STOKE DAMEREL

Aspire Achieve Thrive

Spring Term

Term 2

Triple Science

Year 11

Name: _____

Tutor: _____

GREENSHAW LEARNING TRUST

Year 11 Homework Timetable

Monday	Science Task 1	Ebacc Option A Task 1	Option C Task 1
Tuesday	Sparx Science	Option B Task 1	Modern Britain Task 1
Wednesday	English Task 1	Science Task 2	Option C Task 2
Thursday	Ebacc Option A Task 2	Option B Task 2	Sparx Catch Up
Friday	Modern Britain Task 2	English Task 2	Sparx Maths

Sparx Science - Reach 100% each week before Friday 4pm
Sparx Maths - Reach 100% each week before Friday 4pm

Option A (EBACC)
French
Geography
History

Open B
Art
Business Studies
Catering
Computer Science
History
Health & Social Care
Music
Sport
IT

Open C
Business Studies
Childcare
Catering
Drama
Geography
Health & Social Care
Triple Science
Sport

Year 11 - Homework Plan Science

Week/Date	Homework Task 1	Homework Task 2
Week 1 DATE: 8/1/24	Complete 1 page of retrieval quizzing RAG rate the questions Answer the questions on Sparx Science	Complete the exam question. Fill the remainder of the page with retrieval quizzing on your Red and Amber questions Answer the questions on Sparx Science
Week 2 DATE: 15/1/24	Complete 1 page of retrieval quizzing RAG rate the questions Answer the questions on Sparx Science	Complete the exam question. Fill the remainder of the page with retrieval quizzing on your Red and Amber questions Answer the questions on Sparx Science
Week 3 DATE: 22/1/24	Complete 1 page of retrieval quizzing RAG rate the questions Answer the questions on Sparx Science	Complete the exam question. Fill the remainder of the page with retrieval quizzing on your Red and Amber questions Answer the questions on Sparx Science
Week 4 DATE: 29/1/24	Complete 1 page of retrieval quizzing RAG rate the questions Answer the questions on Sparx Science	Complete the exam question. Fill the remainder of the page with retrieval quizzing on your Red and Amber questions Answer the questions on Sparx Science
Week 5 DATE: 5/2/24	Complete 1 page of retrieval quizzing RAG rate the questions Answer the questions on Sparx Science	Complete the exam question. Fill the remainder of the page with retrieval quizzing on your Red and Amber questions Answer the questions on Sparx Science
Week 6 DATE: 19/2/24	Complete 1 page of retrieval quizzing RAG rate the questions Answer the questions on Sparx Science	Complete the exam question. Fill the remainder of the page with retrieval quizzing on your Red and Amber questions Answer the questions on Sparx Science
Week 7 DATE: 26/2/24	Complete 1 page of retrieval quizzing RAG rate the questions Answer the questions on Sparx Science	Complete the exam question. Fill the remainder of the page with retrieval quizzing on your Red and Amber questions Answer the questions on Sparx Science

Week 8 DATE: 4/3/24	Complete 1 page of retrieval quizzing RAG rate the questions Answer the questions on Sparx Science	Complete the exam question. Fill the remainder of the page with retrieval quizzing on your Red and Amber questions Answer the questions on Sparx Science
Week 9 DATE: 11/3/24	Complete 1 page of retrieval quizzing RAG rate the questions Answer the questions on Sparx Science	Complete the exam question. Fill the remainder of the page with retrieval quizzing on your Red and Amber questions Answer the questions on Sparx Science
Week 10 DATE: 18/3/24	Complete 1 page of retrieval quizzing RAG rate the questions Answer the questions on Sparx Science	Complete the exam question. Fill the remainder of the page with retrieval quizzing on your Red and Amber questions Answer the questions on Sparx Science
Week 11 DATE: 25/3/24	Complete 1 page of retrieval quizzing RAG rate the questions Answer the questions on Sparx Science	Complete the exam question. Fill the remainder of the page with retrieval quizzing on your Red and Amber questions Answer the questions on Sparx Science

WEEK 1 Questions (cover and quiz) - Chemical Analysis

Question	Answer
What is crystallisation?	Method of mixture separation where a solvent is evaporated leaving the solid solute behind
What is distillation?	A separation technique which means a mixture of two liquids is heated to evaporate the one with the lower boiling point, then condensing this substance into a different container.
Why might you use an oil bath to determine the boiling or melting point of a substance?	Oil will be a liquid at higher temperatures than water
What is the chemical test for carbon dioxide?	Turns limewater cloudy
What is the test for oxygen gas?	Relights a glowing splint
What is the test for hydrogen gas?	Burns with a squeaky pop
What is the test for chlorine gas?	Chlorine bleaches damp litmus paper
A mixture that has been designed as a useful product is called…	A formulation
A student wrote down the following description for testing chlorine: "Litmus paper changes from red to blue.” Where has he gone wrong?	Damp litmus paper needs to be used; litmus paper is bleached (turns white; blue litmus paper will turn red first, then white)
True or False: Amino acids can be identified using chromatography.	TRUE
An unknown gas gives out a squeaky pop when a burning splint is put into it. What is the gas?	Hydrogen
Fuels, alloys, fertilisers, pesticides, cosmetics and food products are all types of formulations: True or False?	TRUE
Give two examples of formulations.	Fuels, cleaning agents, paints, medicines, alloys, fertilisers and foods (or any other example)
How are formulations made?	Mixing the components in carefully measured quantities to ensure the product has the required properties.
What test could be used to distinguish between a pure substance and a mixture?	Test melting / boiling point.
How do you make a glowing splint?	Blow out a lit splint
If a glowing splint relights what gas is present?	Oxygen
Is a substance pure or impure if it boils and melts at precise temperatures?	Pure
If damp litmus paper is bleached white what gas is present?	Chlorine
If lime water turns milky what gas is present?	Carbon dioxide

Questions (cover and quiz) - Energy

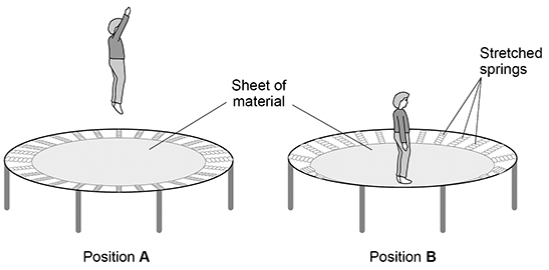
Name five energy stores	Kinetic, Thermal, Gravitational Potential, Chemical Potential, Elastic Potential, Electric Potential, Nuclear Potential, Magnetic Potential
What are the four energy transfer pathways?	Mechanical, Heating, Electrical, Radiation
What is the law of Conservation of Energy?	Energy cannot be created or destroyed, but only transferred from one store to another or dissipated to the surroundings.
Which energy transfer pathway does Work represent?	Work represents the mechanical energy pathway.
What is the word equation for Work?	Work = Force x Distance
What is the symbol equation for Work?	W = F x d
What is the unit for Work?	Joule (J)
What is the unit for Force?	Newtons (N)
What is the unit for distance?	metres (m)
What store of energy is associated with moving objects?	Kinetic energy
What is the word equation for kinetic energy?	kinetic energy = 0.5 x mass x (speed)^2
What is the symbol equation for kinetic energy?	Ek = ½ m x v^2
What are the units of mass?	kilograms, kg
What are the units of kinetic energy?	Joules, J
What store of energy is associated with a stretched spring?	Elastic potential energy
What is the word equation for elastic potential energy?	elastic potential energy = 0.5 x spring constant x (extension)^2
What is the symbol equation for elastic potential energy?	Ee = ½ k e^2
What are the units of spring constant?	Newtons / metre (N/m)
What are the units of extension?	metres (m)
What are the units of elastic potential energy?	Joules, J
What store of energy is associated with an object lifted above ground level?	Gravitational potential energy
What is the word equation for gravitational potential energy?	g p e = mass x gravitational field strength x height
What is the symbol equation for gravitational potential energy?	Eg = m g h
What are the units of gravitational field strength?	Newtons / kilogram (N/kg)
What are the units of gravitational potential energy?	Joules, J

Date: 8/1/24

Week 1 Task 1 - 1 Page of retrieval quizzing - do not use full sentences

Date: 8/1/24

Week 1 Task 2 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.



