Science topic overview: Year 7

Autumn term	
Baseline Testing	In the initial weeks of the Autumn term pupils will take part in baseline assessment to identify their strengths and needs as they transition from KS2 to KS3. Assessment data is used to inform planning for the topics ahead and provide a baseline from which to track progress.
Enquiry Processes (Part 1)	**Big idea:** In this introductory topic pupils will explore the skills that are an essential part of developing knowledge and understanding of Science. **Within this topic all pupils will show that they will be able to:** ✓ Describe how scientists develop an idea into an enquiry question that can be investigated ✓ Identify independent, dependent and control variables ✓ Develop a hypothesis ✓ Make an experimental prediction ✓ Describe how to plan an investigation ✓ Recognise what makes data accurate and precise ✓ Describe a risk assessment ✓ Describe how to make and record observations and measurements ✓ Calculate a mean from repeat measurements ✓ Choose how to display data and justify your decision ✓ Present data appropriately in tables, charts and graphs ✓ Identify patterns in data using a graph or chart ✓ Interpret data to suggest relationships between variables and draw conclusions ✓ Describe the steps in evaluating data ✓ Suggest ways to improve a practical investigation
Particle Models and Separating Stuff	**Big idea:** Matter The batteries in your phone rely on lithium metal. Lithium exists on Earth in rocks and as lithium chloride solution. How can lithium chloride and other substances, be separated from their solutions? Pupils will find out in studying this Big Idea. They will also learn why substances have different properties in their solid, liquid and gas states, and consider what happens when a substance changes from one state to another. **Big Questions:** ✓ What are materials like inside? ✓ What gives a material its properties? ✓ How can we separate the components of a mixture? By the end of the topic all pupils will complete an AQA Unit award.
Speed and Gravity	**Big idea:** Forces What is the link between the Moon orbiting the Earth and a falling object on Earth? In this Big Idea pupils will learn about forces, how they arise, and how they change the motion of an object. They will also learn how to measure speed and how to tell the story of a journey with a graph. **Big Questions:** ✓ Where do forces come from? ✓ How do we measure speed? ✓ Is the force of gravity the same on the Moon?

	By the end of the topic all pupils will complete an AQA Unit award.

Spring term	
Movement and Cells	**Big idea:** Organisms In this Big Idea pupils will start by finding out why they have a skeleton and how it works together with their muscles to enable them to move. They will then look inside organisms to discover what plants and animals are made of. Finally, they will meet some tiny organisms that can only be seen under the microscope. **Big Questions:** ✓ Why do we need a skeleton? ✓ How do we move? ✓ What are we made of? By the end of the topic all pupils will complete an AQA Unit award.
Voltage, resistance and Current	**Big idea:** Electromagnets Electricity can be a bit of a mystery because you cannot see what is happening inside the wires. In this big idea pupils will learn about what is happening in a circuit and how it can be modelled. They will learn about what batteries do and how to use circuit components to make circuits to do different jobs. They will learn about electric charge and how objects can become charged and will see how we can use this idea to explain electric shocks and lightening. **Big Questions:** ✓ Why do you sometimes get an electric shock when you touch a car door? ✓ How can one light in your house go out but the rest still be on? ✓ What is happening in a wire when a current flows? By the end of the topic all pupils will complete an AQA Unit award.
Acids and Alkalis	**Big idea:** Reactions Chemical reactions are very useful. They make new substances such as medicines, fabrics, and building materials. In this Big Idea pupils will learn about the chemical reactions of metals and of acids. They will find out how to use patterns in properties to predict products and discover how to make salts. **Big Questions:** ✓ What are chemical reactions? ✓ What are the patterns in the reactions of metals? ✓ What are the patterns in the reactions of acids? By the end of the topic all pupils will complete an AQA Unit award.

Summer term	
Metals and Non-Metals	**Big idea:** Reactions Chemical reactions are very useful. They make new substances such as medicines, fabrics, and building materials. In this Big Idea pupils will learn about the chemical reactions of metals and of acids. They will find out how to use patterns in properties to predict products and discover how to make salts. **Big Questions:** ✓ What are chemical reactions?

