Cornwallis Academy
Ambitions for All

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Year 7 Science

Lab safety

Learning Objectives

This topic focuses on developing safe and effective laboratory skills, including working safely with chemicals and equipment such as acids and Bunsen burners, and planning accurate scientific experiments using independent, dependent, and control variables

What previous knowledge is required?

None, being new to year 7 we assume the science input at KS2 was limited or perhaps none at all.

How will this topic's content help with future learning?

All content in KS3 is part of a spiral curriculum set out by AQA (the exam board chosen by Cornwallis Academy for GCSE Science). All of KS3 forms the foundation of knowledge for GCSE study.

Common Misconceptions

Common misconceptions include confusing accuracy with precision, mixing up independent, dependent, and control variables. Safety misconceptions can include underestimating the importance of safe lab behaviour and correct use of acids and Bunsen burners.

National Curriculum / Specification

2.1 Analyse Patterns, 2.2 Discuss limitations, 2.9 Collect data, 2.10 Devise questions, 2.11 Plan variables, 2.12 test hypotheses, 2.13 Estimate risks

Movement and Cells

Learning Objectives

This topic focuses on understanding how cells, tissues, and body systems function in living organisms. Students will compare plant and animal cells, describe the functions and adaptations of organelles such as the nucleus, mitochondria, and chloroplasts, and learn how to calculate magnification and use a microscope. Learners will also explore specialised cells and the medical uses of stem cells, as well as study the major organ systems and their functions. Students will investigate how the skeleton and muscles work together for support, protection, movement, and blood cell production, including how antagonistic muscle pairs create movement around joints. They will also examine the process of diffusion and how substances move into and out of cells.

What previous knowledge is required?

Students should already know basic ideas about living things, body parts and their functions, and that organisms are made of cells. They should also have simple scientific skills such as observing, measuring, recording results, and using equipment safely.

How will this term's content help with future learning?

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Common Misconceptions

Common misconceptions include thinking that plant and animal cells are identical, believing all cells look and work the same, or confusing the functions of organelles such as the nucleus and mitochondria. Students may think muscles push rather than pull, misunderstand how antagonistic muscles work, or believe bones are not living tissue. Learners also often confuse ligaments, tendons, and cartilage, and may think diffusion only happens in one direction or requires energy.

National Curriculum / Specification

3.8.1 Movement and 3.8.2 Cells

Voltage, Current and Resistance

Learning Objectives

This topic focuses on understanding electricity, electric circuits, and electrostatic forces. Students will explore how voltage provides an electrical push in a circuit, how current flows in series and parallel circuits, and how resistance

affects the movement of charge and energy transfer. Learners will use formulas to calculate resistance and investigate the properties of conductors and insulators. The topic also examines static electricity, including how objects become charged through the movement of electrons, how charged objects attract or repel each other, and how electric fields decrease in strength with distance.

What previous knowledge is required?

Students should already know that electricity can power devices and flow through circuits, and understand simple ideas about batteries, bulbs, and switches. They should also have basic knowledge of forces, materials, and simple measurements used in science.

How will this term's content help with future learning?

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Common Misconceptions

Common misconceptions include thinking current gets “used up” as it moves through a circuit, confusing current with voltage, or believing batteries supply current rather than energy. Students may also think electrons move extremely fast around a circuit, misunderstand how current behaves in series and parallel circuits, or believe static electricity and current electricity are the same thing.

National Curriculum / Specification

3.2.1 Voltage and Resistance and 3.2.2 Current

Particle Model

Learning Objectives

This topic focuses on understanding the particle model and how the arrangement and movement of particles explain the properties of solids, liquids, and gases. Students will explore how particles behave during changes of state, including melting, boiling, freezing, condensing, evaporating, and sublimation, and how these changes involve particles gaining or losing energy. Learners will also investigate concepts such as diffusion, gas pressure, and density, using the particle model to explain the behaviour of substances in different states.

What previous knowledge is required?

Students should already know the basic differences between solids, liquids, and gases, and understand that materials can change state when heated or cooled. They should also have simple knowledge of temperature and everyday examples of melting, freezing, and evaporation.

How will this term's content help with future learning?

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Common Misconceptions

Common misconceptions include thinking particles themselves expand or grow when a substance is heated rather than moving faster and spreading out. Students may also believe there is nothing between particles in liquids and gases, or that particles change size during state changes. Others may think diffusion only happens in gases, or that boiling and evaporation are the same process occurring in the same way.