A trampoline is made from a sheet of material held in place by stretched springs.

Position A shows the child's maximum height above the trampoline. Position B shows the lowest position reached by the child when landing on the trampoline.

Describe the changes to the stores of energy of the child, springs and surroundings as the child moves from position A to position B. (4)

Improvement Work: Describe the changes to the stores of energy of the child, springs and surroundings as the child moves from position A to position B. (4)

Date: 8/1/24

Week 1 Task 3 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

	Coated paper cups	Polystyrene cups
Source of raw materials	Wood	Crude oil
Energy to make 1 cup in arbitrary units	550	200
Biodegradable	Yes	No
Recyclable	No	Yes

Compare the advantages and disadvantages of using coated paper and poly(styrene) to make disposable cups.

Use the table above and your knowledge and understanding of life cycle assessments (LCAs) (6 marks)

Improvement Work: Compare the advantages and disadvantages of using coated paper and poly(styrene) to make disposable cups.

WEEK 2 Questions (cover and quiz) - Organisation

Question	Answer
What is the definition of organ?	A collection of different tissues working together to carry out a specific function.
What is the definition of an organ system?	A group of organs that work together to carry out a specific function and form organisms.
What is the definition of tissue?	A group of specialised cells with a similar structure and function.
What type of animal tissue contracts, bringing about movement?	Muscular tissue.
Name the four major plant organs.	Roots / Leaves / Stem / Flower
What are the names of the two transport tissues in plants?	Xylem and Phloem.
What is cardiovascular disease?	Any disease that involves the heart or blood vessels.
What are the three main types of blood vessels?	Arteries, veins and capillaries.
Which type of blood vessel carries blood away from the heart?	Arteries.
Which blood vessel has a small lumen and a thick layer of muscle and elastic fibres	Artery.
What can be used to correct irregularities in the heart rhythm?	Artificial pacemakers.
What is the network of tiny vessels linking arteries to veins called?	Capillaries.
Which blood vessel has a thin wall that allows diffusion of gases and nutrients?	Capillary.
What does the natural pacemaker do?	Controls a group of cells in the right atrium that controls the resting heart rate.
What does the vena cava do?	It carries deoxygenated blood from the body into the heart.
What does the pulmonary artery do?	It carries deoxygenated blood from the heart to the lungs.
What does pulmonary vein do?	It carries oxygenated blood from the lungs to the heart.
What does the heart do?	It pumps blood around the body.
What does the aorta do?	It takes oxygenated blood away from the heart to the rest of the body.
What does plasma do?	It transports blood cells and other substances around the body.
What is the name of the fluid part of the blood?	Plasma.
Which part of the blood consists of small fragments of blood cells that help clotting?	Platelets.

Questions (cover and quiz) - Atmosphere

Which elements are present in hydrocarbon molecules?	Carbon; hydrogen
What is the most abundant element in air?	Nitrogen/N_2
Which gas reacts with hydrocarbons when they burn?	Oxygen/O_2
Name one fossil fuel used in cars.	Petrol/diesel oil
Name a gas produced when carbon burns.	Carbon monoxide/carbon dioxide
What compound forms when hydrogen burns in air?	Water
What is the main fossil fuel in natural gas?	Methane
What is the black solid element found in soot and smoke?	Carbon
What are the products of the complete combustion of hydrocarbon fuels?	Carbon dioxide; water
Which gas is produced during incomplete combustion, but not complete combustion, of hydrocarbon fuels?	Carbon monoxide
What solid element is produced during the incomplete combustion of hydrocarbon fuels?	Carbon
Name the gas formed when acids react with metals.	Hydrogen
Name the gas formed when acids react with calcium carbonate.	Carbon dioxide
Which common compound of carbon and oxygen is thought to have been an abundant gas in Earth's early atmosphere?	Carbon dioxide
What are the names of the Earth's two nearest neighbouring planets?	Venus and Mars
Name the biological process that increases oxygen levels and reduces carbon dioxide levels in the atmosphere.	Photosynthesis
What geological feature of a planet's surface can give out large amounts of hot gas?	Volcano
Name the physical process that describes changing a vapour into liquid.	Condensation
What type of reaction occurs when a metal gains oxygen?	Oxidation
How old do scientists think the Earth is: 4.5 billion years, 4.5 million years or 450000 years?	4.5 billion years
What sort of rocks are formed from layers of deposited material?	Sedimentary rocks
Which gaseous element forms most of the Earth's atmosphere today?	Nitrogen
Titan is an icy moon of Saturn. What is ice made of?	Water
Where were the gases that formed the Earth's early atmosphere released from?	Volcanoes
What two compounds are thought to have formed most of the Earth's early atmosphere?	Water, carbon dioxide
What is the chemical test for carbon dioxide?	Turns limewater milky/cloudy

Date: 15/1/24

Week 2 Task 1 - 1 Page of retrieval quizzing - do not use full sentences

Date: 15/1/24

Week 2 Task 2 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

Explain how the percentages of nitrogen, oxygen and carbon dioxide in the Earth's atmosphere today have changed from the Earth's early atmosphere. (6)

Improvement Work: Explain how the percentages of nitrogen, oxygen and carbon dioxide changed from the Earth's early atmosphere. (6)

Date: 15/1/24

Week 2 Task 3 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

Explain:

- why urea and sodium ions are found in urine
- why their concentration is higher on a hot day than on a cold day.

Improvement Work: Explain:

- why urea and sodium ions are found in urine
- why their concentration is higher on a hot day than on a cold day.

