at room temperature with a high boiling point?

Keywords: strong, delocalised electrons, conduct, stable, full, shell, sharing, non metals

Paper 1 & 2 – Topic 1 Calculations pg 216 - 219

Relative Formula Mass	Give the RFM for magnesium	State the RFM for Au.	What is the RFM for sulphuric acid?	What is the RFM for Al_2O_3?	Calculate the RFM for potassium sulphate	Calculate the RFM for $(NH4)_2CO_3$
Mole Calculations	Calculate the number of moles in 685 g of NH_3	Calculate the mass of HNO_3 in 0.100 moles	Calculate the number of moles in 20.0 g of C_4H_{10}	Calculate the mass of ethanol in 0.40 moles		
Empirical Formulae	Calculate the empirical formula for a compound containing N = 82.4% by mass, and H = 17.6%.	0.150 g of copper reacts with oxygen form 0.188 g of copper oxide. Find the empirical formula of copper oxide.	Calculate the empirical formula for a compound containing: Na 0.167 g, C 0.0435 g, O 0.174 g	1.00 g of phosphorus reacts with fluorine form 2.84 g of phosphorus fluoride. Find the empirical formula of phosphorus fluoride		
Balancing Equations	Write a balanced equation for lithium reacting with water	Write a balanced equation for the combustion of butane in a sufficient supply of oxygen	Balance the following equation and add state symbols: $H_2 + Cl_2 \rightarrow HCl$	Write a balanced equation for the neutralisation reaction between sodium hydroxide and sulphuric acid.		

Keywords: atomic mass, relative atomic mass, mole, empirical formula, equation

Paper 1 Topic 3: Chemical Change - Acids

Pg 196 - 197

What ion do acids in solution supply?

What ion do alkalis in solution supply?

What does neutralise mean?

Write a general neutralisation word equation

Write a general neutralisation ionic equation.

Colour of indicator pg 196	Acid (pH)	Neutral (pH)	Alkali (pH)
Litmus			
Methyl orange			
Phenolphthalein			

Explain the difference between pg 197

Concentrated and dilute acid

Strong and weak acid

Keywords: burette, pipette, filter, evaporate, soluble, insoluble, precipitate

Name the salt made when Pg 200	Hydrochloric acid	Sulphuric acid	Nitric Acid
Magnesium			
Copper oxide			
Sodium hydroxide			
Potassium hydroxide			
Copper carbonate			
Lithium carbonate			

Write balanced equations for 3 of the above reactions pg 205

1.

2.

3.

How are alkalis and bases different? Pg 200

Describe how to test for

Hydrogen

Carbon dioxide

Paper 1 Topic 3: Chemical Change – Acids cont.

Describe how to make dry crystals of a soluble salt from an acid and an insoluble reactant: pg 213

Describe how to make a sample of dry crystals of a soluble salt from an acid and an soluble reactant: pg 202

Describe how to make a sample of dry crystals of an insoluble salt pg 213

Keywords: corrosive, neutralisation, acid, alkali, base, water, indicator

Explain how 2 solutions of pH 2 and pH 3 are different. Which has more hydrogen ions?

Common soluble substances pg 212	Common insoluble substances

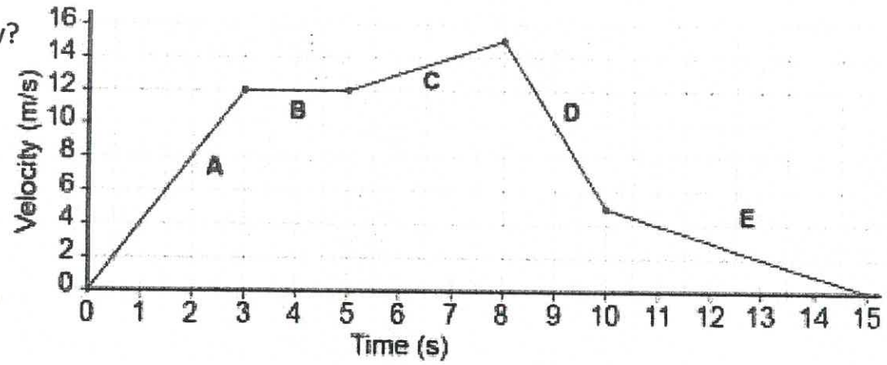
	Soluble or insoluble? Pg 212
Sodium chloride	
Lead nitrate	
Lead chloride	
Potassium sulfate	
Barium sulfate	
Calcium carbonate	

