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Form _____

Memory Workout – Common Entrance 13+ Science



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What is the word equation for aerobic respiration?	Glucose + oxygen → water + carbon dioxide									
In which part of the cell does aerobic respiration take place?	Mitochondria									
What is the purpose of respiration?	The release of energy from glucose									
What is the difference between breathing and respiration?	Breathing is the inspiration and expiration of gases (using the lungs) Respiration is a chemical reaction involving glucose and oxygen									
By what process do gases move between the lungs and the blood?	Diffusion									
How are the lungs adapted for gas exchange?	<ul style="list-style-type: none"> Alveoli increase the surface area A good blood supply maintains the concentration gradient Alveoli have walls one cell thick – smaller diffusion distance A moist layer allows gases to dissolve 									
How can we test for carbon dioxide?	Bubbling the gas through limewater. It will turn from colourless to cloudy white if carbon dioxide is present.									
How will the composition of exhaled air compare to the composition of inhaled air?	Inhaled air will contain more oxygen (~20%) and less carbon dioxide (~0.06%)									
What is the difference between aerobic and anaerobic respiration?	Anaerobic respiration does not require oxygen.									
What is the equation for anaerobic respiration in animals (including humans)?	Glucose → lactic acid									
Does anaerobic respiration release more or less energy than aerobic respiration?	Much less									
What is the issue with producing lactic acid?	It is a mild poison which causes cramp in the muscles.									
What is the effect of exercise on breathing rate?	More exercise = higher breathing rate									
Explain why your breathing rate increases during exercise.	It increases the amount of oxygen reaching your lungs and the amount of carbon dioxide being removed from your lungs.									
What is the effect of exercise on heart rate?	More exercise = higher heart rate									
Explain why your heart rate increases during exercise.	More oxygen and glucose must be delivered to cells to allow respiration to happen more quickly, releasing more energy.									
Explain why anaerobic respiration is necessary during hard exercise?	You cannot transport oxygen quickly enough to your cells.									

Biology – cellular respiration

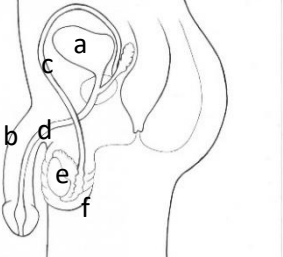
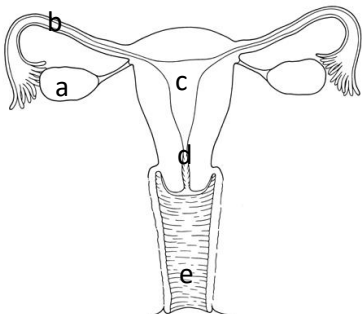
Why do we continue to breathe fast and have a high heart rate after exercise?	To transport oxygen to our cells to break down lactic acid (oxygen debt).									
What is the word equation for the breakdown of lactic acid?	Oxygen + lactic acid → water + carbon dioxide									
What is the equation for anaerobic respiration in plants and yeast?	Glucose → carbon dioxide + ethanol									
What is yeast used for?	<ul style="list-style-type: none"> Baking (production of carbon dioxide causes the bread to rise) Brewing beer (production of ethanol makes the beer alcoholic) 									

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<p>What are the names of each labelled part of the male reproductive system:</p> 	<p>A – bladder B – penis C – sperm duct D – urethra E – testis F – scrotum G – foreskin</p>	
<p>What is the role of each of the following:</p> <ul style="list-style-type: none"> • Bladder • Sperm duct • Urethra • Testis • Scrotum 	<ul style="list-style-type: none"> • Bladder – stores urine • Sperm duct – transports sperm from the testes to the urethra • Testis – produces and stores sperm • Scrotum – expands and contracts to control to temperature of the testis 	
<p>What are the names of each labelled part of the female reproductive system:</p> 	<p>A – ovary B – oviduct (fallopian tube) C – uterus D – cervix E – vagina</p>	
<p>What is the role of each of the following:</p> <ul style="list-style-type: none"> • Ovary • Oviduct • Uterus • Cervix 	<ul style="list-style-type: none"> • Ovary – develops and releases eggs • Oviduct – contains cilia (small hairs) which sweep eggs towards the uterus • Uterus – where the baby will develop • Cervix – holds the baby in place during pregnancy 	
<p>What is the scientific term for ‘sex cells’?</p>	<p>Gametes</p>	
<p>In humans, what is the male gamete?</p>	<p>Sperm</p>	
<p>In humans, what is the female gamete?</p>	<p>Ovum (egg)</p>	
<p>What is the term used to describe the process of fusing the nuclei of the male and female gametes?</p>	<p>Fertilisation</p>	
<p>What is the scientific term for a fertilised egg cell?</p>	<p>Zygote</p>	

