



# KOINONIA FEDERATION – ALL THROUGH SUBJECT MAP

## SUBJECT: Science CURRICULUM INTENT

At Koinonia Federation, we recognise that high-quality Science education nurtures curiosity, wisdom, and an appreciation of God’s creation. Science makes an essential contribution to the knowledge, culture, and well-being of our diverse community from Early Years through to Year 13. This drives us to ensure Science is an inspiring, investigative, and practical subject that enables all pupils to develop secure scientific knowledge, enquiry skills, and an understanding of the world around them.

### **Spirituality in Science**

Science encourages children to think critically, ask meaningful questions, and engage with real-world issues—especially those linked to stewardship, sustainability, and caring for others. Through a progressive, inclusive curriculum aligned with the National Curriculum, pupils build confidence, resilience, and a sense of responsibility as young scientists.

We offer children the opportunity to:

- develop scientific knowledge and conceptual understanding across biology, chemistry, and physics
- build a repertoire of enquiry skills, including observing, testing, classifying, predicting, and evaluating
- apply scientific thinking to investigate problems creatively, both independently and collaboratively
- **recognise the moral, environmental, and social implications of scientific developments and make considered choices rooted in Christian values**
- **take pride in communicating their ideas confidently and using science to contribute positively to their community and the wider world.**

Through studying Science, students develop a sense of awe and wonder about the natural world and their place within it. They are encouraged to reflect on the mysteries of life and the universe, deepening their appreciation of the beauty, order, and interconnectedness of all things.



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Biology	Chemistry	Physics	Theme / concept 4
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	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
<b>NURSERY – KEY THEMES / CONCEPTS</b>	<b><u>Understanding the World</u></b> Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes.					
<b>RECEPTION - KEY THEMES / CONCEPTS</b>	<b><u>Understanding the World</u></b> Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes.					
<b>YEAR 1 - KEY THEMES / CONCEPTS</b>	<u>Seasonal Changes</u>	<u>Plants</u>	<u>Animals including Humans</u>		<u>Everyday materials</u>	
<b>YEAR 1 - KEY CONTENT/ LEARNING</b>	<ul style="list-style-type: none"> <li>Observe and describe weather associated with the seasons and how day length varies.</li> <li>Observe changes across the four seasons.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</li> <li>Identify and describe the basic structure of a variety of</li> </ul>	<ul style="list-style-type: none"> <li>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</li> <li>Identify and name a variety of common animals that are</li> </ul>	<ul style="list-style-type: none"> <li>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</li> <li>Identify and name a variety of common animals that are carnivores,</li> </ul>	<ul style="list-style-type: none"> <li>Distinguish between an object and the material from which it is made.</li> <li>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</li> <li>Describe the simple physical properties of a</li> </ul>	<ul style="list-style-type: none"> <li>Distinguish between an object and the material from which it is made.</li> <li>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</li> <li>Describe the simple physical</li> </ul>



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common flowering plants, including trees.

- carnivores, herbivores and omnivores.
- Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).
  - Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

- herbivores and omnivores.
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  - Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

- variety of everyday materials.
- Compare and group together a variety of everyday materials on the basis of their simple physical properties.

- properties of a variety of everyday materials.
- Compare and group together a variety of everyday materials on the basis of their simple physical properties.



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YEAR 2 - KEY THEMES / CONCEPTS	<u>Everyday Materials</u>	<u>Plants</u>	<u>Animals including Humans</u>		<u>Living Things and Habitats.</u>	
YEAR 2 - KEY CONTENT/ LEARNING	<ul style="list-style-type: none"> <li>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</li> <li>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</li> </ul>	<ul style="list-style-type: none"> <li>Observe and describe how seeds and bulbs grow into mature plants.</li> <li>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</li> </ul>	<ul style="list-style-type: none"> <li>Notice that animals, including humans, have offspring which grow into adults.</li> <li>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).</li> <li>Describe the importance for humans of exercise, eating the right amounts of different</li> </ul>	<ul style="list-style-type: none"> <li>Notice that animals, including humans, have offspring which grow into adults.</li> <li>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).</li> <li>Describe the importance for humans of exercise, eating the right amounts of different</li> </ul>	<ul style="list-style-type: none"> <li>Explore and compare the differences between things that are living, dead, and things that have never been alive.</li> <li>Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.</li> </ul>	<ul style="list-style-type: none"> <li>Explore and compare the differences between things that are living, dead, and things that have never been alive.</li> <li>Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.</li> </ul>