Forces and motion

Quantities	Definition	Vector or Scalar?
Distance		
Displacement		
Speed		
Velocity		
Acceleration		
Force		
Mass		
Weight		

What doe the gradient show?

What doe the area show?



1. Find the gradient for A
2. Find the gradient for D
3. What is the area under the graph for A&B?
4. What is the area under the graph for D&E?

$a = \frac{v-u}{t}$

$a = \frac{v^2-u^2}{2x}$

What do these letters mean?

v

u

x

$W = mg$

$F = ma$

$p = mv$

What do these letters mean?

W

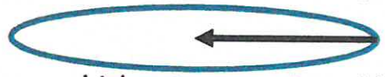
m

g

p

What is momentum?

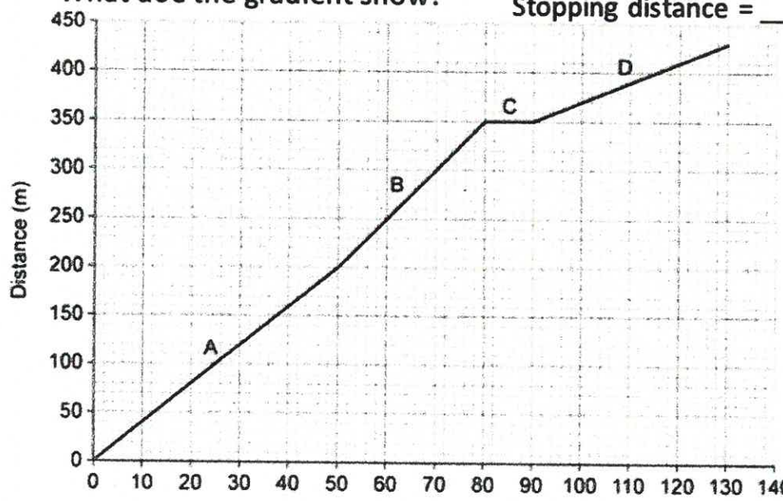
When is all momentum conserved?



Name the 3 forces which act as centripetal force for these:

- Car round a round about
- Planet round the sun
- Ball on a string

What doe the gradient show?



1. Find the gradient for A
2. Find the gradient for D
3. Where is the cyclist travelling fastest?

Stopping distance = _____distance + _____ distance

Human reaction time is _____

Name 3 factors that effect stopping distance.

Name 3 factors that effect thinking distance

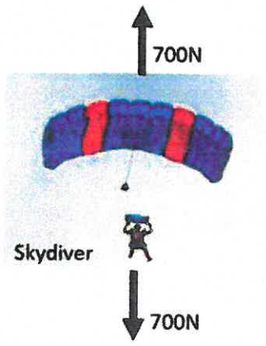
How can you reduce the force in a collision?

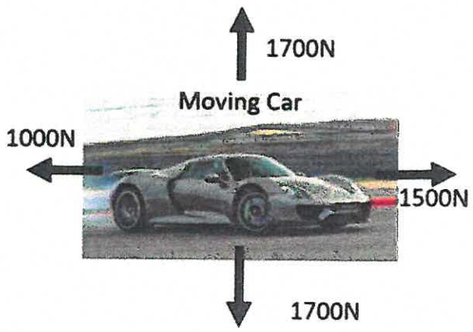
Newton's first law states that an object at rest stays at rest and an object in motion stays in motion with the same _____ and in the same _____ unless acted upon by an _____ _____.