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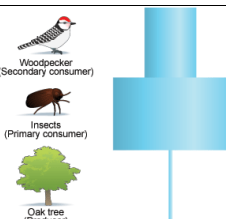
What is the potential impact of the mother drinking alcohol during pregnancy?	Premature birth, low birth weight and brain disorders										
What is the potential impact of the mother smoking during pregnancy?	Premature birth, low birth weight and heart/breathing problems										
How are waste products (e.g. carbon dioxide) excreted by the fetus?	The waste products travel through the umbilical cord, pass across the placenta, and are then excrete by the mother.										
Whose blood flows inside the umbilical cord?	The fetus'										
What changes take place in the body during puberty?	<ul style="list-style-type: none"> • Grow more body hair • Penis enlarges (in men) • Voice deepens (in men) • Menstrual cycle starts (in women) • Breasts develop (in women) • Hormones (testosterone in men and oestrogen in women are produced) 										

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What type of diagram is used to describe the feeding links between different organisms?	A food chain
What does an arrow represent in a food chain?	The transfer of energy from one organism to another
What happens to the amount of energy transferred as you move through a food chain?	It decreases
Suggest three reasons the energy transferred will decrease?	<ul style="list-style-type: none"> • Organisms use some energy for movement • Organisms use some energy for keeping warm • Organisms may reproduce and transfer energy in growing their offspring
Why are there normally no more than 4 or 5 levels in a food chain?	There is insufficient energy remaining to be transferred
What are the different levels in a food chain called?	Trophic levels
What is the term used to describe the first organism in a food chain?	Producer
From where do producers get their energy?	The sun – through photosynthesis
What is a herbivore?	An organism which feeds on plants
What is a carnivore?	An organism which feed on the flesh of other animals
What is an omnivore?	An organism which eats both plants and meat
Put these organisms into a food chain: Mouse Hawk Snake Corn	Corn → Mouse → Snake → Hawk
What would be the effect on each of the other organisms if all of the snakes catching a disease and dying?	<p>The population of hawks would fall – less prey</p> <p>The population of mice would increase – less predators</p> <p>The population of corn would fall – more predators (mice)</p>
What type of diagram is used to describe interlinked food chains?	Food webs
What is the name for this type of diagram? 	Pyramid of numbers

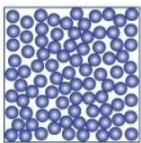
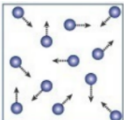
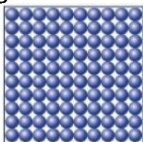
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What are some of the problems of deforestation?	<ul style="list-style-type: none"> • Habitat loss and extinction of species • Reduced soil fertility • Flooding and landslides • Changes to the atmosphere (less oxygen, more carbon dioxide, drier air) 									
What are some conservation activities which may be carried out?	<ul style="list-style-type: none"> • Creation of new habitats – plants new trees, digging a garden pond • Creation of nature reserves • Captive breeding – such as in zoos 									
What does the word ‘biodiversity’ mean?	A range of living organisms									
Why is biodiversity important?	Without biodiversity, it is more likely that the death of one species will result in the death of many more species									