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			types of food, and hygiene.	types of food, and hygiene.	<ul style="list-style-type: none"> <li>Identify and name a variety of plants and animals in their habitats, including microhabitats.</li> <li>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and name a variety of plants and animals in their habitats, including microhabitats.</li> <li>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</li> </ul>
<b>YEAR 3 - KEY THEMES / CONCEPTS</b>	<u>Animals including Humans</u>	<u>Rocks</u>	<u>Plants</u>	<u>Light</u>	<u>Forces and Magnets</u>	
<b>YEAR 3 - KEY CONTENT/ LEARNING</b>	<ul style="list-style-type: none"> <li>Identify that animals, including humans, need the right types</li> </ul>	<ul style="list-style-type: none"> <li>Compare and group together different kinds of</li> </ul>	<ul style="list-style-type: none"> <li>Identify and describe the functions of different parts of</li> </ul>	<ul style="list-style-type: none"> <li>Recognise that they need light in order to see things and</li> </ul>	<ul style="list-style-type: none"> <li>Compare how things move on different surfaces.</li> <li>Notice that some forces</li> </ul>	<ul style="list-style-type: none"> <li>Compare how things move on different surfaces.</li> <li>Notice that some forces</li> </ul>



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	<p>and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.</p> <ul style="list-style-type: none"> <li>Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</li> </ul>	<p>rocks on the basis of their appearance and simple physical properties.</p> <ul style="list-style-type: none"> <li>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</li> <li>Recognise that soils are made from rocks and organic matter.</li> </ul>	<p>flowering plants: roots, stem/trunk, leaves and flowers.</p> <ul style="list-style-type: none"> <li>Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.</li> <li>Investigate the way in which water is transported within plants.</li> <li>Explore the part that flowers play in the life</li> </ul>	<p>that dark is the absence of light.</p> <ul style="list-style-type: none"> <li>Notice that light is reflected from surfaces.</li> <li>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</li> <li>Recognise that shadows are formed when the light from a light source is blocked by an opaque object.</li> <li>Find patterns in the way that the size</li> </ul>	<p>need contact between two objects, but magnetic forces can act at a distance.</p> <ul style="list-style-type: none"> <li>Observe how magnets attract or repel each other and attract some materials and not others.</li> <li>Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.</li> <li>Describe magnets as having two poles.</li> <li>Predict whether two magnets will attract or repel each</li> </ul>	<p>need contact between two objects, but magnetic forces can act at a distance.</p> <ul style="list-style-type: none"> <li>Observe how magnets attract or repel each other and attract some materials and not others.</li> <li>Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.</li> <li>Describe magnets as having two poles.</li> <li>Predict whether two</li> </ul>
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			<p>cycle of flowering plants, including pollination, seed formation and seed dispersal.</p>	<p>of shadows change.</p>	<p>other, depending on which poles are facing.</p>	<p>magnets will attract or repel each other, depending on which poles are facing.</p>
<b>YEAR 4 - KEY THEMES / CONCEPTS</b>	<b><u>Animals including Humans</u></b>	<b><u>States of Matter</u></b>	<b><u>Sound</u></b>	<b><u>Living Things</u></b>	<b><u>Electricity</u></b>	
<b>YEAR 4 - KEY CONTENT/ LEARNING</b>	<ul style="list-style-type: none"> <li>Describe the simple functions of the basic parts of the digestive system in humans.</li> <li>Identify the different types of teeth in humans and their simple functions.</li> <li>Construct and interpret a</li> </ul>	<ul style="list-style-type: none"> <li>Compare and group materials together, according to whether they are solids, liquids or gases.</li> <li>Observe that some materials change state when they are</li> </ul>	<ul style="list-style-type: none"> <li>Identify how sounds are made, associating some of them with something vibrating.</li> <li>Recognise that vibrations from sounds travel through a medium to the ear.</li> </ul>	<ul style="list-style-type: none"> <li>Recognise that living things can be grouped in a variety of ways.</li> <li>Explore and use classification keys to help group, identify and name a variety of living things in their local</li> </ul>	<ul style="list-style-type: none"> <li>Identify common appliances that run on electricity.</li> <li>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</li> </ul>	<ul style="list-style-type: none"> <li>Identify common appliances that run on electricity.</li> <li>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</li> </ul>