National Curriculum / Specification

3.5.1 Particle Model

Metals and Non-Metals

Learning Objectives

This topic focuses on understanding the properties and reactions of metals and non-metals. Students will learn how these substances react with oxygen to form acidic or basic oxides, explore the reactivity series of metals, and investigate how some metals react with acids to produce salts and hydrogen gas. Learners will also study important facts about materials, including magnetic metals such as iron, nickel, and cobalt, and unusual elements like mercury and bromine, which are liquid at room temperature.

What previous knowledge is required?

Students should already know the basic differences between solids, liquids, and gases, understand simple particle ideas, and recognise that materials have different properties. They should also have basic knowledge of elements, compounds, and simple chemical reactions.

How will this term's content help with future learning?

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Common Misconceptions

Common misconceptions include thinking all metals are magnetic, believing all metals are solid at room temperature, or assuming non-metals cannot be liquids. Students may also confuse physical and chemical changes, think metals disappear during reactions, or misunderstand that reactivity means how dangerous a substance is rather than how easily it reacts.

National Curriculum / Specification

3.6.1 Metals and non-metals

Acids and Alkalis

Learning Objectives

This topic focuses on understanding acids, alkalis, and the pH scale, including how the strength of an acid affects its pH value. Students will explore neutralisation reactions between acids and alkalis, learning how salts and water are formed. Learners will also investigate the properties of strong and weak acids, use indicators to identify acidic and alkaline solutions, and understand the importance of handling corrosive and irritant substances safely.

What previous knowledge is required?

Students should already know that substances can be solids, liquids, or gases, and understand simple ideas about chemical reactions and laboratory safety. They should also have basic experience using scientific equipment and observing changes in substances.

How will this topic's content help with future learning?

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Common Misconceptions

Common misconceptions include thinking strong acids are always concentrated, confusing strength with concentration, or believing all acids are dangerous and all alkalis are harmless. Students may also think neutralisation always produces a neutral pH of 7 or misunderstand that pH measures acidity and alkalinity rather than how “strong” a chemical is overall.

National Curriculum / Specification

3.6.2 Acids and Alkalis

Variation

Learning Objectives

This topic focuses on understanding variation within a species and how differences between individuals can be inherited, caused by the environment, or influenced by both. Students will explore why variation is important for survival and how it helps species adapt to changing environments, reducing the risk of extinction.

What previous knowledge is required?

Students should already know that living things grow, reproduce, and belong to different species. They should also understand that offspring are similar to, but not exactly the same as, their parents, and have basic knowledge of habitats and survival.

How will this topic's content help with future learning?

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Common Misconceptions

Common misconceptions include thinking all variation is inherited, believing environmental factors cannot affect organisms, or assuming individuals of the same species are identical. Students may also confuse adaptation with choice, or think variation only refers to physical appearance rather than behaviours and other characteristics.

National Curriculum / Specification

3.10.1 Variation

Energy Costs & Transfers

Learning Objectives

This topic focuses on understanding how energy is transferred, stored, and used in everyday life, including domestic electricity usage and energy resources. Students will explore different energy stores such as thermal, kinetic, gravitational potential, chemical, and elastic energy, and learn that energy is conserved even though some is dissipated as waste. Learners will also investigate renewable and non-renewable energy resources, compare their advantages and disadvantages, and calculate the cost of electricity using power, time, and price per kilowatt-hour.

What previous knowledge is required?

Students should already know that energy is needed for movement, heating, and everyday activities, and understand simple ideas about electricity and fuels. They should also have basic maths skills for using formulas and measuring time.

How will this topic's content help with future learning?

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Common Misconceptions

Common misconceptions include thinking energy is “used up” rather than transferred, confusing power with energy, or believing dissipated energy disappears completely. Students may also think renewable energy has no disadvantages, confuse electricity with energy itself, or misunderstand that fossil fuels are formed over millions of years and cannot be quickly replaced.

National Curriculum / Specification

3.3.1 Energy Costs and 3.3.2 Energy Transfers

Human Reproduction

Learning Objectives

This topic focuses on understanding human reproduction, the menstrual cycle, and the development of a foetus during pregnancy. Students will learn how the male and female reproductive systems work, including the roles of gametes, fertilisation, ovulation, and menstruation. Learners will also explore how a foetus develops in the uterus, how the placenta and umbilical cord provide nutrients and oxygen while removing waste, and how amniotic fluid helps protect the developing baby during gestation.

What previous knowledge is required?

Students should already know that living things reproduce to produce offspring and understand basic life processes in humans and animals. They should also have simple knowledge of body organs, growth, and that babies develop inside the mother before birth.

How will this topic's content help with future learning?

