

Previous Knowledge / Links
Year 7: Cells, Body Systems and Reproduction.

Emerging

- Identify the components of a healthy diet.
- Describe the main parts of the digestive system.

Developing

- Explain the role of each food group in the body.
- Describe how to test foods for starch, lipids, sugar, and protein.
- Describe some health issues caused by an unhealthy diet.
- Describe the role of enzymes in digestion.

Secure

- Explain the importance of testing foods for different nutrients.
- Describe food requirements for a healthy diet using information provided.
- Describe the role of bacteria in digestion.
- Describe the differences between recreational and medical drugs.

Mastery

- Describe the effects of drugs, alcohol, and tobacco smoke on health and behaviour.
- Explain the effects of alcohol and tobacco smoke on a developing baby.
- Analyse the impact of different substances on overall health, considering various factors and consequences.

GCSE: Organisation (Biology)

Next Topics / Links

Key Words

Healthy diet, food groups, carbohydrates, proteins, fats, vitamins, minerals, fibre, water, digestive system, enzymes, bacteria, testing foods, starch, lipids, sugar, protein, unhealthy diet, health issues, recreational drugs, medical drugs, drug effects, alcohol, tobacco smoke, developing baby, behaviour, nutrient testing,

Knowledge | Comprehension | Application | Analysis | Evaluation | Creation

Previous Knowledge / Links
Year 7: Lab Safety, Particles and their behaviour and atoms elements and compounds.

Emerging

- Describe what happens to atoms in chemical reactions.
- Compare chemical changes to physical changes.
- Identify reactants and products in word equations.

Developing

- Explain why chemical reactions can be useful.
- Write word equations to represent chemical reactions.
- State that combustion is a reaction with oxygen in which energy is transferred to the surroundings as heat and light.
- Identify decomposition reactions from word equations.

Secure

- Predict the products of a combustion reaction.
- Evaluate different fuels in terms of the pros and cons of their products of combustion.
- Use a pattern to predict how a set of compounds thermally decompose.
- Explain conservation of mass in chemical reactions.
- Determine the characteristics of endothermic and exothermic energy changes.

Mastery

- Calculate masses of reactants and products in chemical reactions.
- Analyse and compare the energy changes in various types of chemical reactions.
- Design an experiment to investigate the effects of different factors on the rate of a chemical reaction.

Next Topics / Links
GCSE: Chemical changes (Chemistry), Energy Changes (Chemistry), Quantitative Chemistry.

Key Words

Atoms, chemical reactions, physical changes, reactants, products, word equations, combustion, oxygen, energy transfer, heat, light, fuels, decomposition, thermal decomposition, compounds, conservation of mass, endothermic, exothermic, energy changes, reaction rates, experiment, efficiency, environmental impact, industry.

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Emerging

- State what a mixture is and give examples of mixtures.
- Use particle models to compare mixtures and pure substances.
- Describe solutions using key terms.
- State that the method chosen to separate a mixture depends on which physical properties of the individual substance are different.

Developing

- Comment on the purity of a substance by interpreting temperature change data.
- Explain how substances dissolve using the particle model.
- Draw annotated before and after diagrams to represent dissolving.
- Label distillation apparatus and describe what happens in distillation.
- Describe what happens to a mixture when it undergoes chromatography.

Secure

- Justify the suitability of separation techniques in terms of properties of constituent substances.
- Justify whether a given particle diagram represents a solution or a pure substance.
- Use the solubility curve of a solute to describe and explain simple observations about solutions.
- Compare evaporation and distillation.
- Use evidence from chromatography to identify unknown substances in mixtures and to identify the pen or plant a sample is from.

Mastery

- Justify the procedure and evaluate the results in a solubility investigation.
- Suggest a reason for the effect of temperature on solubility for a given solute.
- Explain how chromatography separates mixtures.
- Justify the use of chromatography in different scenarios and consider how chromatography can be used to monitor the progress of reactions.
- Suggest possible issues to consider when using chromatography to identify unknown substances.

Previous Knowledge / Links

Year 7: Particles and their behaviour and atoms, elements and compounds.

