



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

Spring Term 1	Assessment Week	Introduction Using metals and non-metals Exploring the reactions of metals with acids	Understanding displacement reactions Understanding oxidation reactions Exploring acids	Exploring alkalis Using indicator Exploring neutralisation Investigating neutralisation	Assessment Week	Introduction Understanding the structure of the Earth Exploring igneous rocks		
Spring Term 2	Exploring sedimentary rocks Exploring metamorphic rocks Understanding the rock cycle	Describing stars and galaxies Explaining the effects of the Earth's motion Exploring our neighbours in the Universe Using models in science	Assessment Week	Introduction Describing series and parallel circuits Understanding energy in circuits	Comparing series and parallel circuits Investigating static charge Understanding electric fields	Assessment Week		
Summer Term 1	Introduction Looking at variation Exploring causes of variation	Considering the importance of variation Understanding the female reproductive system and fertility	Understanding the male reproductive system & fertilisation Learning how a foetus develops Understanding factors affecting a developing foetus	Communicating ideas about smoking in pregnancy Assessment Week	Introduction Exploring sound Describing sound Hearing sounds			



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Summer Term 2	Understanding how sound travels through materials Learning about the reflection and absorption of sound Exploring properties of light	Exploring reflection Exploring refraction Seeing clearly Exploring coloured light Assessment	Assessment Week	Introduction Understanding energy transfer by fuels and food Comparing rates of energy transfers	Looking at the cost of energy use in the home Getting the electricity, we need Using electricity responsibly	Energy stores and transfers Exploring energy transfers Understanding potential energy and kinetic energy Understanding elastic energy	Assessment Week	
---------------	---	--	-----------------	--	--	--	-----------------	--



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Unit Name: Organisms- Movement and Cells - Chapter 8	Recommended Teaching Time: 12 hrs
Overview and Aims: This topic covers the use and purpose of some of the building blocks of life used by living organisms. We look at the skeleton, muscles, plant structures and different types of single celled organisms.	
I can statements (star the "essentials")	Critical Content, Key Words and Additional Notes.
<ol style="list-style-type: none">1. I can identify bones of the human skeleton.2. I can explain why we have different shapes and sizes of bones.3. I can describe the roles of tendons, ligaments, joints and muscle4. I can describe antagonistic muscles and give examples.5. I can recall some medical problems with the skeletal system.6. I can define the terms tissues, organs and organ systems.7. I can explain the function of some of the structures within animal and plant cells.8. I can identify examples of specialised plant and animal cells.9. I can observe cells using a microscope and record findings.10. I can compare and contrast features of unicellular organisms.	
Assessment details The work is assessed by the work in the books, in class questioning and an end of topic test.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	Identify bones of the human skeleton.	1, The four roles of the skeleton are: support the body, protect the organs, provide movement and produce red blood cells.	
	Explain why we have different shapes and sizes of bones.	2. Each bone is adapted to perform its function.	
	Describe the roles of tendons, ligaments, joints and muscles.	3. Tendons attach bone to muscle. Ligaments attach bone to bone.	
	Describe antagonistic muscles and give examples.	4. Muscles can only pull. They must work in opposite or antagonistic pairs. Eg. the bicep and the triceps.	
	Recall some medical problems with the skeletal system.	5. Common problems with the skeleton are: broken bones, arthritis where the cartilage at the end of the bones wear off and osteoporosis where the bones become weaker as they lose their density with age.	
	Define the terms tissues, organs and organ systems.	6. Similar cells working together is a tissue, different tissues working together is an organ. Different organs working together is an organ system.	
	Explain the function of some of the structures within animal and plant cells.	7. The nucleus of the cell directs what the cell makes. This is where the genetic material is. The cell membrane holds the cell together and controls what comes in and goes out of the cell.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