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Common Misconceptions

Common misconceptions include thinking fertilisation happens in the uterus rather than the oviduct, believing menstruation and ovulation are the same process, or assuming pregnancy happens immediately after fertilisation. Students may also confuse the roles of reproductive organs, think the foetus breathes independently inside the womb, or misunderstand the functions of the placenta, umbilical cord, and amniotic fluid.

National Curriculum / Specification

3.10.2 Human Reproduction

Speed and Gravity

Learning Objectives

This topic focuses on understanding how forces affect motion and how gravity acts on objects. Students will learn that unbalanced forces can cause objects to speed up, slow down, or change direction, and will use formulas and distance-time graphs to calculate and interpret speed. Learners will also explore the relationship between mass and weight, understand how gravitational force depends on mass and distance, and investigate how gravity keeps planets and moons in orbit. They will apply the formula for weight and compare gravitational field strength on Earth and the Moon.

What previous knowledge is required?

Students should already know that forces can push or pull objects, understand basic measurement of distance and time, and have simple graph-reading skills. They should also know that gravity pulls objects towards Earth and have basic arithmetic skills for using formulas.

How will this topic's content help with future learning?

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Common Misconceptions

Common misconceptions include thinking force is needed to keep an object moving at a constant speed, confusing speed with acceleration, or misreading distance-time graphs. Students may also believe mass and weight are the same, think heavier objects fall faster because of gravity alone, or assume there is no gravity in space.

National Curriculum / Specification

3.1.1 Speed and 3.1.2 Gravity

Sound

Learning Objectives

This topic focuses on understanding how sound is produced and travels through vibrations as a longitudinal wave. Students will explore how sound moves through different substances, why it travels faster in denser materials, and why it cannot travel through a vacuum. Learners will also investigate how amplitude affects loudness, how frequency affects pitch, and compare the speed of sound to the much faster speed of light.

What previous knowledge is required?

Students should already know that sound is something we hear and that vibrations can create sound. They should also have basic knowledge of solids, liquids, and gases, simple wave ideas such as movement through a medium, and basic measurement skills.

How will this topic's content help with future learning?

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Common Misconceptions

Common misconceptions include thinking sound can travel through a vacuum, believing louder sounds travel faster, or confusing pitch with volume. Students may also think sound waves move matter from one place to another, rather than transferring energy through vibrations, and may misunderstand that sound travels faster in air than in solids.

National Curriculum / Specification

3.4.1 Sound

Interdependence and Plant Reproduction

Learning Objectives

This topic focuses on understanding how organisms in ecosystems depend on one another through food chains and food webs, and how changes in one population can affect others. Students will explore the roles of producers, consumers, and decomposers, as well as factors that influence populations such as predators, disease, pollution,

and competition for resources. Learners will also study plant reproduction, including pollination, fertilisation, seed formation, and seed dispersal by wind, water, and animals, while identifying the structures and functions of different parts of a flower.

What previous knowledge is required?

Students should already know that living things need food, water, and suitable habitats to survive, and understand simple ideas about plants and animals in environments. They should also have basic knowledge of life processes, parts of a plant, and that plants can grow from seeds.

How will this topic's content help with future learning?

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Common Misconceptions

Common misconceptions include thinking food chains are separate rather than linked in food webs, believing plants get food from the soil instead of making it themselves, or confusing producers, consumers, and decomposers. Students may also think pollination and fertilisation are the same process, believe all seeds are dispersed in the same way, or misunderstand the functions of flower parts such as pollen, ovules, and the ovary.

National Curriculum / Specification

2.9.1 Interdependence and 3.9.2 Plant Reproduction

Earth Structure and Universe

Learning Objectives

This topic focuses on understanding the rock cycle and the structure of the Earth, as well as exploring the solar system and the wider Universe. Students will learn how sedimentary, igneous, and metamorphic rocks are formed and changed over millions of years through processes such as weathering, erosion, heat and pressure, and melting and cooling. They will also study the Earth's crust, mantle, and core, and investigate the properties of different rock types. In space science, learners will explore how planets and moons move in orbit, how Earth's tilt and orbit create day and night and the seasons, and how the solar system fits within the Milky Way galaxy and the vast Universe beyond.

What previous knowledge is required?

Students should already know that Earth is made of different materials and that rocks are found naturally in the environment. They should also have basic knowledge of day and night, the Sun, Moon, and planets, and understand that Earth moves in space.

How will this topic's content help with future learning?

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Common Misconceptions

Common misconceptions include thinking rocks never change, confusing weathering with erosion, or believing fossils are found in all rock types. Students may also think the seasons are caused by Earth being closer to the Sun, believe the Sun moves around Earth, or confuse galaxies, solar systems, and planets as being the same type of object.

National Curriculum / Specification

3.7.1 Earth structure and 3.7.2 Universe