	✓ What are the patterns in the reactions of metals? ✓ What are the patterns in the reactions of acids? By the end of the topic all pupils will complete an AQA Unit award.
Energy Costs and Energy Transfer	**Big idea:** Energy In our daily lives we need food for our bodies and fuels for heating, transportation, and generating electricity. Without these things our life would be very different, and much as they were thousands of years ago. In this 'Big idea' pupils will learn about the ways of calculating energy in food and fuels. They will find out about the ways that we generate electricity and why it is helpful to reduce the time we use appliances. Pupils will learn how scientists think about energy, including the idea of dissipation. They will model how energy is transferred between different stores and learn how we can use energy calculations to tell us which processes are possible. **Big Questions:** ✓ What is the connection between a lump of coal and a sandwich? ✓ How will we generate electricity in the future? ✓ Why are more efficient devices better? By the end of the topic all pupils will complete an AQA Unit award.
Interdependence and plant reproduction	**Big idea:** Ecosystems Our environment if very important. It gives us the things we need to live, like food, water and shelter. We share our environment with many different types of plants and animals. In this Big Idea pupils will learn about how these organisms are connected and how they interact within ecosystems. Pupils will look closely at their feeding relationships and competition between species. They will also study the life cycle of a flowering plant and will learn about the reproductive parts of a plant and the differences between wind-pollinated and insect pollinated flowers. They will then follow the steps of reproduction from pollination to fertilisation, and finally to germination. **Big Questions:** ✓ How do organisms interact within an ecosystem? ✓ What happens to organisms if ecosystems change? ✓ How do plants reproduce? By the end of the topic all pupils will complete an AQA Unit award.
Environmental Challenge	All pupils will take part in a STEM based project with a focus on the Environment. The challenge will make a contribution to improving the environment around them either at home, in school or within the local community

Science topic overview: Year 8

Autumn term	
Earth's Structure and the Universe	**Big idea:** Earth Everything we need to live comes from the Earth, the oceans, the air, and the Sun. In this Big Idea pupils will find out about what the Earth is made from and its structure. They will also discover how materials are recycled in the rock cycle. They will also learn about the size and scale of our Solar System and galaxy. They will find out how the movement of the Earth and Moon explains the observations that we make of the Sun and the night sky. **Big Questions:** ✓ How do we classify rocks? ✓ How are materials recycled in the rock cycle? ✓ How big is the Solar system? How big is the universe? ✓ Why is it hotter in August than in December if you live in Britain? Why is it the other way around in Australia? ✓ How and why have ideas about the Universe changed? By the end of the topic all pupils will complete an AQA Unit award.
Variation and Human Reproduction	**Big idea:** Genes Every human in the world is different – even identical twins differ in some ways. In this Big Idea pupils will look at these differences and how they are caused. They will think about how variation can help organisms survive in difficult environments. Pupils will also learn about human reproduction. They will begin by looking at the changes that take place during adolescence, and then discover how new life is created and develops, resulting in the birth of a baby. **Big Questions:** ✓ How do organisms vary? ✓ How are organisms adapted to their habitat? ✓ How are new humans made? By the end of the topic all pupils will complete an AQA Unit award.
Sound and Light	**Big idea:** Waves In thunderstorm you see a flash of lightning and hear thunder. Your eyes and ears detect light and sound. In this Big Idea, pupils will learn about sound and hearing, and what changes when you make sounds of different pitch and loudness. They will learn how we see objects and how light behaves when it hits different materials. They will find out why we see lightning before we hear the thunder. **Big Questions:**

	✓ How fast do sound and light travel? ✓ How do lenses correct short sight and long sight? ✓ Why do coloured By the end of the topic all pupils will complete an AQA Unit award.

