



	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
7	<p>Topic 1: Particles. What are particles and how do they behave in the different states of matter?</p> <p>Topic 2: Forces. What are forces? How do we measure and describe them?</p>	<p>Topic 3: Separating Mixtures. What is a mixture and how can we separate a mixture?</p> <p>Topic 4: Energy. What is energy and how is it transferred?</p>	<p>Topic 5: Cells, tissues and organs. How are animal and plant cells different?</p> <p>Topic 6: Electricity. What are electrical circuits? What are current and voltage and how do we measure them?</p>	<p>Topic 7: Sexual reproduction. How do humans and other animals reproduce sexually?</p> <p>Topic 8: Atoms, elements and compounds. What are the similarities and differences between atoms, elements?</p>	<p>Topic 9: Muscles and bones. What is gas exchange and how does it occur? Which are the major bones and joints in the body?</p> <p>Topic 10: Acids and alkalis. What are acids and alkalis? How do we handle them and identify them in the lab? What happens when they react together?</p>	<p>Topic 11: Ecosystems. How and why are organisms adapted to live in a variety of ecosystems? How do organisms within an ecosystem interact with one another?</p> <p>Topic 12: Sound. What is sound? How is it created and how does it travel? How and why do sounds differ?</p>
8	<p>Topic 1: Food and nutrition. What are the nutrient groups? How does our knowledge of them contribute to health?</p> <p>Topic 2: Energy transfers. What is the difference between heat and temperature? How is energy transferred and how do we reduce these transfers in our homes?</p>	<p>Topic 3: Periodic table. How did the periodic table arise and how is it used today?</p> <p>Topic 4: Combustion. What is combustion and what is its impact on the environment?</p>	<p>Topic 5: Plants. What is the basic structure and function of plants? How are they adapted to reproduce and disperse their seeds?</p> <p>Topic 6: Light. What is light? How does it behave in different mediums? What is colour?</p>	<p>Topic 7: Rocks. What are rocks made of? How are rocks made? How are they classified?</p> <p>Topic 8: Metals. What are the differences between metals and non-metals? How do metals react with a range of different chemicals?</p>	<p>Topic 9: Breathing and respiration. What is the difference between breathing and respiration? What is the impact of exercise on them?</p> <p>Topic 10: Fluids. How do particles behave in different situations? How does this influence density, drag and pressure?</p>	<p>Topic 11: Unicellular organisms. What are unicellular organisms how are they classified? What is their impact upon us?</p> <p>Topic 12: Space. Why do we have days, seasons and years? What is gravity? What is beyond our solar system?</p>



9	<p>Topic 1: Genetics and evolution. How and why do organisms show variation?</p> <p>Topic 2: Forces and motion. What are forces and how do they affect motion? What is speed? What are levers and gears?</p>	<p>Topic 3: Making materials. What are the properties and uses of ceramics, polymers and composite materials? What are endothermic and exothermic reactions?</p> <p>Topic 4: Reactivity. What are chemical and physical reactions? What are the signs of a chemical reaction? What is a reactivity series? What are displacement reactions?</p>	<p>Topic 5: Plant growth. How do plants use photosynthesis to grow? How do humans benefit from this reaction and how can they manipulate it?</p> <p>Topic 6: Force fields and electromagnets. What are contact and non-contact forces? What is static electricity? What is resistance in electrical circuits? What are electromagnets?</p>	<p>Physics transition unit: Energy. This unit focuses on the 'big idea' of energy. The aim is to go over the key concepts from KS3 to prepare students for KS4.</p> <p>Physics transition unit: Heat. This unit focuses on the 'big idea' of heat. The aim is to go over the key concepts from KS3 to prepare students for KS4.</p>	<p>Biology Transition unit. This unit focuses on the 'big idea' of cells, respiration and photosynthesis. The aim is to go over the key concepts from KS3 to prepare students for KS4.</p> <p>Chemistry transition unit. This unit focuses on the 'big idea' of atoms, elements and compounds. The aim is to go over the key concepts from KS3 to prepare students for KS4.</p>	<p>Biology Transition unit. This unit focuses on the 'big idea' of cells, respiration and photosynthesis. The aim is to go over the key concepts from KS3 to prepare students for KS4.</p> <p>Chemistry transition unit. This unit focuses on the 'big idea' of atoms, elements and compounds. The aim is to go over the key concepts from KS3 to prepare students for KS4.</p>
---	--	---	--	---	---	---



10

**Biology topic:** Core principles.

What is the structure and function of plant, animal and prokaryotic cells? How do we use a microscope to view them? How do substances move across membranes? What are enzymes and how do they function?

**Chemistry topic:** States of matter and separating.

What are the states of matter? What is the particle model? How do we separate mixtures?

**Chemistry topic:** Atomic structure and the periodic table.

What are atoms? How do we represent atoms using diagrams? What is the periodic table and how do atoms fit into it?

**Physics topic:** Motion and forces.

What are vectors and scalars? How do we calculate speed and draw and interpret distance-time graphs?

**Biology topic:** Cells and control.

How do cells divide by mitosis? What are stem cells? What is the structure and function of the nervous system?

**Biology topic:** Genetics.

How do cells divide by meiosis to produce gametes? What is the structure and function of DNA? How do we inherit traits from our parents?

**Biology topic:** Natural selection and genetic modification.

What is natural selection? What is evolution? What is genetic engineering and how does it work?