Newton's second law states that _____ is proportional to _____ and _____

Newton's third law states that for every _____ there is an _____ and _____ reaction

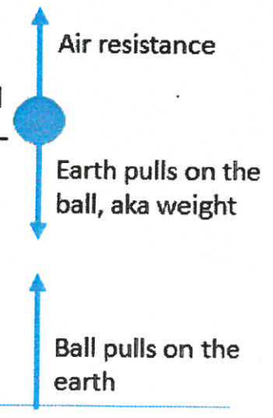
1. Name the forces on the two diagrams below
2. Describe the motion of the two objects





	Balanced	Action reaction
Object they act	Same	Different
Type of force	Different	Same
Size	Equal and opposite	Equal and opposite

Label the balanced forces and the action-reaction pair:



Conservation of Energy Revision Poster

List the different energy stores **(pg 34)**

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

List the different energy transfers **(pg 34)**

_____

2. _____
3. _____

Useful	Friction...	Wasteful
	...between car tyres and the road	
	...between brakes and tyres	
	...between 2 pieces of flint to start a campfire	

List 4 non-renewable fuels. **(pg42)**

1. _____ 2. _____
3. _____ 4. _____

How does burning fossil fuels contribute to global warming and climate change?

_____

_____

State the Law of Conservation of Energy **(pg 34)**

_____

_____

When a kettle boils it uses electrical energy to function. What energy conversions occur while the kettle is on?

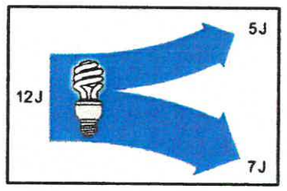
Electrical energy → _____

Electrical energy → _____

Electrical energy → _____

What is the formula for efficiency? **(pg 37)**

Calculate the efficiency of the bulb using the Sankey diagram below. **(Pg 37)**



List the different types of renewable energy **(pg 44)**

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Give one advantage and one disadvantage to using renewable energy options.

Advantage: _____

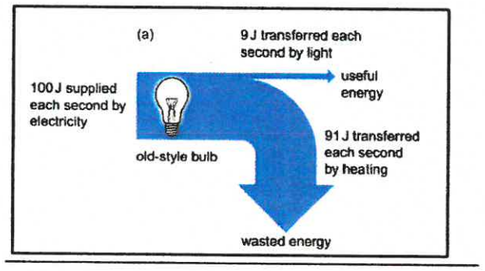
Disadvantage: _____

This Sankey diagram shows that 12J of energy enter a bulb. **(pg 37)**

Light and thermal energy are generated.

a) Label the arrow that you think shows light energy.

b) Do you think this is an efficient bulb?



_____

_____

_____

Explain the term Efficiency. **Pg 36**

_____

_____

_____

_____

$$KE = \frac{1}{2}mv^2$$

Symbol	Stands for:	Units:
KE		
m		
v		

$$GPE = mgh$$

Symbol	Stands for:	Units:
GPE		
g		
h		

Wasted energy is energy that can no longer be used in a useful way. We can also say this energy has d_____. **(pg 36)**

Friction causes objects to heat up if they are rubbing against each other. This can be wasteful.

Is friction useful or wasteful in the examples below?

Convection:

Describe convection:

In what substance does it occur?

What is used in houses to prevent it?

Conduction:

Describe conduction:

In what substance does it occur?

What is used in houses to prevent it?

Radiation:

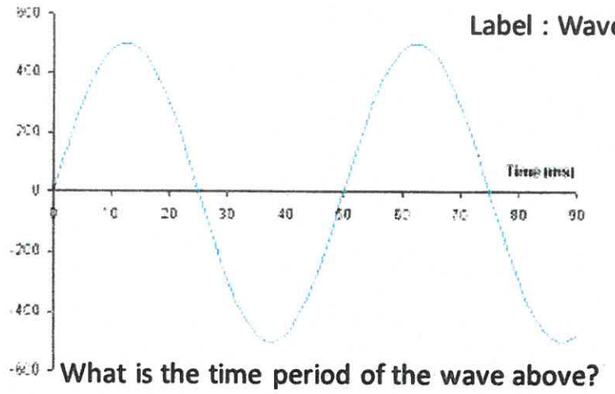
Describe radiation:

In what substance does it occur?