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	<p>variety of food chains, identifying producers, predators and prey.</p>	<p>heated or cooled, and measure or research the temperature at which this happens</p> <ul style="list-style-type: none"> <li>• in degrees Celsius (°C).</li> <li>• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</li> </ul>	<ul style="list-style-type: none"> <li>• Find patterns between the pitch of a sound and features of the object that produced it.</li> <li>• Find patterns between the volume of a sound and the strength of the vibrations that produced it.</li> <li>• Recognise that sounds get fainter as the distance from the sound source increases.</li> </ul>	<p>and wider environment.</p> <ul style="list-style-type: none"> <li>• Recognise that environments can change and that this can sometimes pose dangers to living things.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.</li> <li>• Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</li> <li>• Recognise some common conductors and insulators, and associate metals with being good conductors.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.</li> <li>• Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</li> <li>• Recognise some common conductors and insulators, and associate metals with being good conductors.</li> </ul>
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YEAR 5 - KEY THEMES / CONCEPTS	<u>All Living Things (Living Things and Habitats and Animals including Humans)</u>		<u>Earth and Space</u>	<u>Forces</u>	<u>Properties and Changes of Materials</u>	
YEAR 5 - KEY CONTENT/ LEARNING	<ul style="list-style-type: none"> <li>Describe the life process of reproduction in some plants and animals.</li> <li>Describe the life process of reproduction in some plants and animals.</li> <li>Describe the changes as humans develop to old age.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the life process of reproduction in some plants and animals.</li> <li>Describe the life process of reproduction in some plants and animals.</li> <li>Describe the changes as humans develop to old age.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.</li> <li>Describe the movement of the Moon relative to the Earth.</li> <li>Describe the Sun, Earth and Moon as approximately spherical bodies.</li> <li>Use the idea of the Earth's rotation to explain day and night</li> </ul>	<ul style="list-style-type: none"> <li>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</li> <li>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</li> <li>Recognise that some mechanisms, including levers, pulleys and gears, allow</li> </ul>	<ul style="list-style-type: none"> <li>Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.</li> <li>Know that some materials will dissolve in liquid to</li> </ul>	<ul style="list-style-type: none"> <li>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</li> <li>Demonstrate that dissolving, mixing and changes of state are reversible changes.</li> </ul>