**Chemistry topic:** Bonding and types of substance.

What are ionic, covalent and metallic bonds and how do they form? What are the properties of ionic, covalent and metallic substances?

**Physics topic:** Conservation of energy.

What are energy transfers and how can we reduce them in our homes? How to calculate energy transfers?

**Chemistry topic:** Fuels.

What are the fossil fuels and how do they form? What are hydrocarbons? What is the structure and uses of the alkanes? What are alkenes?

**Physics topic:** Forces – doing work and their effects.

What are forces and how can they impact objects? What is the difference between mass and weight? What are stopping distances and what factors affect them?

**Biology topic:** Ecosystems and material cycles.

What are ecosystems and how do organisms interact within them? How can we monitor changes in the ecosystems using quadrats? What occurs in the major material cycles within nature?

**Physics topic:** Waves.

What are waves? How can we describe waves? What is the wave equation and how do we use it?

**Chemistry topic:** Atmosphere.

What is the structure and function of the atmosphere? How and why has the atmosphere changed over time?

**Physics topic:** Light and the EM spectrum.

What type of waves are in the EM spectrum? What are their uses and dangers? How do light waves behave in different mediums?

**Physics topic:** Forces and matter.

A review of energy stores and transfer. What is 'work done'? what is 'power'?





11	<p><b>Biology topic:</b> Health, disease and development of medicines</p> <p><b>Chemistry topic:</b> Acids and alkalis.</p> <p>What are acids and alkalis? What are indicators and how do we use them? What are neutralisation reactions? What are balanced equations?</p> <p><b>Physics topic:</b> Waves.</p> <p>What are waves? How can we describe waves? What is the wave equation and how do we use it?</p> <p><b>Physics topic:</b> Light and the EM spectrum.</p> <p>What type of waves are in the EM spectrum? What are their uses and dangers? How do light waves behave in different mediums?</p>	<p><b>Chemistry topic:</b> Calculations involving masses.</p> <p>How to work out the number of protons, neutrons and electrons an atom has? How to calculate formula mass? How to calculate moles? How to calculate concentration? How to calculate the empirical formula? How to calculate reacting masses?</p> <p><b>Physics topic:</b> Radiation.</p> <p>What are atoms and isotopes? What are the three types of nuclear radiation? How can we measure radioactivity?</p> <p><b>Chemistry topic:</b> Electrolytic processes, obtaining and using materials, reversible reactions. What is electrolysis and how does it happen? How is it used to obtain metals? How else could we extract metals? What are reversible reactions?</p>	<p><b>Biology topic:</b> Plants and photosynthesis.</p> <p>What is photosynthesis? Where and why does it occur? How are substances transported through plants?</p> <p><b>Biology topic:</b> Coordination, control and homeostasis.</p> <p>How are the nervous system and endocrine system different? What are hormones and what is their role in the body? How can hormones be used to alter fertility in women?</p> <p><b>Chemistry topic:</b> Rates of reaction.</p> <p>What factors affect the rate of a chemical reaction? How can we monitor the rate of a chemical reaction? What are catalysts?</p> <p><b>Physics topic:</b> Electricity.</p> <p>How do we draw and make electrical circuits? How do we measure current and potential difference and how do they behave in series and parallel circuits? What is resistance and how do we measure it?</p>	<p><b>Biology topic:</b> Exchange and transport.</p> <p>How are substances exchanged and transported around the body? How and where does gas exchange occur? What is the structure and function of the respiratory system? What is respiration? How and why does it occur?</p> <p><b>Biology topic:</b> Ecosystems.</p> <p>What are ecosystems and how do organisms interact within them? How can we monitor changes in the ecosystems using quadrats? What occurs in the major material cycles within nature?</p> <p><b>Chemistry topic:</b> Atmosphere.</p> <p>What is the structure and function of the atmosphere? How and why has the atmosphere changed over time?</p> <p><b>Chemistry topic:</b> Groups in the periodic table.</p> <p>What are the different groups in the periodic table? What are the trends seen in group 1, 7 and 0?</p> <p><b>Physics topic:</b> Magnetism and electromagnets.</p> <p>What causes magnetism? What is the structure and function of an electromagnet?</p>	<p><b>Chemistry topic:</b> Energy changes in chemical reactions.</p> <p>What are endothermic and exothermic reactions?</p> <p><b>Physics topic:</b> Particle model, forces and matter.</p> <p>How does the arrangement of particles affect the density of a substance? How does a change of state occur? What is pressure and how is it affected by pressure? What is elastic potential energy and how can it be calculated?</p>	Exam leave
12	<p>Students study individual sciences beyond year 11. Details for those routes can be found under the specific subject.</p>					
13						



## **Curriculum Intent:**

Science at DEC is designed to fulfil the four principal arguments put forward by the ASE (*ASE Guide to Secondary Science Education 2006*) to justify the place of Science in the core curriculum:

- 1) The reliable and useful knowledge argument - a scientific habit of mind allows students to rationally tackle questions and problems based on empirical evidence.
- 2) The economic argument – Science can be seen as pre professional education which enables students to access many careers in the modern world.
- 3) The cultural argument – Science is one of the great achievements of our culture and students should have the opportunity to gain knowledge of how it was derived.
- 4) The democratic argument – scientifically literate citizens are likely to become democratically empowered and able to make informed judgements of their own.