WEEK 3 Questions (cover and quiz) - Forces

Question	Answer
What piece of equipment can be used to measure an object's weight?	A calibrated spring-balance or newton-meter.
What is the name given to the single force that is equivalent to all other forces acting on a given object?	The resultant force
What does it mean if a force is said to do 'work'?	The force causes an object to be displaced through a distance.
What distance must be used when calculating work done?	It must be the distance that is moved along the line of action of the force.
What occurs when work is done against frictional forces?	Thermal energy dissipated to the surroundings (energy wasted).
What is the relationship between the force applied and the extension of an elastic object?	Extension is directly proportional to the force applied, provided that the limit of proportionality is not exceeded.
What is meant by inelastic deformation?	Deformation which results in the object being permanently stretched.
What is the equation linking extension, force & spring constant?	Force = spring constant x extension
What are the units of force?	Newtons (N)
What are the units of extension?	metres (m)
What are the units of spring constant?	Newtons / metre (N/m)
What type of energy is stored in a spring when it is stretched?	Elastic potential energy
What is the opposite action to extending a spring?	Compression (this also causes elastic potential energy to be stored)
What is meant by the term fluid?	A liquid or a gas
In any fluid, at what angle do the forces due to pressure act on a given surface?	At right angles (normal) to the surface
State the equation relating pressure, force and area.	Pressure = Force/ Area
What are the units of area?	metres squared (m^2)
What are the units of pressure?	Pascals (Pa)
Write down 1 Pascal in terms of Newtons and metres squared.	1 Pa = 1N/m^2
What is the Earth's atmosphere?	A thin (relative to the magnitude of the Earth) layer of gas surrounding the Earth.
What happens to the density of the atmosphere with increasing altitude?	The atmosphere becomes less dense as altitude increases.
Why does atmospheric pressure decrease with an increase in height?	As height increases, density of air molecules decreases. As density of air molecules decreases, frequency of collisions between air molecules and an object decreases. As frequency of collisions decreases, force on the object decreases. As force decreases, pressure decreases.
What is upthrust always equal to?	The weight of the fluid that the object displaces.
What factors influence whether an object will sink or float?	Upthrust, Weight, Density of fluid
What is acceleration?	The rate of change of velocity.
What does an inclined gradient of a velocity time graph tell us about the motion of an object?	It is accelerating
What does a flat line on a velocity time graph tell us about the motion of an object?	Constant velocity

What does the inclined gradient of a distance time graph tell us about the motion of an object?	The speed of an object.
What does a flat line on a distance time graph tell us about the motion of an object?	The object is at rest/stationary
What does a diagonal line of constant gradient on a distance time graph tell us about the motion of an object?	The object is moving at constant speed
A **velocity time** graph starts with a steep gradient. The gradient gradually decreases until the line becomes flat. Describe the motion of the object in these stages.	Object starts moving with rapid acceleration. Acceleration then decreases until it reaches zero. From that point, the object is moving at constant speed (terminal velocity).
A **distance time** graph starts with a steep gradient. The gradient gradually decreases until the line becomes flat. Describe the motion of the object in these stages.	Object initially moving at high speed. Speed then decreases until it reaches zero. From that point, the object is stationary.
Which two factors does the stopping distance of a car depend on?	Thinking distance and braking distance
What is the relationship between thinking distance, reaction time and speed?	thinking distance = speed x reaction time
How would thinking distance change if the speed of the car doubles?	Thinking distance will double
How would the braking distance change if the speed of the car doubles?	Braking distance would increase (by a factor of 4).
What is the term used to describe the time taken for the driver to see the hazard and press the brake pedal?	Reaction time
What factors can increase the thinking distance of a car?	Using a mobile phone, speed, intoxications, distractions
What factors can increase the braking distance of a car?	poor road conditions, poor driving weather, poor tyre condition, poor condition of the brakes, speed
What is the distance moved by a car during the reaction time called?	thinking distance

Questions (cover and quiz) - Cell Biology

How can we increase the rate of diffusion?	Increase the concentration gradient, decrease the diffusion distance/thickness of surface, increase the surface area
How is a root hair cell adapted for osmosis?	Lots of hairs/projections that increase the surface area so more water can be absorbed.
How are cells in the small intestine adapted for active transport?	Many mitochondria release energy for active transport. Villi to increase surface area. Good blood supply to maintain concentration gradient.
How are fish gills adapted for efficient exchange?	Large surface area on gills, constant concentration gradient between blood and water, thin diffusion pathway
What is required for active transport?	Energy from respiration
What is a concentration gradient?	The difference between two concentrations
Define the terms solute and solvent	Solute- Soluble solid/substances that dissolves Solvent- A liquid that the dissolves the solute
What are the differences between hypertonic, hypotonic and isotonic?	Hypertonic- less solute inside the cell, more outside Hypotonic- more solute inside, less outside Isotonic- same amount of solute inside/outside cell
How are single-celled organisms adapted to efficient transport of molecules?	Have a large surface area to volume ratio. This allows sufficient, quick transport of molecules into and out of the cell.
What is a stem cell?	An undifferentiated cell that has the potential to specialise
Name another type of stem cell found in animals	Embryonic stem cells
Where are embryonic stem cells found?	Embryos, umbilical cord
Where are adult stem cells found?	Bone marrow
What is a plant stem cell called?	Meristems
Where would you find plant stem cells?	Meristem (tip of plant)
How are plant stem cells different from adult stem cells or embryonic stem cells?	They can differentiate at any time, throughout the life of the plant
What is an advantage of using plant stem cells?	Can be used to produce clones of plants quickly and economically. Rare species can be cloned and prevented from extinction. Crop plants with special (e.e disease resistance) can be cloned to produce lots of identical plants for farmers
What are the advantages of using adult stem cells?	Easier to obtain, effective, no ethical issues, abundant supply, little or no problems with immune rejection
What are the advantages of using embryonic stem cells?	Can differentiate into any type of cell. Potential to cure diseases such as blindness, diabetes and cancers
Why might people be against the use of stem cells?	Ethical reasons surrounding the use of embryos, may not know the side effect, infection, expensive, potential rejection

Date: 22/1/24

Week 3 Task 1 - 1 Page of retrieval quizzing - do not use full sentences

Date: 22/1/24

Week 3 Task 2 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

> Stem cells are used to treat some human diseases.
>
> Stem cells can be collected from early embryos. These stem cells have not begun to differentiate, so they could be used to produce any kind of cell, tissue or organ. The use of embryonic stem cells to treat human diseases is new and, for some diseases, trials on patients are happening now.
>
> Stem cells can also be collected from adult bone marrow. The operation is simple but may be painful. Stem cells in bone marrow mainly differentiate to form blood cells. These stem cells have been used successfully for many years to treat some kinds of blood disease. Recently there have been trials of other types of stem cell from bone marrow. These stem cells are used to treat diseases such as heart disease.

Evaluate the use of stem cells from embryos or from adult bone marrow for treating human diseases. (5)

Improvement Work: Evaluate the use of stem cells from embryos or from adult bone marrow for treating human diseases. (5)

Date: 22/1/24

Week 3 Task3 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

The skateboard moves backwards as the skateboarder jumps forwards.

Explain, using the idea of momentum, why the skateboard moves backwards (3 marks)

Improvement Work: Explain, using the idea of momentum, why the skateboard moves backwards (3 marks)