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What are the names of the 3 states of matter?	Solid, liquid, gas																		
For which state of matter is this the particle diagram? 	Liquid																		
For which state of matter is this the particle diagram? 	Gas																		
For which state of matter is this the particle diagram? 	Solid																		
How are the particles arranged in a solid?	<ul style="list-style-type: none"> • Regular arrangement • Particles touching 																		
How do particles move in a solid?	Vibrate about a fixed point																		
How are the particles arranged in a liquid?	<ul style="list-style-type: none"> • Random arrangement • Particles touching 																		
How do particles move in a liquid?	Move around each other																		
How are the particles arranged in a gas?	<ul style="list-style-type: none"> • Random arrangement • Particles far apart 																		
How do particles move in a gas?	Move freely																		
Explain why gases can be compressed, but solids and liquids cannot.	There is space between the particles, so they can be moved closer together.																		
Explain why gases and liquids can flow, but solids cannot.	The intermolecular forces in liquids and gases are weaker than in solids. This means that particles are not fixed in place.																		
What are intermolecular forces?	Forces between molecules																		
In which state of matter do the particles have most energy?	Gas																		
What causes gas pressure?	Collision of particles with the container wall																		
What is the term used for the random motion of particles?	Brownian motion																		
What is the definition for diffusion?	The movement of particles from an area of higher concentration to an area of lower concentration.																		
What type of change is a change of state?	Physical change																		

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What is filtration?	Passing a suspension through a very fine sieve (normally made of paper).																		
How does filtration work?	Small, liquid particles, are able to pass through the pores in the filter paper. Larger, solid particles, get trapped and cannot pass through.																		
What is the same for the solid that is trapped by the filter paper?	Residue																		
What is the name for the liquid which passes through the filter paper?	Filtrate																		
What type of mixtures can be separated using distillation?	Mixtures of substances with different boiling points. Evaporation and condensation only happen once.																		
What type of mixtures can be separated using paper chromatography?	A mixture of different coloured compounds dissolved in a liquid. These substances must have different levels of solubility.																		
How is paper chromatography carried out?	<ol style="list-style-type: none"> 1. A line is drawn in pencil towards the bottom of the chromatography paper 2. A small spot of the mixture is placed on the line 3. The bottom of the chromatography paper is placed in a solvent (usually water) and the water allowed to move up the paper 																		
Why is the line drawn in pencil?	Graphite doesn't dissolve in water and so won't move up the paper																		
How high does the water level need to be?	Between the bottom of the paper and the pencil line																		
What does it mean if a spot doesn't move from the pencil line?	The substance doesn't dissolve in that solvent																		
What does the distance moved by a spot tell you about the solubility of the substance?	The further a spot moves, the more soluble it is																		
How can you tell the difference between pure and impure substances on a paper chromatogram?	A pure substance will only have one spot. An impure substance will separate into multiple spots																		
How can you tell if two substances from different mixtures are the same?	They will have travelled the same distance																		
Which alternative solvents can be used in paper chromatography?	Ethanol or propanone																		
What is potable water?	Water that is safe to drink																		

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Which scale is used to measure the strength of acids and alkalis?	pH scale																		
With universal indicator, what colour will a strong acid turn? What pH does this represent?	Red; 1-2																		
With universal indicator, what colour will a weak acid turn? What pH does this represent?	Yellow; 5-6																		
With universal indicator, what colour will a neutral substance turn? What pH does this represent?	Green; 7																		
With universal indicator, what colour will a weak alkali turn? What pH does this represent?	Blue/green; 8-9																		
With universal indicator, what colour will a strong alkali turn? What pH does this represent?	Purple; 13-14																		
What colour will litmus paper turn with an acid?	Red																		
What colour will litmus paper turn with an alkali?	Blue																		
How could you prepare an indicator using red cabbage, raw beetroot or blackcurrants?	<ul style="list-style-type: none"> Grind up the plant in water Filter the liquid Add to acid/alkali 																		
What is a better method for measuring pH, rather than using an indicator?	Using a pH probe																		
What is the general word equation for the reaction between an acid and a base?	Acid + base \rightarrow salt + water																		
What is the general word equation for the reaction between an acid and a metal?	Acid + metal \rightarrow salt + hydrogen																		
What is the general word equation for the reaction between an acid and a metal oxide?	Acid + metal oxide \rightarrow salt and water																		
What is the general word equation for the reaction between an acid and a metal hydroxide?	Acid + metal hydroxide \rightarrow salt + water																		
What is the general word equation for the reaction between an acid and a metal carbonate?	Acid + metal carbonate \rightarrow salt + water + carbon dioxide																		
What is the name for the type of reaction between an acid and a base which forms a salt and water	Neutralisation reaction																		
What is the method for making a pure salt from an acid and an insoluble base?	<ol style="list-style-type: none"> React an acid with excess base Filter the excess base Evaporate the water 																		
What is the effect of evaporating the water more slowly?	Larger crystals																		