What is used in houses to prevent it?

Waves

Waves transfer _____ & _____

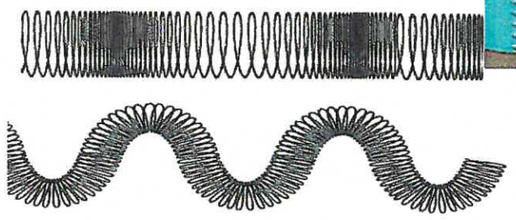


Label : Wavelength
Amplitude

What is the time period of the wave above?

What is the frequency of the wave above?

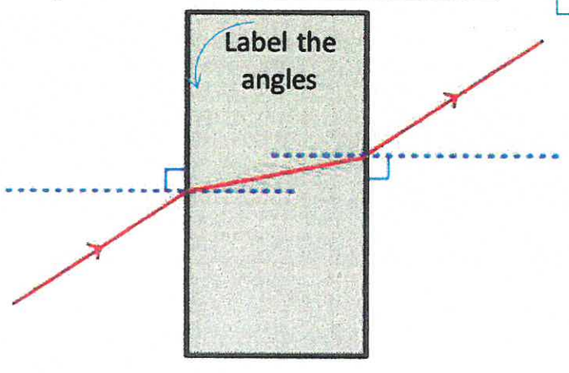
Label these waves:
Longitudinal
Transverse
Wavelength



In a _____ wave, the particles oscillate (vibrate) perpendicular (up and down)

In a _____ wave, the particles oscillate (vibrate) parallel (back and forth)

This process is called _____



As the light enters the glass block it changes s_____. The wave s_____ d_____. This means the light b_____ towards the n_____. When it exits the glass block it returns to the original p_____.

How can we use this equation to find the speed of a wave?

$$f = \frac{1}{T}$$

$$v = f \times \lambda$$

$$v = \frac{d}{t}$$

What do these lets mean and what are units?

v

f

λ

d

t

T

What frequency range is ultrasound?

How do boats use ultrasound?

How can we use this equation to find the speed of a wave?

Give 2 examples of longitudinal waves:

•

•

Give 3 examples of transverse waves:

•

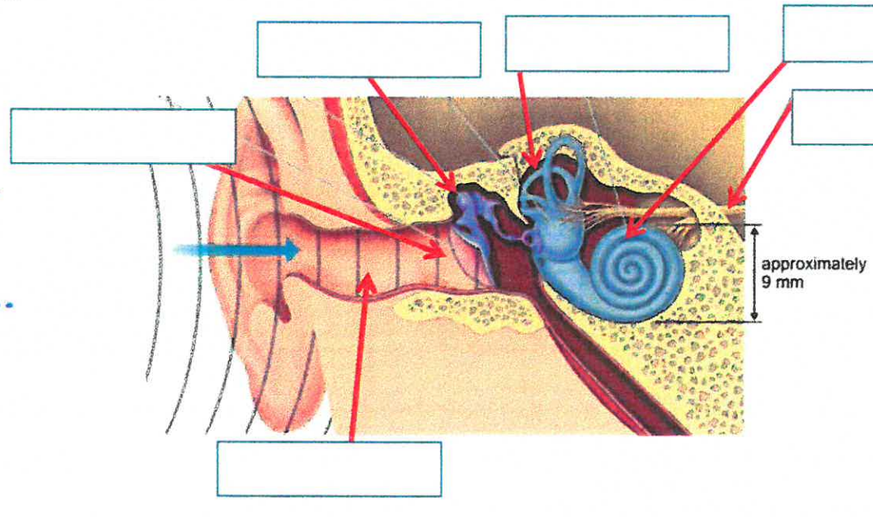
•

•

What frequency range is the human hearing rage?