Spring term	
Periodic table and elements	**Big idea:** Matter What is stuff made of? In this Big Idea pupils will learn about the elements that make up everything in the Universe. They will explore ways of classifying elements, and find out about the patterns in their physical and chemical properties. **Big Questions:** ✓ What are atoms and elements? ✓ What are the patterns in the properties of elements? ✓ How can we use the periodic table to predict element properties By the end of the topic all pupils will complete an AQA Unit award.
Breathing and Digestion	**Big idea:** Organisms What do we need to stay healthy? In this Big Idea pupils will learn about how we breathe, and then look at the damage that can be caused through smoking, drinking alcohol, and taking drugs. Pupils will also study what makes a balanced diet and how the body breaks down the food that they eat to release energy and other nutrients that they need to live and grow. **Big Questions:** ✓ How does your body exchange gases with the environment? ✓ How can drugs affect your body? ✓ How does the body break down the foods you eat? By the end of the topic all pupils will complete an AQA Unit award.
Contact forces and pressure	**Big idea:** Forces You may have seen videos of skydivers jumping out of a plane and landing safely. Their motion changes between jumping and landing. Understanding the forces acting on an object allows you to explain how it's moving or not moving. The air skydivers move through is fluid – it is like a spread-out liquid. In this Big Idea pupils will learn about pressure in fluids (gases and liquids) and relate it to floating and sinking. They will also learn about the pressure of one solid object, like the skydiver, on another solid object, like the ground. **Big Questions:** ✓ Why is there so little friction on some surfaces, like ice, but not others, like wood? ✓ Why do you get put on weighing scales before you do a bungee jump? ✓ Why don't earth movers sink? By the end of the topic all pupils will complete an AQA Unit award.

Summer term	
Chemical Energy and types of reactions	**Big idea:** Reactions Chemical reactions are vital to life. We depend on chemical reactions – including the products they make and the energy they transfer -for everything that we do. In this Big Idea pupils will learn what happens to atoms in chemical reactions. Pupils will find out how chemical reactions transfer energy , and why chemical reactions are important.

	Big Questions: ✓ What happens to the atoms in chemical reactions? ✓ How does mass change in chemical reactions? ✓ Why do chemical reactions transfer energy? By the end of the topic all pupils will complete an AQA Unit award.
Respiration and photosynthesis	**Big idea:** Ecosystems How do we get energy from food? In this Big Idea, pupils will find out how the body transfers energy from food so it can be used for movement, growth and repair by the process of respiration. They will discover how anaerobic respiration in microorganisms can be used to make bread and beer. Pupils will learn how plants produce food by the process of photosynthesis, and look in detail at the structure of a leaf and why minerals are required for healthy growth. **Big Questions:** ✓ How does the body transfer energy from food by respiration? ✓ What is the difference between aerobic and anaerobic respiration? ✓ How do plants produce food by photosynthesis? By the end of the topic all pupils will complete an AQA Unit award.
Outdoor learning challenge	All pupils will take part in a STEM based project with a focus on learning through the outdoors. The challenge will make support the school in developing is outdoor learning provision for Science for primary pupils through a small scale project or feature to support their learning of Science.

Science topic overview: Year 9

Autumn term	
Enquiry Processes (Part 2)	**Big idea:** In this follow up topic pupils will further develop their skills of enquiry that are an essential part of developing knowledge and understanding of Science. **Within this topic all pupils will show that they will be able to:** ✓ Explain why and how we test a hypothesis ✓ Explain why controlling variables is important ✓ Explain why it important that someone else repeats your experiment ✓ Identify ways to use data and line graphs ✓ Explain how to evaluate investigations and ask further questions