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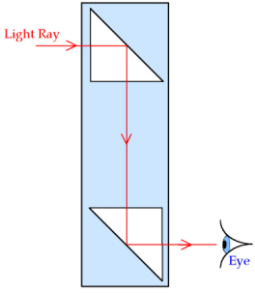
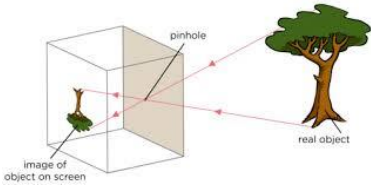
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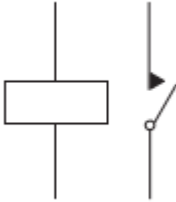



Which piece of scientific equipment can produce an image (or trace) of a sound wave?	Oscilloscope																		
What will cause a higher pitch sound?	A higher frequency vibration (or vibrations per second)																		
What range of frequencies can be detected by humans?	20 – 20000 Hz																		
What happens to this range of hearing as you get older?	It gets smaller (~30 – 16000 Hz)																		
What could be the effects on the ear of hearing very loud sounds?	<ul style="list-style-type: none"> Perforated (broken) ear drum – temporary deafness Damage to the cochlea – permanent deafness 																		

What is the term used for an object which gives out light?	Luminous																		
How does light travel?	<ul style="list-style-type: none"> As a wave In straight lines At 300 million m/s 																		
How can non-luminous objects be seen?	Light is reflected by these objects																		
In which direction do light rays travel?	From a luminous object to your eyes																		
What is the term used for an object which absorbs or reflects light (does not transmit light)?	Opaque																		
What is the term used for an object which transmits and scatters light?	Translucent																		
What is the term used for an object which transmits light in straight lines?	Transparent																		
How are shadows made?	An opaque object is placed in front of a light source																		
What is the effect of moving an opaque object closer to the light source?	The shadow created will be larger																		
Why can light travel through a vacuum?	It doesn't need particles to be transmitted																		
What is the law of reflection?	Angle of incidence = angle of reflection																		
What is the 'normal'?	A line at 90° to the surface of the mirror																		
What is the angle of incidence?	The angle made between the incoming ray of light and the normal																		
What is the angle of reflection?	The angle made between the reflected ray of light and the normal																		
What types of objects make good mirrors?	Smooth, shiny surfaces																		
What happens when light is reflected by a rough surface?	The rays are scattered																		

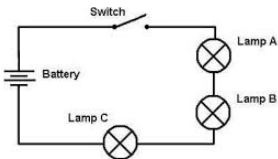
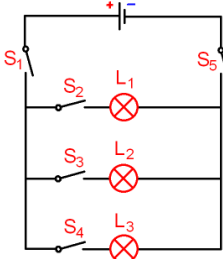
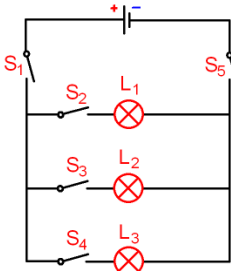
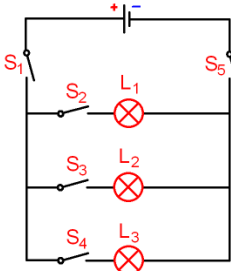
<p>What is the name used for this arrangement of mirrors?</p> 	Periscope																		
<p>What might a periscope be used for?</p>	<ul style="list-style-type: none"> • Seeing over a wall • In submarines to see above the water 																		
<p>Use this diagram to explain how a pinhole camera works:</p> 	<ol style="list-style-type: none"> 1. Light (or reflected light) from the object passes through the pinhole 2. The light hits the screen at the back of the camera 3. The image is upside down because the light rays travel in straight lines 																		
<p>What is a pinhole camera used to represent (in a very basic way)?</p>	An eye																		
<p>What is the name used to describe the bending of light due to a change in the density of the medium?</p>	Refraction																		
<p>If light passes from a less dense medium (e.g. air) to a more dense medium (e.g. water or glass), what will happen to the speed of the wave?</p>	It will slow down																		
<p>If light passes from a less dense medium (e.g. air) to a more dense medium (e.g. water or glass), what will happen to the direction of the wave?</p>	It will bend towards the normal																		
<p>If light enters a medium with a difference density whilst travelling along the normal, what will happen to the direction of the wave?</p>	It will continue in the same direction																		
<p>What is the difference between different colours of light?</p>	The frequency																		
<p>What is white light?</p>	A mixture of all of the different colours of light																		
<p>In order, what are the different colours in white light?</p>	Red Orange Yellow Green Blue Indigo Violet																		