What frequency range is infrasound?

Label these waves:



What is a seismic wave?

What are the two types of seismic waves?

What causes the s-shadow zone?

What causes the p-shadow zone?

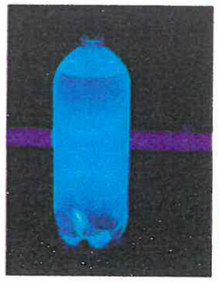
Electromagnetic Waves

Waves transfer _____ & _____

What 2 things do all EM waves have in common?

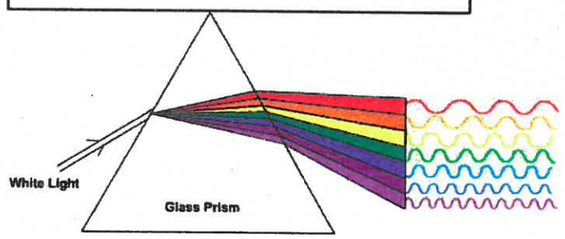
•

•



What is florescence?

What is the wavelength of visible light?



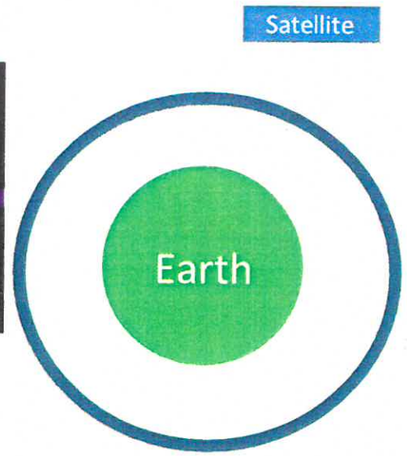
Why does light split up when it enters a prism?

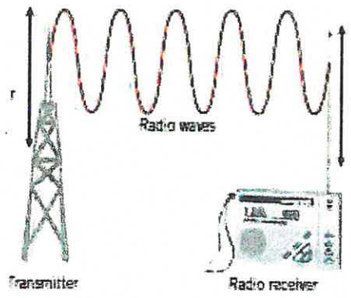
List all the different medical uses of EM waves and the wave they require

Which wave have the lowest energy?

Which wave has the highest frequency?

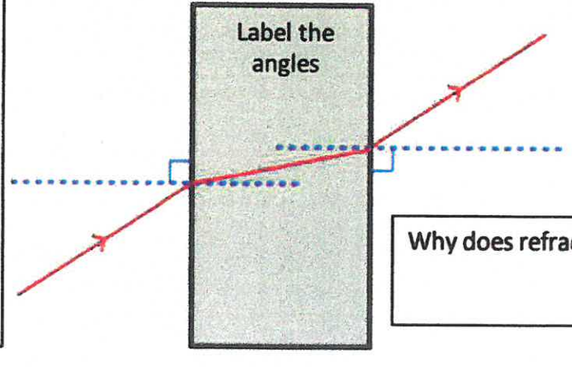
Which wave has a wavelength of around 600 nm?





What is irradiation?

This process is called _____



How can we use this equation to find the speed of a wave?

$$v = f \times \lambda$$

Symbol	Name	Unit
v		
f		
λ		
d		
t		

Draw on the diagram of earth, microwaves and radio waves and explain what you have drawn

How can we use this equation to find the speed of a wave?

$$v = \frac{d}{t}$$

How are radio waves produced and received?