WEEK 4 Questions (cover and quiz) - Bonding

Question	Answer
What kinds of elements usually form molecules?	Non-metals
What kinds of bonds are found in molecules?	Covalent
How strong are the forces of attraction **within** simple covalent molecules?	They are very strong.
How strong are the forces of attraction **between** simple covalent molecules?	They are relatively weak.
Are simple molecules usually good conductors of electricity at room temperature?	No, they are poor conductors of electricity.
What is the name for lots of monomers joined together to form large molecular chains?	Polymers
What simple molecule joins to form poly(ethene)?	Ethene
Why might simple molecules, such as methane, have low melting points?	Because they have weak intermolecular forces of attraction between them
What are monomers?	Small, simple molecules that can be joined to make polymers
What is poly(ethene) made of?	Hydrogen and carbon or ethene monomers
What are polymers?	Many monomers joined together
In what types of bonds are pairs of electrons shared?	Covalent bonds
What is the monomer unit in poly(propene)?	Propene
Which has the higher melting point: poly(ethene) or the monomer it is made from?	Poly(ethene)
What are intermolecular forces?	Forces of attraction between molecules
Do simple molecules have strong intermolecular forces between them?	No. They are described as weak.
Why are simple molecules poor conductors of electricity?	There are no charge carriers.
What can you say about the formula of small, simple molecules?	They are fixed.
What type of bonding is between the atoms in a molecule of water?	Covalent
What type of structure does water have?	Simple covalent molecule
What strength of forces are there between different molecules of water?	Weak
Does pure water conduct electricity?	No
What is a typical property of a metal?	High melting point, shiny when polished, malleable, high density, conducts electricity
What does the term malleable mean?	Can be hammered or bent into a different shape
What type of bonding involves sharing electrons?	Covalent
What kind of bonding and structure tends to be associated with low melting points and boiling points?	Covalent, simple molecular
Which kind of bonding and structure allows substances to conduct electricity when solid?	Metallic
Why does sodium chloride conduct electricity when molten but not when solid?	Ions are free to move when molten and the charged ions can carry the current.
Name a substance that has a very high melting point and is a non-conductor of electricity in any state.	Diamond
Why do lattice structures usually have high melting points?	Lots of energy is needed to break so many (strong) bonds.
Why does sodium metal conduct electricity?	It contains freely moving delocalised electrons, and the charged electrons can carry the current.
Name two types of bonding models.	From: molecular formula; structural formula; dot and cross diagram; all shells; dot and cross diagram outer

	shell only; 3D ball and stick; 2D space-filling; or 3D space-filling (other answers are possible)
Name a type of bonding model that is used to show what happens to the electrons in a covalent bond.	A dot and cross model

Questions (cover and quiz) - Energy

What is the store of energy that is associated with temperature changes?	Thermal energy
What is the word equation for thermal energy?	change in thermal energy = mass x specific heat capacity x temperature change
What is the symbol equation for thermal energy?	$\Delta E = m\ c\ \Delta T$
What is the unit of specific heat capacity?	J/kg °C
What is the specific heat capacity of a substance?	It is the amount of energy required to raise the temperature of 1 kg of the substance by 1 °C.
What is the definition of power?	Power is defined as the rate at which energy is transferred or the rate at which work is done.
What is the word equation for power?	power = energy transferred ÷ time, power = work done ÷ time
What is the symbol equation for power?	P = E/ t P = W/ t
What is the unit of power?	Watts, W
What does 1 Watt mean in terms of Joules and seconds?	1 Joule of energy is transferred every second.
What is the most common way that energy is "wasted"?	Thermal energy / heating the surroundings
How can you limit unwanted energy transfers?	Thermal insulation, lubrication.
What does thermal conductivity mean?	The higher the thermal conductivity of a material the higher the rate of energy transfer by conduction across the material.
What factors affect the rate of cooling of a building?	The thickness and thermal conductivity of its walls.
What does the efficiency of an energy transfer tell us?	How much of the total input energy is transferred usefully
What is the word equation for efficiency?	efficiency = useful output energy transfer ÷ total input energy transfer x 100% OR efficiency = useful power output ÷ total power input x 100%
What is the definition of a renewable energy resource?	It is one that can be replaced as quickly as it is used.
What are some examples of renewable energy resources?	Biofuel, wind, hydro-electricity, geothermal, tidal, solar, wave
What is the definition of non-renewable energy?	It is one that cannot be replaced as it takes too long.
What are some examples of non-renewable energy?	Fossil fuels (coal, oil, natural gas), nuclear
What are some examples of uses of energy resources?	Transport, electricity generation, heating.
What does the word reliable mean?	Always available when you need it.
Why are some energy resources more reliable than others?	Some resources rely on the weather (solar/wind power) which may not always be favourable.
What environmental impact do some resources cause?	Burning fossil fuels and biofuel release CO_2 into the atmosphere which contributes to global warming.
Although we know that these environmental issues arise, why can we not always deal with them?	There may be political, social, ethical or economic considerations.

Date: 29/1/24

Week 4 Task 1 - 1 Page of retrieval quizzing - do not use full sentences

Date: 29/1/24

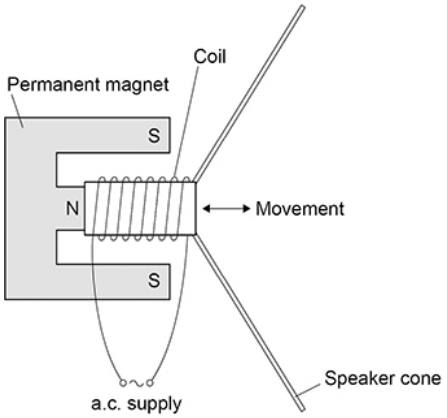
Week 4 Task 2 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

Explain why calcium fluoride has a high melting point. (4)

Improvement Work: Explain why calcium fluoride has a high melting point. (4)

Date: 29/1/24

Week 4 Task 3 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.



Explain how a moving-coil loudspeaker produces a sound wave (4 marks)

Improvement Work:

WEEK 5 Questions (cover and quiz) - Inheritance

Question	Answer
What are the two methods of reproducing?	Asexual reproduction and sexual reproduction.
How many parents are involved in asexual reproduction?	One.
Which type of reproduction produces genetically identical offspring?	Asexual reproduction.
Which type of cell division is involved in asexual reproduction?	Mitosis.
Which type of cell division produces gametes (sex cells)?	Meiosis.
Which type of reproduction involves gametes?	Sexual reproduction.
Which type of cell division produces genetically identical cells?	Mitosis.
Which type of cell division produces genetically different cells?	Meiosis.
What are the names of the male gametes in flowering plants and animals?	Pollen (plants), sperm (animals).
What are the names of the female gametes in flowering plants and animals?	Eggs.
How many sets of chromosomes are found in body cells?	Two sets of chromosomes.
How many sets of chromosomes are found in gametes?	One set of chromosomes.
Which type of cell division divides twice to form four cells?	Meiosis.
Which type of cell division divides once to form two cells?	Mitosis.
What type of cell division occurs as an embryo develops?	Mitosis.
What happens to the number of chromosomes when the gametes fuse?	The number of chromosomes is restored to the normal number (one set from the female gamete and one set from the male gamete).
What is a genome?	The entire genetic material of an organism.
What was the human genome project?	A study to identify the sequence of all the genes in a human.
Why was the human genome project important?	It helps us to search for genes linked to different types of diseases, understand and treat inherited disorders, and trace human migration patterns from the past.
What shape is a DNA molecule?	A double helix.
What is a gene?	A small section of DNA that codes for a sequence of amino acids to make a protein.
What is a chromosome?	A structure inside the nucleus of a cell that is made up of DNA.
What are chromosomes made of?	DNA (deoxyribonucleic acid).