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			<p>and the apparent movement of the sun across the sky.</p> <ul style="list-style-type: none"><li>• Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</li><li>• Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.</li><li>• Describe the movement of the Moon</li></ul>	<p>a smaller force to have a greater effect.</p>	<p>form a solution, and describe how to recover a substance from a solution.</p> <ul style="list-style-type: none"><li>• Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</li></ul>	<ul style="list-style-type: none"><li>• Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.</li></ul>
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			<p>relative to the Earth.</p> <ul style="list-style-type: none"> <li>Describe the Sun, Earth and Moon as approximately spherical bodies.</li> </ul>			
<p><b>YEAR 6 - KEY THEMES / CONCEPTS</b></p>	<p><b><u>All Living Things</u></b></p>	<p><b><u>Electricity</u></b></p>	<p><b><u>Evolution</u></b></p>	<p><b><u>Animals including Humans</u></b></p>	<p><b><u>Light</u></b></p>	
<p><b>YEAR 6 - KEY CONTENT/ LEARNING</b></p>	<ul style="list-style-type: none"> <li>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganism</li> </ul>	<ul style="list-style-type: none"> <li>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</li> <li>Compare and give reasons for</li> </ul>	<p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p>	<ul style="list-style-type: none"> <li>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</li> <li>Recognise the impact of diet, exercise,</li> </ul>	<ul style="list-style-type: none"> <li>Recognise that light appears to travel in straight lines.</li> <li>Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.</li> <li>Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.</li> <li>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</li> </ul>	



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	<p>s, plants and animals.</p> <ul style="list-style-type: none"> <li>• Give reasons for classifying plants and animals based on specific characteristics.</li> </ul>	<p>variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.</p> <ul style="list-style-type: none"> <li>• Use recognised symbols when representing a simple circuit in a diagram</li> </ul>	<p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>	<p>drugs and lifestyle on the way their bodies function.</p> <ul style="list-style-type: none"> <li>• Describe the ways in which nutrients and water are transported within animals, including humans</li> </ul>		
<p><b>YEAR 7 - KEY THEMES / CONCEPTS</b></p>		<ul style="list-style-type: none"> <li>• Metals and non-metals react with oxygen to form oxides which are either bases or acids.</li> </ul>				



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- Metals can be arranged as a reactivity series in order of how readily they react with other substances.
- Some metals react with acids to produce salts and hydrogen.
- Describe an oxidation, displacement, or metal acid reaction with a word equation. Use particle diagrams to represent oxidation, displacement and metal-



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		<p>acid reactions. Identify an unknown element from its physical and chemical properties.</p> <ul style="list-style-type: none"> <li>Place an unfamiliar metal into the reactivity series based on information about its reactions.</li> </ul>				
<b>YEAR 7 - KEY CONTENT/ LEARNING</b>						
<b>YEAR 8 - KEY THEMES / CONCEPTS</b>						
<b>YEAR 8 - KEY</b>						



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CONTENT/ LEARNING						
<b>YEAR 9 - KEY THEMES / CONCEPTS</b>	<ul style="list-style-type: none"> <li>Describe how cells are the basic unit of all forms of life.</li> <li>Explain how structural differences between types of cells enables them to perform specific functions within the organism.</li> <li>State how differences in cells are controlled by genes in the nucleus.</li> <li>Describe how an organism to grow, the cells must divide by mitosis producing two new identical cells.</li> </ul>	<ul style="list-style-type: none"> <li>The periodic table provides chemists with a structured organisation of the known chemical elements from which they can make sense of their physical and chemical properties.</li> <li>The historical development of the periodic table and models of atomic structure provide good examples of how scientific ideas and explanations develop over time as new evidence emerges.</li> <li>The arrangement of elements in</li> </ul>	<ul style="list-style-type: none"> <li>The concept of energy emerged in the 19th century. The idea was used to explain the work output of steam engines and then generalised to understand other heat engines.</li> <li>It also became a key tool for understanding chemical reactions and biological systems. Limits to the use of fossil fuels and global warming are critical problems for this century.</li> <li>Physicists and engineers are working hard to identify ways to reduce our energy usage.</li> </ul>	<ul style="list-style-type: none"> <li>In this section we will learn about the human digestive system which provides the body with nutrients and the respiratory system that provides it with oxygen and removes carbon dioxide.</li> <li>In each case they provide dissolved materials that need to be moved quickly around the body in the blood by the circulatory system.</li> <li>Damage to any of these systems can be debilitating if</li> </ul>	<ul style="list-style-type: none"> <li>Chemists use theories of structure and bonding to explain the physical and chemical properties of materials.</li> <li>Analysis of structures shows that atoms can be arranged in a variety of ways, some of which are molecular while others are giant structures.</li> <li>Theories of bonding explain how atoms are held together in these structures.</li> <li>Scientists use this knowledge of structure and bonding to engineer new materials with desirable properties. The properties of</li> </ul>	<ul style="list-style-type: none"> <li>The particle model is widely used to predict the behaviour of solids, liquids and gases and this has many applications in everyday life. It helps us to explain a wide range of observations and engineers use these principles when designing vessels to withstand high pressures and temperatures, such as submarines and spacecraft.</li> <li>It also explains why it is difficult to make a good cup of tea high up a mountain!</li> </ul>