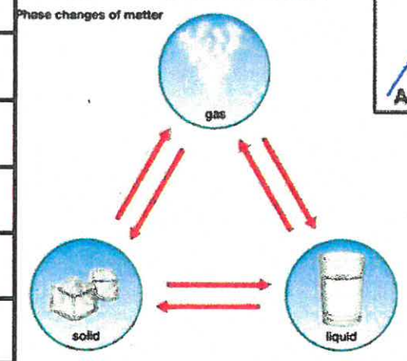
Uses	Wave	Dangers

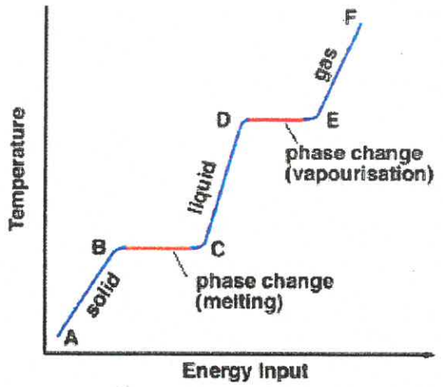
Why does refraction occur?

Symbol	Name	Unit
ρ		
m		
V		
ΔQ		
c		
$\Delta\theta$		
L		
P_1		
P_2		
V_1		
V_2		
F		
k		
x		
E		
A		
h		
g		

Particles and materials

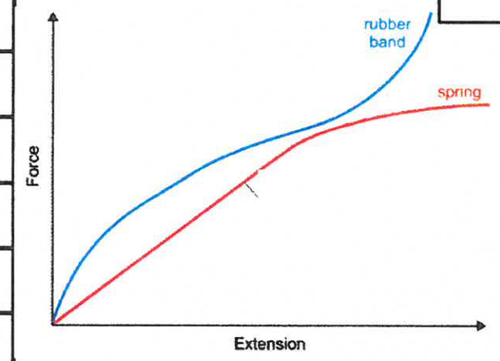
Label the arrows





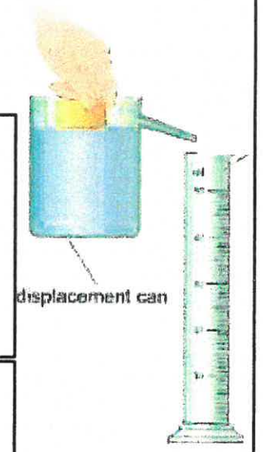
Why does the temperature on the graph not increase between B and C, as well as between D and E?

What is the difference between temperature and energy?



What does the gradient represent?

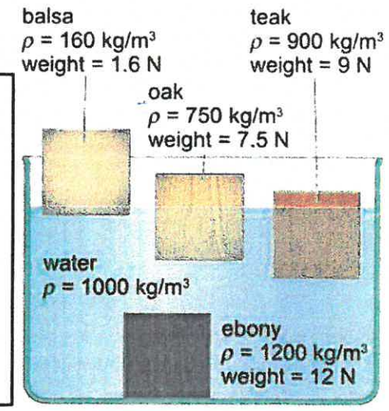
What does the are under the graph represent?



How is a displacement can used to measure the density of an object?

Describe and explain the behaviour of the spring.

Why do some of these block float but not all of them?

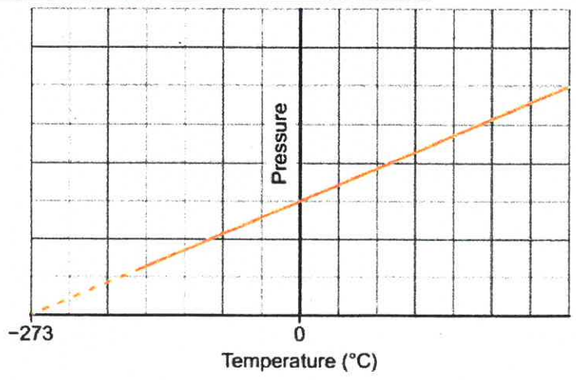


$$F = kx \qquad \rho = \frac{m}{V}$$

$$E = \frac{1}{2}\,k\,x^2 \qquad \Delta Q = mc\Delta\theta$$

$$F = PA \qquad Q = mL$$

$$P = h\rho g \qquad P_1V_1 = P_2V_2$$



What is absolute zero?

If pressure increases in a fixed volume	Temperature...
If volume decrease at a fixed temperature	Pressure...
If pressure increases at a fixed temperature	Volume...