Questions (cover and quiz) - Atoms and The Periodic Table

Define the term inert.	Unreactive
Explain why the noble gases are inert.	They have full outer shells, so do not need to gain or lose electrons
What is a trend?	A pattern in properties
State the trend in the melting points of the alkali metals.	Melting point reduces further down the group
Write a name for this chemical equation LiOH	Lithium hydroxide
Write a name for this chemical equation KOH	Potassium hydroxide
Define a displacement reaction?	A reaction in which a more reactive element takes the place of a less reactive element in a compound
Explain why fluorine is more reactive than chlorine.	Fewer shells/electrons, less shielding (or stronger attraction from nucleus), easier to gain electrons
Explain why potassium is more reactive than lithium.	More shells/electrons, less shielding (or weaker attraction from nucleus), easier to lose electrons
Explain why bromine is less reactive than chlorine.	More shells/electrons, more shielding (or weaker attraction from nucleus), harder to gain electrons
Explain why sodium is less reactive than caesium	Fewer shells/electrons, less shielding (or stronger attraction from nucleus), harder to lose electrons
What did Chadwick discover?	The neutron
What elements are in sodium fluoride?	Sodium and fluorine
What elements are in potassium nitrate?	Potassium nitrogen and oxygen
Write down the charge of a lithium ion.	+1
Write down the charge of a chlorine ion.	-1
What are two isotopes of the same element?	Atoms of the same element with different numbers of neutrons
The number of _____ and _____ are the same in atoms of different isotopes.	Protons and electrons
Who in 1914 revised the model of the atom suggesting electrons are in certain energy levels	Bohr
Who discovered the electron?	Thomson
Who suggested atoms behaved as if they were tiny, hard spheres?	Dalton
Describe the structure of the transition metals.	Lattice of positive ions surrounded by delocalised electrons.
State the properties of the transition metals.	Hard, shiny, conduct heat and electricity, ductile
What is an alloy?	A metal mixed with other metals or elements
Why are alloys often used?	Atoms of other elements change the structure of metals, giving them more useful properties (e.g. harder, stronger).

Date: 5/2/24

Week 5 Task 1 - 1 Page of retrieval quizzing - do not use full sentences

Date: 5/2/24

Week 5 Task 2 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

Meiosis and mitosis are different types of division in human cells. Compare the two processes by referring to where each takes place and the kind of products that are made. (6)

Improvement Work: Meiosis and mitosis are different types of division in human cells. Compare the two processes by referring to where each takes place and the kind of products that are made. (6)

Date: 5/2/24

Week 5 Task 3 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

Explain the difference between a real image and a virtual image (3 marks)

Improvement Work: Explain the difference between a real image and a virtual image (3 marks)

WEEK 6 Questions (cover and quiz) - Inheritance

Question	Answer
What are different forms of the same genes called?	Alleles.
Which type of allele is expressed in the phenotype even if only one version of it is present?	Dominant
Which type of allele needs two versions to be present for it to be expressed in the phenotype?	Recessive
What keyword describes an individual with two identical alleles for a characteristic?	Homozygous
What keyword describes an individual with two different alleles for a characteristic?	Heterozygous
Define the keyword genotype.	All the alleles present in an individual.
What is the phenotype of an individual?	The physical appearance of an individual.
How many **pairs** of chromosomes are found in normal human body cells?	23
What are the sex chromosomes for male and female mammals?	XX- female, XY - male.
Give an example of a disease caused by a dominant allele?	Polydactyly (having extra fingers and/or toes).
Give an example of a disease caused by a recessive allele?	Cystic fibrosis.
What does it mean if someone is a carrier for a genetic disorder?	They are able to pass the recessive gene to their offspring but do not suffer the disease themselves.
Why are there no carriers for genetic disorders caused by dominant alleles?	A person who is heterozygous for a genetic disease caused by a dominant allele will suffer the disease themselves and so will be a sufferer not a carrier.
What is embryo screening?	Testing to see if an embryo (or foetus) carries any alleles that cause genetic disorders.
What keyword describes 'the differences in characteristics in a population'?	Variation.
What causes variation?	Variation is caused by genes, the environment and a combination of both genes and the environment.
What is the theory of evolution?	All species of living things have evolved from simple life forms that developed over 3 billion years ago.
What causes genetic variation?	Mutations.
What is a mutation?	A change in the DNA code.
Is it common for mutation to lead to a new phenotype?	No, most mutations have no effect on the phenotype, some influence phenotype, very few determine phenotype.
Describe the theory of evolution by natural selection.	Individuals within a population have a range of phenotypes and genetic variation, individuals with characteristics most suited to the environment are more likely to survive and breed successfully, the alleles that enable the individual to survive are then passed on to the next generation.
What is a fossil?	Fossils are the remains of organisms from millions of years ago that can be found in rocks, ice and other places.
How are fossils formed?	They can be formed by the absence of decay (fossils in ice), the replacement of parts by minerals as they decay (fossils in rocks) or preserved traces of organisms (fossilised footprints).

Why is the fossil record incomplete?	Many early forms of life were soft-bodied, which means that they have left few traces behind. What traces there were have been mainly destroyed by geological activity.
Why are scientists uncertain about how life on Earth began?	There is a lack of evidence because there are gaps in the fossil record.
What information do scientists get from fossils?	How much or how little different organisms have changed as life developed on Earth.
What are the main causes of extinction?	A change in the environment the organism is living in.
What does the keyword extinction mean?	There are no remaining individuals of a species still alive.
What changes in the environment can cause extinction?	Change in temperature, new predators, new diseases, better competitors, long term geological changes to the environment, single catastrophic events (e.g. volcanic activity).

Questions (cover and quiz) - Chemical Changes

What term describes a substance that attacks metals, stonework and skin?	Corrosive
What type of substance turns litmus paper red?	Acid
What happens in all chemical reactions?	New substances are formed.
What kind of reaction occurs between an acid and an alkali?	Neutralisation
What do you call a solution which is neither acidic nor alkaline?	Neutral
Give the name and formula of a common laboratory acid.	Hydrochloric acid (HCl), nitric acid (HNO_3), sulfuric acid (H_2SO_4), etc
Which ion is in excess in all acid solutions?	Hydrogen ions or H+ ions
Which ion is in excess in all alkali solutions?	Hydroxide ions or OH– ions
What scale is used for measuring acidic and alkaline properties?	The pH scale
Name three examples of acid/alkali indicators apart from universal indicator.	Litmus, methyl orange and phenolphthalein
What pH values are acidic?	Below 7
What happens to the pH as the H+ ion concentration increases?	It decreases
If a solution has the same concentration of hydrogen ions as hydroxide ions, how is it described?	Neutral or pH = 7
What word describes a solution that contains a large amount of solute in a small volume of solvent?	Concentrated
How can a solution be made more dilute?	By adding solvent/water
What kind of reaction occurs between an acid and a base?	Neutralisation
What is formed when an acid reacts with a base like a metal oxide?	Salt + water
What acid would be used to make zinc sulphate from zinc oxide?	Sulfuric acid
What process can be used to separate an insoluble solid from a liquid?	Filtration
How can a sample of a dissolved salt be obtained from a salt solution?	Evaporation of the water

Date: 19/2/24

Week 6 Task 1 - 1 Page of retrieval quizzing - do not use full sentences

Date: 19/2/24

Week 6 Task 2 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

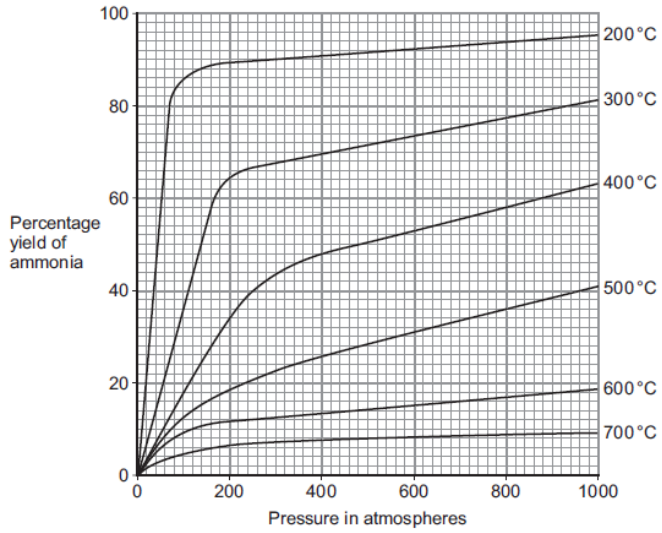
Outline a safe plan the student could use to make pure, dry, crystals of the soluble salt copper sulphate from an insoluble metal oxide and dilute acid. (6)