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	<ul style="list-style-type: none"> <li>Explain how if cells are isolated at an early stage of growth before they have become too specialised, they can retain their ability to grow into a range of different types of cells.</li> </ul>	<p>the modern periodic table can be explained in terms of atomic structure which provides evidence for the model of a nuclear atom with electrons in energy levels.</p>		<p>not fatal. Although there has been huge progress in surgical techniques, especially with regard to coronary heart disease, many interventions would not be necessary if individuals reduced their risks through improved diet and lifestyle.</p> <ul style="list-style-type: none"> <li>We will also learn how the plant's transport system is dependent on environmental conditions to ensure that leaf cells are provided with the water and carbon dioxide that they need for photosynthesis.</li> </ul>	<p>these materials may offer new applications in a range of different technologies.</p>	
		<ul style="list-style-type: none"> <li>(Physics) Ionising radiation is hazardous but can be very useful. Although radioactivity was discovered over a century ago, it took many nuclear physicists several decades to understand the structure of atoms, nuclear forces and stability.</li> </ul>				



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		<ul style="list-style-type: none"><li>• Early researchers suffered from their exposure to ionising radiation.</li><li>• Rules for radiological protection were first introduced in the 1930s and subsequently</li></ul>				
<b>YEAR 9 - KEY CONTENT/ LEARNING</b>						



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<p><b>YEAR 10 - KEY THEMES / CONCEPTS</b></p>	<p>Pathogens are microorganisms such as viruses and bacteria that cause infectious diseases in animals and plants. They depend on their host to provide the conditions and nutrients that they need to grow and reproduce. They frequently produce toxins that damage tissues and make us feel ill. This section will explore how we can avoid diseases by reducing contact with them, as well as how the body uses barriers against pathogens. Once inside the body our immune system is triggered which is usually strong enough to destroy the pathogen and prevent disease. When at risk from unusual or dangerous diseases our body's natural system can be enhanced by the use of vaccination. Since the 1940s a range of</p>	<p>Understanding of chemical changes began when people began experimenting with chemical reactions in a systematic way and organizing their results logically. Knowing about these different chemical changes meant that scientists could begin to predict exactly what new substances would be formed and use this knowledge to develop a wide range of different materials and processes. It also helped biochemists to understand the complex reactions that take place in living organisms. The extraction of important resources from the earth makes use of the way that some elements and compounds react with each other and</p>	<p>Electric charge is a fundamental property of matter everywhere. Understanding the difference in the microstructure of conductors, semiconductors and insulators makes it possible to design components and build electric circuits. Many circuits are powered with mains electricity, but portable electrical devices must use batteries of some kind. Electrical power fills the modern world with artificial light and sound, information and entertainment, remote sensing and control. The fundamentals of electromagnetism were worked out by scientists of the 19th century. However, power stations, like all machines, have a limited lifetime. If we all continue to</p>	<p>Cells in the body can only survive within narrow physical and chemical limits. They require a constant temperature and pH as well as a constant supply of dissolved food and water. In order to do this the body requires control systems that constantly monitor and adjust the composition of the blood and tissues. These control systems include receptors which sense changes and effectors that bring about changes. In this section we will explore the structure and function of the nervous system and how it can bring about fast responses. We will also explore the hormonal system which usually brings about much slower changes. Hormonal coordination is particularly important</p>	<p>Electromagnetic effects are used in a wide variety of devices. Engineers make use of the fact that a magnet moving in a coil can produce electric current and also that when current flows around a magnet it can produce movement. It means that systems that involve control or communications can take full advantage of this.</p> <p>Wave behaviour is common in both natural and man-made systems. Waves carry energy from one place to another and can also carry information. Designing comfortable and safe structures such as bridges, houses and music performance halls requires an understanding of mechanical waves. Modern technologies such as imaging and communication systems show how we can make</p>	
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	<p>antibiotics have been developed which have proved successful against a number of lethal diseases caused by bacteria. Unfortunately many groups of bacteria have now become resistant to these antibiotics. The race is now on to develop a new set of antibiotics.</p>	<p>how easily they can be 'pulled apart'. Energy changes are an important part of chemical reactions. The interaction of particles often involves transfers of energy due to the breaking and formation of bonds. Reactions in which energy is released to the surroundings are exothermic reactions, while those that take in thermal energy are endothermic. These interactions between particles can produce heating or cooling effects that are used in a range of everyday applications. Some interactions between ions in an electrolyte result in the production of electricity. Cells and batteries use these chemical reactions to</p>	<p>demand more electricity this means building new power stations in every generation – but what mix of power stations can promise a sustainable future?</p>	<p>in reproduction since it controls the menstrual cycle. An understanding of the role of hormones in reproduction has allowed scientists to develop not only contraceptive drugs but also drugs which can increase fertility.</p>	<p>the most of electromagnetic waves.</p>	
				<p>Chemists use quantitative analysis to determine the formulae of compounds and the equations for reactions. Given this information, analysts</p>		