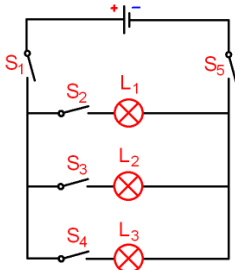

What happens when white light is passed through a water drop (or a prism)?	It is split up into each of the different colours to produce a rainbow									
What is the name for this effect?	Dispersion									
Why does dispersion happen?	Different colours of light are refracted (bent) by different amounts. Red is refracted least. Violet is refracted most.									

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What does this circuit symbol represent? 	Diode																		
What does this circuit symbol represent? 	Light emitting diode (LED)																		
What does this circuit symbol represent? 	Fixed resistor																		
What does this circuit symbol represent? 	Variable resistor																		
What does this circuit symbol represent? 	Push-button switch																		
What does this circuit symbol represent? 	Relay																		
What does this circuit symbol represent? 	Ammeter																		
What does this circuit symbol represent? 	Reed switch																		
What does this circuit symbol represent? 	Junction of conductors (or wires)																		
What is a series circuit?	A circuit which only has one path for the electrons to take																		
What is a parallel circuit?	A circuit which has multiple paths which the electrons can take																		
In a series circuit, what is the effect of adding another bulb?	The bulbs will be dimmer																		

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What is a relay circuit?	A circuit which can be turned on an off using another circuit. This involves an electromagnet and a reed switch																		
What is the effect of increasing the resistance in a circuit on the current?	The current will decrease																		
Explain why the current decreases when the resistance is increased.	The electrons move more slowly because it is harder for them to move through the circuit																		
<p>In the series circuit below, what is the effect of opening the switch on each of lamp A, B and C?</p> 	<p>Lamp A will be off Lamp B will be off Lamp C will be off</p>																		
<p>In the parallel circuit below, what is the effect of opening switch 1 on each of lamp 1, 2 and 3 (assuming that all other switches are closed)?</p> 	<p>Lamp 1 will be off Lamp 2 will be off Lamp 3 will be off</p>																		
<p>In the parallel circuit below, what is the effect of opening switch 2 on each of lamp 1, 2 and 3 (assuming that all other switches are closed)?</p> 	<p>Lamp 1 will be off Lamp 2 will be on Lamp 3 will be on</p>																		
<p>In the parallel circuit below, what is the effect of opening switch 3 on each of lamp 1, 2 and 3 (assuming that all other switches are closed)?</p> 	<p>Lamp 1 will be on Lamp 2 will be off Lamp 3 will be on</p>																		

<p>In the parallel circuit below, what is the effect of opening switch 4 on each of lamp 1, 2 and 3 (assuming that all other switches are closed)?</p> 	<p>Lamp 1 will be on Lamp 2 will be on Lamp 3 will be off</p>											
<p>What is a fuse used for?</p>	<p>Protecting electrical appliances from power surges.</p>											
<p>How does a fuse work?</p>	<p>If the current is too high, the wire inside the fuse will melt and break. This breaks the circuit.</p>											
<p>Which way should a diode (or LED) be placed in a circuit so that it works?</p>	<p>With the flat side of the triangle closest to the positive side of the cell (or battery)</p> 											
<p>Why must an LED be placed into a circuit the correct way around?</p>	<p>An LED has very low resistance in one direction and very high resistance in the other. This means that it will only work if placed the correct way around.</p>											
<p>What are the energy transfers which take place in a battery powered torch?</p>	<p>Chemical → Thermal (by light)</p>											
<p>What is a short circuit?</p>	<p>When electrons take the easiest route to get back to the battery (e.g. if a piece of wire is placed in parallel with the bulb)</p>											

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Revisiting plan

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