Next Topics / Links

GCSE: Analytical Chemistry and Using resources (Chemistry)

Key Words

mixture, pure substances, particle model, temperature change, separation techniques, solution, dissolving, solubility, solubility curve, investigation, filtration, distillation, evaporation, chromatography, chromatogram, physical properties, identification, unknown substances, reactions,

Knowledge | Comprehension | Application | Analysis | Evaluation | Creation

Emerging

- Calculate speed using the speed equation
- Describe relative motion
- Choose equipment to make appropriate measurements for time and distance to calculate speed
- Explain why fluids exert a pressure
- Describe how liquid pressure changes with depths
- Describe what is meant by a moment

Developing

- Interpret distance-time graphs
- Calculate speed from a distance-time graph and convert between units
- Calculate fluid pressure
- Describe how atmospheric pressure changes with height
- Calculate the moment of a force
- Explain why some things float and some things sink using force diagrams

Secure

- Plot data on a distance-time graph accurately
- Use the equations for calculating fluid pressure
- Calculate stress
- Apply ideas of stress to different situations
- Independently identify scientific questions from results

Mastery

- Predict quantitatively the effect of changing area and/or force on stress
- Calculate stress in various contexts and situations
- Analyse and interpret complex distance-time graphs, including non-linear and multi-segmented graphs

Previous Knowledge / Links
Year 7: Forces and Particles and their behaviour.

Next Topics / Links
GCSE: The particle model of matter (physics), Forces (Physics) Graph skills (All Sciences)

Key Words

speed, relative motion, distance, time, distance-time graph, fluid pressure, atmospheric pressure, liquid pressure, buoyancy, force, moment, stress, area, calculations, non-linear graphs, height, depth, sinking, floating, force diagrams, measurements, equipment, units

Knowledge | Comprehension | Application | Analysis | Evaluation | Creation

Previous Knowledge / Links
Year 7: Lab Safety, Particles and their behaviour
and atoms elements and compounds.

Emerging

- Describe features of chemical reactions
- Identify chemical reactions and physical changes
- Record simple observations from practical work
- Name common properties of acids and alkalis
- Define concentrated and dilute
- Label hazard symbols and describe related hazards
- State pH levels for acids, neutral solutions, and alkalis
- Recognize neutralisation reactions

Developing

- Use indicators to identify the pH of a solution
- Describe what happens during a neutralisation reaction
- Identify independent, dependent, and control variables in an investigation
- Describe the type of substance made when an acid and an alkali react
- Match the type of salt that will form from the type of acid used
- Describe observations during an experiment
- Describe reactions between metals and acids, and metals and oxygen

Secure

- State the products of reactions between metals and acids, metals and oxygen, and metals and water
- Compare reactivity of different metals
- Write a simple method to test reactivity of metals with acids or water
- Determine which metal is more reactive in a pair of named metals
- Place different metals in the reactivity series
- Use observations from experiments to determine if a displacement reaction has occurred

Mastery

- Predict and explain the outcome of reactions between metals and acids, metals and oxygen, and metals and water
- Analyse experimental data to draw conclusions about metal reactivity
- Design experiments to investigate the reactivity of different metals and their reactions with acids, oxygen, and water
- Use knowledge of the reactivity series to predict and explain the outcomes of various chemical reactions

GCSE: Chemical changes (Chemistry), Energy Changes
(Chemistry), Quantitative Chemistry,
The rate and extent of chemical change

Key Words

Acid, Alkali, Chemical reaction, Physical change, pH, Neutral solution, Concentrated, Dilute, Hazard symbols, Indicator, Observations, Neutralisation reaction, Independent variable, Dependent variable, Control variable, Salt, Experiment, Properties,

Knowledge | Comprehension | Application | Analysis | Evaluation | Creation

Emerging

- Define charge and insulators
- Identify the two types of charge
- Recognize the difference between series and parallel circuits
- Describe basic features of a magnet
- Identify conductors and insulators

Developing

- Explain what happens when similarly charged and differently charged objects are brought together
- Measure current using an ammeter
- Describe the effect of potential difference in a circuit
- Draw magnetic field lines around a bar magnet
- State the main features of an electromagnet.

Secure

- Use appropriate equipment to measure potential difference
- Calculate resistance for values of potential difference and current
- Explain how potential difference varies in series and parallel circuits
- State the Earth has a magnetic field
- Test the effect of changing an electromagnet

Mastery

- Identify patterns of current in series and parallel circuits
- Compare the resistance of conductors and insulators
- Record the shape of field lines around a magnet
- State the difference between a permanent magnet and an electromagnet
- State where the magnetic field due to a wire or solenoid is strongest

Previous Knowledge / Links
Year 7: Particles and their behaviours and Elements atoms and compounds.