	✓ Describe how to plan to communicate effectively ✓ Describe how to adapt your style to different audiences ✓ Describe what peer review is ✓ Describe how to assess sources of evidence ✓ Describe how to critique a claim ✓ Describe how to justify your opinion ✓ Describe how to assess the impact of and invention or discovery ✓ Describe which types of groups need to be considered ✓ Explain how a decision might be reached ✓ Describe what a scientific theory is ✓ Describe the link between theory and evidence in the development of a theory ✓ Describe the role of argumentation in the development of a theory ✓ Explain why some theories take a long time to be established By the end of the topic all pupils will complete an AQA Unit award.
Electromagnets and Magnetism	**Big idea:** Electromagnets In this Big idea pupils will learn how to make a magnet using electricity, and about the different ways that you can make it stronger. Pupils will learn how electromagnetic devices like bells and loudspeakers work and will model magnetic fields whilst exploring the Earth's magnetic field. **Big Questions:** ✓ Which device in your house protects you from a dangerous electric current, and how does it work? ✓ How can you make a magnet strong enough to lift a car? Why does a compass point North? By the end of the topic all pupils will complete an AQA Unit award.
Evolution and Inheritance	**Big idea:** Genes The world is full of lots of different types of living things. In this Big Idea pupils will find out how the organisms that exist today have evolved, and how scientists are trying to prevent further species from becoming extinct and preserve biodiversity. They will also learn about how you inherit characteristics from your parents through genetic material, and how genetic material in some organisms is being modified. **Big Questions:** ✓ What is the theory of evolution by natural selection? ✓ How do you inherit characteristics from your parents? ✓ What is the likelihood of you inheriting a characteristic? By the end of the topic all pupils will complete an AQA Unit award.

Spring term	
Climate and Earth's resources	**Big idea:** Earth Where do we get the materials we need? All the materials we use come from the Earth, the oceans, or the atmosphere. In this Big idea pupils will learn how we extract metals from the Earth, and what we can do to prevent vital resources running out. They will also find out about the atmosphere, and consider the causes and effects of global warming. **Big Questions:** ✓ What causes climate change? ✓ How do we obtain the materials we need?

	✓ How can we conserve the Earth's resources? By the end of the topic all pupils will complete an AQA Unit award.
Work Heat and Cooling	**Big idea:** Energy Athletes can use energy in chemical reactions to run, jump, or throw. Where does this energy end up? There are lots of different ways of transferring energy between stores. In this Big Idea, pupils will learn about doing work and transferring energy with radiation and particles. Sometimes we want to stop energy being transferred, and pupils will learn about different ways of stopping energy transfer due to friction and conduction. **Big Questions:** ✓ How are you transferring energy as you read this page? ✓ What happens in terms of energy when you are watching television, or charging your phone. How can you reduce your electricity bills? By the end of the topic all pupils will complete an AQA Unit award.
Wave effects and their properties	**Big idea:** Waves Tsunamis, sound, infrared, and light all have something in common. They are waves and transfer energy. In this Big Idea, pupils will learn about what affect the energy that waves transfer, and how they interact with surfaces that they hit and with matter they travel through. They will find out about ultrasound and some of its uses and will learn how the wave model can support in explaining wave behaviour. Waves can cause damage, and not just by damaging objects on a large scale. Radiation can cause damage to the cells of the human body. **Big Questions:** ✓ What is ultrasound, and how do we use it? ✓ What damage does electromagnetic radiation do to the human body? Why do bottles of water act like lenses? By the end of the topic all pupils will complete an AQA Unit award.

Summer term	
End of year assessments	In the initial weeks of the Summer term pupils will take part in final assessment to identify their strengths and needs as they transition from KS3 to KS4. Assessment data is used to inform planning for the topics ahead and provide data from which to show progress. Final assessment will provide information to parents and teachers from which future learning pathways can be determined (academic or vocational routes)
STEM Projects	All pupils will take part in a STEM based project with a focus on careers pathways into Science and will include visits to local businesses, guest speakers in school and visits to research institutes such as the centre for life. The actual focus to be discussed and agree with the group and staff involved.
Introduction to AQA Entry Level Certificate Component 1: The human Body	Where an academic pathway through Science is more appropriate to future career choices: Pupils will demonstrate an understanding that a healthy body can be maintained by a balanced diet, exercise and a healthy lifestyle. Health can be damaged by microbes, which can cause infectious diseases. They will explore how the body can defend itself against most diseases but will sometimes need drugs in order to alleviate the symptoms and speed recovery. **TDA**: Investigating which food (biscuits or crisps) contain the most energy. **ESA:** Component 1
Introduction to ….	Where an academic vocational through Science is more appropriate to future career choices:

Course to be confirmed for 2021 onwards	