Improvement Work: Outline a safe plan the student could use to make pure, dry, crystals of the soluble salt copper sulphate from an insoluble metal oxide and dilute acid. (6)

Date: 19/2/24

Week 6 Task 3 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

Figure 2



Use Figure 2 to suggest and explain why the conditions used to produce ammonia in the Haber process are a temperature of 450 °C and a pressure of 200 atmospheres (5 marks)

_Improvement Work: Use Figure 2 to suggest and explain why the conditions used to produce ammonia in the Haber process are a temperature of 450 °C and a pressure of 200 atmospheres (5 marks)

WEEK 7 Questions (cover and quiz) - Homeostasis

Question	Answer
What is the main male reproductive hormone?	Testosterone.
Which gland produces testosterone in males?	The testis.
What does testosterone do?	It stimulates sperm production.
After puberty on average how often is an egg released from the ovary?	Approximately every 28 days.
What happens at ovulation?	An egg is released from the ovary.
What term refers to 'the release of an egg from the ovary'?	Ovulation.
Name the four hormones involved in the menstrual cycle.	FSH (follicle stimulating hormone), LH (luteinising hormone), oestrogen, progesterone.
Which hormone causes an egg in the ovary to mature?	FSH (follicle stimulating hormone).
Which hormone stimulates the release of a mature egg from the ovary?	LH (luteinising hormone).
Which hormones are involved in maintaining the uterus lining?	Progesterone and oestrogen.
At what point in the menstrual cycle does a woman have her period?	Day 1-5.
At what point in the menstrual cycle is an egg released?	Day 12-16
Which gland releases LH?	The pituitary gland.
Which gland releases oestrogen?	The ovaries.
What produces progesterone?	The empty follicle after ovulation.
What is produced by the empty follicle after ovulation?	Progesterone.
What is the role of progesterone?	It maintains the uterus lining and inhibits release of FSH and LH.

Questions (cover and quiz) - Organisation

What are the bi-concave cells that contain haemoglobin and carry oxygen around the body in the blood?	Red blood cells.
What can be used to reduce cholesterol levels in the blood?	Statins.
Which major blood vessel carries oxygenated blood away from the heart?	The aorta.
Name the three parts of the human circulatory system.	The blood, blood vessels and the heart.
What does the trachea branch into?	The bronchi.
What is the definition of a 'double circulatory system'?	The circulation of blood from the heart to the lungs is separate from the circulation of the heart to the rest of the body.
What separates your lungs from your abdomen?	The diaphragm.
Which chamber of the heart does oxygenated blood flow into?	The left ventricle.
Which blood vessel carries deoxygenated blood from the heart to the lungs?	The pulmonary artery.
Which bones protect your lungs?	The ribs.
What is the name of the long tube that takes air down into the lungs?	The trachea.
Which blood vessels have valves and carry deoxygenated blood back to the heart?	The veins.
Which major blood vessel carries deoxygenated blood back to the heart?	The vena cava.
What do white blood cells do?	They engulf pathogens and make antibodies and antitoxins.
What do the lungs do?	They exchange gases between the body and the air.
How are the alveoli adapted to diffuse gases in and out of the blood as efficiently as possible?	They have a large surface area, thin walls and a good blood supply.
What are stents used for?	To keep narrowed or blocked arteries open.
What is the job of the valves in veins?	To stop the blood from flowing in the wrong direction

Date: 26/2/24

Week 7 Task 1 - 1 Page of retrieval quizzing - do not use full sentences

Date: 26/2/24

Week 7 Task 2 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

Arteries and veins have different structures and different functions. Explain how the different structure of arteries and veins relates to their different functions. (6)

Improvement Work: Arteries and veins have different structures and different functions. Explain how the different structure of arteries and veins relates to their different functions. (6)

Date: 26/2/24

Week 7 Task 3 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

Describe how the body responds when a decrease in core body temperature is detected (6 marks)

Improvement Work: Describe how the body responds when a decrease in core body temperature is detected.(6)

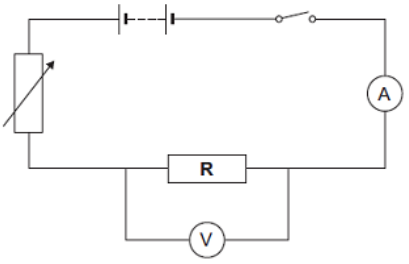
WEEK 8 Questions cover and quiz
Use your blue mock sheet for your retrieval practice this week.

Date: 4/3/24

Week 8 Task 1 - 1 Page of retrieval quizzing - do not use full sentences

Date: 4/3/24

Week 8 Task 2 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.



A resistor is a component that is used in an electric circuit. Describe how a student would use the circuit to take the readings necessary to determine the resistance of resistor R. (6)

Improvement Work: A resistor is a component that is used in an electric circuit. Describe how a student would use the circuit to take the readings necessary to determine the resistance of resistor R. (6)

Date: 4/3/24

Week 8 Task 3 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

The ‘Big Bang’ theory uses red-shift as evidence to explain the beginning of the Universe.

How does the red-shift from distant galaxies provide evidence for the beginning of the Universe? (3 marks)

Improvement Work: The ‘Big Bang’ theory uses red-shift as evidence to explain the beginning of the Universe.
How does the red-shift from distant galaxies provide evidence for the beginning of the Universe? (3)

WEEK 9 cover and quiz
Use your blue mock sheet for your retrieval practice this week.

Date: 11/3/24

Week 9 Task 1 - 1 Page of retrieval quizzing - do not use full sentences

Date: 11/3/24

Week 9 Task 2 - Complete the exam question then fill the remainder of the page with retrieval quizzing on your Red and Amber questions on your blue sheet.

Describe the model now used for the structure of an atom. In your answer you should give details of the individual particles that make up an atom, including the relative masses and relative charges of these particles. Do not include a diagram in your answer. (6)

Improvement Work: Describe the model now used for the structure of an atom. (6)

Date: 11/3/24

Week 9 Task 3 - Complete the exam question then fill the remainder of the page with retrieval quizzing on your Red and Amber questions on your blue sheet.

Lithium carbonate contains lithium ions and carbonate ions. A student tested the tablet for lithium ions and for carbonate ions.

The student used:

- a metal wire
- dilute hydrochloric acid
- limewater.