Next Topics / Links
GCSE: Electricity and magnetism (Physics),
Electrolysis (Chemistry)

Key Words

Charge, Insulators, Positive charge, Negative charge, Charged objects, Attraction, Repulsion, Current, Ammeter, Series circuit, Parallel circuit, Potential difference, Voltmeter, Resistance, Conductors, Insulators, Magnet, Magnetic field lines, Bar magnet, Earth's magnetic field, Electromagnet, Permanent magnet, Solenoid, Magnetic field strength, Investigation.,

Knowledge | Comprehension | Application | Analysis | Evaluation | Creation

Previous Knowledge / Links
Year 7: Cells, Body Systems and Reproduction.

Emerging

- Define the term variation
- Recognize that variation is caused by the environment and inheritance
- Identify environmental changes
- Define DNA, chromosome, and gene

Developing

- Distinguish between the two types of variation
- Record observations of variations between different species of animals
- Give a possible reason for adaptation or extinction
- Describe how survival rates differ for successful adaptations.

Secure

- Plot graphs representing the two types of variation
- Explain the process of organisms changing over time and provide examples
- State what is meant by peer review
- Define the terms extinct and biodiversity

Mastery

- Create a simple evolutionary sequence
- Explain the role of peer review in the scientific process
- Name the process by which organisms evolve
- Extract information from scientific text about a possible theory for dinosaur extinction

Next Topics / Links
GCSE: Genetics and inheritance (Biology)
Ecology (Biology)

Key Words

Variation, environment, inheritance, species, continuous variation, discontinuous variation, adaptation, extinction, DNA, chromosome, gene, survival rates, evolutionary sequence, peer review, organisms, biodiversity, dinosaur extinction,

Knowledge | Comprehension | Application | Analysis | Evaluation | Creation

Emerging

- Name the main structures of a leaf
- State the function of the chloroplasts in a leaf
- Use observations from the underside of a leaf to label a diagram
- State where photosynthesis occurs in a plant
- State the products of photosynthesis
- Name the minerals required by plants
- Define and understand the term 'ecosystem'
- Define the terms 'food chain' and 'trophic level'
- Define the term 'food web'

Developing

- State the requirements for aerobic respiration
- Give the name of the process by which energy is released in cells
- Differentiate between various types of ecosystems (e.g., aquatic, terrestrial, desert, rainforest, grassland)
- Identify and explain the roles of producers, primary consumers, secondary consumers, and tertiary consumers in a food chain
- Construct simple food chains using appropriate terminology and examples from different ecosystems
- Recognise that food webs are complex, interconnected networks of feeding relationships in an ecosystem
- Identify factors that can disrupt food chains and webs, such as natural disasters, climate change, invasive species, and human impact

Secure

- Plan an experiment to measure breathing rates
- State the products of anaerobic respiration
- State one difference between aerobic and anaerobic respiration
- Explain the concept of interdependence within an ecosystem, including the roles of producers, consumers, and decomposers
- Understand the concept of energy transfer through a food chain and the principle of the 10% energy rule
- Construct and interpret food webs using appropriate examples from different ecosystems
- Evaluate the consequences of disruptions to food chains and webs on ecosystems, including loss of biodiversity and habitat destruction

Mastery

- Identify one source of error in data collected
- Investigate factors that affect the balance of an ecosystem, such as climate, competition, and human impact
- Analyse the role of keystone species in food webs and their importance in maintaining ecosystem balance
- Explore case studies of disrupted food chains and webs to understand their real-world implications
- Discuss potential strategies and actions to prevent or mitigate the negative effects of disruptions to food chains and webs, emphasising the importance of conservation and sustainable practices

Next Topics / Links

GCSE: Bioenergetics (Biology)
Ecology (Biology)

Previous Knowledge / Links
Year 7: Cells, Body Systems and Reproduction.
Year 8 Adaptation and inheritance.

Key Words

leaf, chloroplasts, photosynthesis, oxygen, minerals, plants, aerobic respiration, anaerobic respiration, energy, ecosystem, biotic, abiotic, aquatic, terrestrial, desert, rainforest, grassland, interdependence, producers, consumers, decomposers, food chain, trophic level, primary consumer, secondary consumer, tertiary consumer, energy transfer, 10% energy rule, food web, keystone species, disruption, natural disasters, climate change, invasive species, human impact, biodiversity, habitat destruction, conservation, sustainable practices,