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		<p>provide electricity. Electricity can also be used to decompose ionic substances and is a useful means of producing elements that are too expensive to extract any other way.</p>		<p>can then use quantitative methods to determine the purity of chemical samples and to monitor the yield from chemical reactions. Chemical reactions can be classified in various ways. Identifying different types of chemical reaction allows chemists to make sense of how different chemicals react together, to establish patterns and to make predictions about the behaviour of other chemicals. Chemical equations provide a means of representing chemical reactions and are a key way for chemists to communicate chemical ideas.</p>		
<b>YEAR 10 - KEY CONTENT/ LEARNING</b>						



# KOINONIA FEDERATION – ALL THROUGH SUBJECT MAP

<b>YEAR 11 - KEY THEMES / CONCEPTS</b>	<p>In this section we will discover how the number of chromosomes are halved during meiosis and then combined with new genes from the sexual partner to produce unique offspring. Gene mutations occur continuously and on rare occasions can affect the functioning of the animal or plant. These mutations may be damaging and lead to a number of genetic disorders or death. Very rarely a new mutation can be beneficial and consequently, lead to increased fitness in the individual. Variation generated by mutations and sexual reproduction is the basis for natural selection; this is how species evolve. An understanding of these processes has allowed scientists to intervene through selective</p>					
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# KOINONIA FEDERATION – ALL THROUGH SUBJECT MAP

	<p>breeding to produce livestock with favoured characteristics. Once new varieties of plants or animals have been produced it is possible to clone individuals to produce larger numbers of identical individuals all carrying the favourable characteristic. Scientists have now discovered how to take genes from one species and introduce them in to the genome of another by a process called genetic engineering. In spite of the huge potential benefits that this technology can offer, genetic modification still remains highly controversial.</p>					
<b>YEAR 11 - KEY CONTENT/ LEARNING</b>						
<b>YEAR 12 - KEY THEMES / CONCEPTS</b>						



# KOINONIA FEDERATION – ALL THROUGH SUBJECT MAP

<b>YEAR 12 - KEY CONTENT/ LEARNING</b>						
<b>YEAR 13 - KEY THEMES / CONCEPTS</b>						
<b>YEAR 13 - KEY CONTENT/ LEARNING</b>						