Plan an investigation to show the presence of lithium ions and of carbonate ions in the tablet. You should include the results of the tests for the ions. (6 marks)

Improvement Work: Plan an investigation to show the presence of lithium ions and of carbonate ions in the tablet. You should include the results of the tests for the ions

WEEK 10 Questions (cover and quiz) - Inheritance

Question	Answer
What is selective breeding?	A process where humans breed plants and animals for desired characteristics.
Describe the process of selective breeding.	Parents with the desired characteristic are chosen from the population, they are bred together and the offspring with the desired characteristic are bred together. This continues over many generations until all the offspring show the desired characteristic.
What problem can selective breeding lead to?	Selective breeding can lead to ‘inbreeding’ where some breeds are particularly prone to disease or inherited defects.
Give three characteristics that have been selectively bred in plants.	Disease resistance in food crops, large or unusual flowers, size and taste in fruit.
What characteristics have been selectively bred in animals?	Animals which produce more meat or milk, domestic animals with a gentle nature.
What is genetic engineering?	A process which involves modifying (changing) the genome of an organism to give a desired characteristic.
What traits do GM (genetically modified) crops have?	Improved resistance to insect attack or herbicides, improved crop yield, produce bigger and better fruit.
Why are genes transferred into the cells of organisms in the early stages of their development?	So that the organisms develop with desired characteristics.
During genetic engineering, what is used to transfer the desired gene into the new organism?	A vector.
During genetic engineering, what is used to 'cut out' the gene so it can be transferred?	Enzymes.
What is usually used as a vector during genetic engineering?	A bacterial plasmid or virus.
What are the two main industries that could benefit from genetic engineering?	Medicine and agriculture.
What are the potential benefits of genetic engineering in medicine?	It can make large quantities of pure medicines (e.g. insulin), it may be able to cure some genetic disorders.
What are the potential benefits of genetic engineering in agriculture?	It can improve growth rates in plants and animals, increase crop yield, produce crops that grow in extreme conditions, increase pest/disease resistance in crops.
What are the concerns about genetic engineering?	Insects may become pesticide resistant if they eat pesticide forming GM crops, GM plants and animals may spread into the wildlife, GM crops, it could lead to unethical human engineering.
Why can bacteria evolve rapidly?	They reproduce quickly.
What does a mutation in bacterial DNA lead to?	The development of a new strain of bacteria.
What is an antibiotic-resistant bacteria?	A strain of bacteria that may not be killed by antibiotics.
Why are antibiotic-resistant bacteria a problem?	They survive and reproduce, so the population of the resistant strain rises. The resistant strain will then spread because people are not immune to it and there is no effective treatment for it.
Give an example of an antibiotic-resistant bacteria.	MRSA.
Describe how to reduce the development of antibiotic-resistant bacteria.	Doctors should not prescribe antibiotics inappropriately, patients should complete their course of antibiotics, agriculture should restrict the use of antibiotics.
Why must patients complete their course of antibiotics?	So all the bacteria are killed and none survive to mutate and form resistant strains.
When should doctors not prescribe antibiotics?	When treating non-serious or viral infections.

Why are antibiotic-resistant bacteria hard to treat?	The development of new antibiotics is costly and slow and it is unlikely to keep up with the emergence of new resistant strains.
Give two pieces of evidence used to support Darwin's theory of evolution by natural selection.	Changes shown in the fossil record and the evolution of antibiotic resistant bacteria.
Which scientist came up with the theory of evolution by natural selection?	Darwin.

Questions (cover and quiz) - Magnetism

In a field diagram, how are the magnetic fields around a current-carrying wire shown?	As a series of circles
How can the magnetic field around a current-carrying wire be demonstrated?	Pass the wire through a piece of paper. Place plotting compasses at different positions on the paper at equal distances from the wire. Add dots to show where the arrow is pointing. Join the dots to show the magnetic field lines.
How can the magnetic field around a current-carrying wire be made stronger?	By winding the wire into more turns.
What is the motor effect?	When a force is exerted between a magnetic field and a current-carrying conductor placed in that field.
What rule is used to determine the force experienced due to the motor effect?	Fleming's Left Hand Rule
When using Fleming's left hand rule, what does the forefinger represent?	The forefinger points in the direction of the magnetic field.
When using Fleming's left hand rule what does the second finger represent?	The second finger points in the direction of current flow in the conductor.
What factors affect the size of the force on a current-carrying wire in a magnetic field?	The magnitude of the current flowing through the conductor. The strength of the magnetic field that the conductor is placed in.
If the direction of current in a current-carrying wire, placed in a uniform magnetic field is reversed, what happens to the force?	The direction of the force is reversed.
If the strength of the current in a current-carrying wire placed in a uniform field is increased, what happens to the force?	The strength of the force is increased
What criteria must be met for the equation linking force, magnetic flux density, current and length to hold?	The conductor must be at right-angles to the magnetic field it is placed in.
What is the correct name for magnetic field strength?	Magnetic flux density
What is the unit used for magnetic flux density?	Tesla, T
How does an electric motor work?	A coil of wire, carrying a current, is placed in a magnetic field. The forces on the two sides perpendicular to the field experience forces in opposite directions. This causes a rotational effect
How do loudspeakers make use of the motor effect?	The motor effect is used to convert variations in the current of an electrical circuit into the pressure variations which produce audible sound.
How is the pitch of the sound from a loudspeaker changed?	The frequency of the a.c current is altered. This generates a different frequency of vibration in the cone.
What happens when an electrical conductor moves relative to a magnetic field?	A potential difference is induced across the ends of the conductor.
What happens to an electrical conductor when there is a change to the magnetic field that it is placed in?	A potential difference is induced across the ends of the conductor.
What is the requirement for an induced potential difference to cause a current flow?	The conductor must form a closed loop or be part of a complete circuit.

What are the two ways that the generator effect is used to generate different types of current?	In an alternator to produce alternating-current. In a dynamo to produce direct-current.
What electromagnetic effect does a microphone take advantage of and how?	The generator effect converts the pressure variations in sound waves into alternating current in a circuit.
Why must the current flowing through the primary coil of a transformer be alternating?	For current to be induced in the secondary coil, the magnetic field in the core must be continuously changing. For the magnetic field to be changing, the current in the primary coil must be alternating.
What equation links force, magnetic flux density, current and length of wire?	Force = magnetic flux density x current x length
Write down the symbol equation linking force, magnetic flux density, current and length of wire.	F = B x I x L
Write down the symbol equation linking potential difference across the primary and secondary coils and the number of turns on each coil.	Vp / Vs = np / ns
Write down the symbol equation linking potential difference across the primary and secondary coils and the current in each coil.	VpIp = VsIs

Date: 18/3/24

Week 10 Task 1 - 1 Page of retrieval quizzing - do not use full sentences

Date: 18/3/24

Week 10 Task 2 - Complete the exam question then fill the remainder of the page with retrieval quizzing on your Red and Amber questions on your blue sheet.

Penicillin is an antibiotic which stops bacteria from reproducing. Explain how natural selection could have produced strains of penicillin resistant bacteria. (5)

Improvement Work: Penicillin is an antibiotic which stops bacteria from reproducing. Explain how natural selection could have produced strains of penicillin resistant bacteria. (5)

Date: 18/3/24

Week 10 Task 3 - Complete the exam question then fill the remainder of the page with retrieval quizzing on your Red and Amber questions on your blue sheet.

A woman's hand accidentally touches a hot object.
The woman moves her hand away rapidly.
Describe how the woman's nervous system coordinates the reflex action. (6 marks)

Improvement Work: A woman's hand accidentally touches a hot object.
The woman moves her hand away rapidly.
Describe how the woman's nervous system coordinates the reflex action.(6)

WEEK 11 Questions (cover and quiz) - Quantitative Chemistry

Question	Answer
What is the mass of MgO?	40
What is the relative formula mass of: CO_2	44
What is the relative formula mass of: a) $MgCl_2$	95
What is the mass of H_2S0_4?	98
What is Avogadro's constant?	6.023×10^{23}
What does the term mole mean?	A mole contains 6.023×10^{23} particles of any substance.
Why might some reactions appear to show a change in mass?	A reactant or a product is a gas.
Why does magnesium increase in mass when it is heated in air?	Combines with oxygen
What is the name for CO_2?	Carbon dioxide
How many atoms and elements are in the compound sodium aluminate, $NaAl(OH)_4$?	Four elements and ten atoms.
Why can you have relative atomic masses which are not whole numbers e.g. chlorine is 35.5?	Relative atomic mass is an average mass of all the isotopes known to exist in the universe.
What is the law of conservation of mass?	Mass of reactants = mass products.
The formula of sulfuric acid is H_2SO_4. How many atoms of each element are in the formula?	H = 2, S = 1, O = 4
The formula of calcium nitrate is $Ca(NO_3)_2$. How many calcium, nitrogen and oxygen atoms are in the formula?	Ca = 1, N = 2, O = 6
There are two numbers alongside chlorine in the periodic table, 17 and 35.5. What does the number 17 represent?	Atomic number
What does the number 35.5 represent?	Relative atomic mass
Sodium chloride has the formula NaCl. The relative atomic mass of sodium is 23 and that of chlorine is 35.5. What is the relative formula mass of NaCl?	58.5
A water molecule has the formula H_2O. The relative atomic mass of hydrogen is 1 and that of oxygen is 16. What is the relative formula mass of a molecule of water?	18
What is the symbol for relative atomic mass?	Ar
What is the symbol for relative formula mass?	Mr
What is the limiting reactant in a reaction?	The reactant that is completely used up.
What does it mean if a reactant is in excess?	Some of the reactants will be left over after the reaction has been completed.
What is the formula for concentration by mass of a solution?	Concentration (of solution) = mass (of solute) / volume (of solvent)
State a unit for concentration by mass.	g/dm^3
What is the formula for concentration by amount of a solution?	Concentration (of solution) = no. moles (of solute) / volume (of solvent)
State a unit for concentration by amount.	mol/dm^3
State three reasons a reaction might not go to completion.	Reaction is reversible, some product lost, some reactants may react in other ways.
What is the yield of a reaction?	The amount of product actually obtained relative to the amount predicted by theory.
Write down the formula for % yield.	% yield = actual mass of product / theoretical mass of product (x 100%)

What is atom economy?	The amount of starting materials that end up as useful products
Write down the formula for atom economy.	M_r of desired product / sum of M_r's of all products (x 100%)
Why is atom economy an important consideration in industry?	High atom economy reduces costs, involves less waste.
What is Avogadro's law relating the number of particles to volume of the gas?	Equal volumes contain equal numbers of particles at constant temperature / pressure.
What is the volume of one mole of any gas at room temperature and pressure (20oC and 1 atmosphere pressure)?	$24dm^3$

Questions (cover and quiz) - Atomic Structure

Why do unstable nuclei give out radiation?	Unstable nuclei undergo decay to become more stable. As they release radiation their stability increases.
What is the name of the process in which an unstable nucleus gives out radiation to become more stable?	Radioactive decay
Define the activity of an unstable nucleus.	Activity is the rate of decay of a source of unstable nuclei.
What is the unit of radioactive activity?	Becquerel (Bq)
What is count rate?	The number of radioactive decays per second for a radioactive source.
Give an example of a detector that may be used to measure count-rate.	Geiger-Muller tube
State four types of nuclear radiation.	Alpha particles, Beta particles, Gamma rays, Neutrons.
What are the constituents of an alpha particle?	Two protons and two neutrons. It is the same as a helium nucleus.
What is the range of an alpha particle through air?	A few centimetres (normally in the range of 2-10cm)
What will stop beta radiation from passing through a point?	A thin sheet of aluminium Several metres of air
What will stop gamma radiation from passing through a point?	Several centimetres of lead A few metres of concrete
What type of radiation is most ionising?	Alpha radiation
What type of radiation is least ionising?	Gamma radiation
State any changes to mass or charge that occur due to the emission of a gamma ray?	Both mass and charge remain unchanged.
Describe the nature of radioactive decay	Random
Define the half-life of a radioactive isotope.	The time it takes for the number of unstable nuclei in a substance to halve. The time it takes for the count rate from a sample to fall to half its initial level.
What is radioactive contamination?	The presence of unwanted radioactive nuclei on other materials.
What is irradiation?	The process of exposing a material to nuclear radiation. The material does not become radioactive.
Why is it important for the results of studies on the effects of radiation to be published and shared with other scientists?	To allow the findings to be independently checked (peer review)
Give 4 sources of background radiation?	Rocks, Cosmic rays from space, Nuclear weapons testing, nuclear accidents
How should background radiation be dealt with in calculations?	Background count should be subtracted from any readings before calculations.

What is the unit used to measure radiation dosage?	Sieverts(Sv)
How many millisieverts are equal to 1 sievert?	1000 mV is equal to 1 sievert
Why might the radiation dosage that different people experience differ?	Some occupations involve working with radiation. Background radiation differs with location
What determines how dangerous a particular radioactive isotope is?	The half-life of the isotope.
What name is given to the process by which the nuclei of heavy elements split apart?	Nuclear fission
What is absorbed by a uranium nucleus that causes it to undergo fission?	A neutron
When a uranium nucleus breaks apart because of fission, what is produced?	Two smaller nuclei + 2-3 neutrons + ionising radiation.
True or false: nuclear fission only occurs in large, stable nuclei.	FALSE - it occurs in large, unstable nuclei
If the neutrons produced by each fission event go on to cause more fission events, and this process continues, what might occur?	Chain reaction
True or false: generating electricity via nuclear fission is unpopular because it releases carbon dioxide.	FALSE
Why is generating electricity via nuclear fission unpopular in some countries?	Risk of disaster if chain reaction occurs. Large building and decommissioning costs. Problems with storing radioactive waste.
What name is given to the process by which two smaller nuclei join together to form one larger nucleus?	Nuclear fusion
Which releases more energy per event: nuclear fission or nuclear fusion?	Nuclear fusion
Why are nuclear fusion power stations not yet in operation?	Humans have not managed to obtain high enough temperatures to carry out fusion over a long period.

Date: 25/3/24

Week 11 Task 1 - 1 Page of retrieval quizzing - do not use full sentences

Date: 25/3/24

Week 11 Task 2 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

Explain how the properties of α, β and γ radiation affect the level of the hazard at different distances. (6)

Improvement Work: Explain how the properties of α, β and γ radiation affect the level of the hazard at different distances. (6)

Date: 25/3/24

Week 11 Task 3 - Complete the exam question then fill the remainder of the page with retrieval quizzing. Use full sentences for the exam question, but not the quiz.

Plan an investigation to show how the concentration of the sodium thiosulfate solution affects the rate of the reaction with dilute hydrochloric acid.
Your plan should give valid results. (6 Marks)

Improvement Work:Plan an investigation to show how the concentration of the sodium thiosulfate solution affects the rate of the reaction with dilute hydrochloric acid.
Your plan should give valid results. (6 Marks)

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