	Identify examples of specialised plant and animal cells.	8.Pupils should be able to identify sperm cells, egg cells, palisade mesophyll (photosynthesising plant cells), root hair cell (plant) and red blood cells.	
	Observe cells using a microscope and record findings.	9. Practical investigation.	
	Recognise different types of unicellular organisms.	10.I can identify prokaryotic and eukaryotic unicellular organisms.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Unit Name: Matter-Particle model and separating mixtures - Chapter 5	Recommended Teaching Time: 12
Overview and Aims To recognise the differences between solids liquids and gases. Be able to define the properties of each state of matter. Have a n understanding of the particle model for states of matter. Apply the particle model to explain changes in state for substances. Explore and understand dissolving and solutions in scientific terms. Explain how chromatography works and its uses.	
✓ I can statements	Critical Content & Common errors (star the “essentials”)
<ol style="list-style-type: none">1. I can recognise differences between solids, liquids and gases.2. I can describe solids, liquids and gases in terms of the particle model.3. I can describe the properties of solids.4. I can relate the properties and behaviour of solids to the particle model.5. I can describe the properties of liquids and gases.6. I can relate the properties and behaviour of liquids and gases to the particle model.7. I can use the particle model to explain observations involving diffusion.8. I can recognise changes of state as being reversible changes.9. I can use scientific terminology to describe changes of state.10. I can explain changes of state using the particle model and ideas about energy transfer.11. I can recognise the differences between substances and use these to separate them.12. I can explain the terms solvent, solution, solute and soluble.13. I can describe the effect of temperature on solubility.14. I can analyse patterns and present data to explain solubility.15. I can use distillation to separate substances.16. I can explain why distillation can purify substances.17. I can devise ways to separate mixtures, based on their properties.18. I can use chromatography to separate dyes.19. I can use evidence from chromatography to identify unknown substances in a mixture.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
1.	Recognise differences between solids, liquids and gases.	Solids have a fixed shape and cannot flow, liquids and gases can. Liquids cannot be compressed whilst gases can.	
2.	Describe solids, liquids and gases in terms of the particle model.	<ol style="list-style-type: none">1. Particles in a solid vibrate in a fixed position.2. Particles in a liquid move around randomly but always in contact with other particles.3. 3. Particles in a gas move around freely, randomly and very fast.	
3.	Describe the properties of solids.	Solids can be hard and strong, do not flow some can conduct electricity and heat. Some can be stretched some are brittle.	
4.	Describe the properties of liquids and gases.	Gases and liquids flow, the resistance to flow is called viscosity. Liquids and gases take the shape of the container. Gases can be compressed, liquids cannot.	
5.	Use the particle model to explain observations involving diffusion.	Diffusion is the process where the particles something is made of spread out. The more particles there are in an area the more concentrated we say a substance is. The more concentrated something is the faster diffusion happens.	
6.	Recognise changes of state as being reversible changes.	The energy levels of the particles in the substance will decide the state of the substance. All substances move states between solid (lowest energy), liquid (middle) and gas (highest energy).	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

7.	Use scientific terminology to describe changes of state.	Changes between the states of matter, solid / liquid / gas have technical terms. Liquid to solid is freezing. Solid to liquid is melting. Liquid to gas is boiling. Gas to liquid is condensing. Solid to gas and gas to solid is sublimating and deposition.	
8.	Explain changes of state using the particle model and ideas about energy transfer.	As particles in a substance receive more energy (often in the form of heat) the greater the energy within each particle the greater the desire of the particle to move. Enough energy and the particles within the substance will be able to move to the next state of matter (defined by the level of freedom the particles have).	
9	Explain the terms solvent, solution, solute and soluble.	A solvent is a liquid that dissolves another substance. A solute is the substance dissolved in the solvent. A solution is a mixture of solvent and solute. Soluble is a word we use to describe a substance that can be dissolved by a particular solvent.	
10	Describe the effect of temperature on solubility.	Increased temperature increases solubility.	
11	Use distillation to separate substances.	Practical lesson.	

Commented [ML1]: Follow Up:



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

Unit Name: Forces Speed and Gravity – Chapter 1	Recommended Teaching Time: 12 hours
<p>Overview and Aims In this topic we investigate what we mean by speed, apply this to calculations and identify the typical graphs produced by common calculations. We study what we mean by force and forces. Types of force and common examples of different types of force. We learn how to draw scientific force diagrams and compute force calculations.</p>	
✓ I can statements	Critical Content & Common errors (star the “essentials”)
<ol style="list-style-type: none">1. I can list the factors involved in defining speed.2. I can explain a simple method to measure speed.3. I can use the speed formula.4. I can gather relevant data to describe a journey.5. I can use the conventions of a distance–time graph.6. I can display the data on a distance–time graph.7. I can interpret distance–time graphs to learn about the journeys represented.8. I can relate distance–time graphs to different situations and describe what they show.9. I can describe the motion of an object whose speed is changing.10. I can devise questions that can be explored scientifically.11. I can present data so that it can be analysed to answer questions.12. I can describe the motion of objects in relation to each other.13. I can explain the concept of relative motion.14. I can apply the concept of relative motion to various situations.15. I can recognise different examples of forces.16. I can list the main types of force.17. I can represent forces using arrows.18. I can describe gravity as a non-contact force.19. I can explore the concept of gravitational field and weight.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

- | | |
|--|--|
| <ul style="list-style-type: none">20. I can relate this concept to life on Earth.21. I can answer questions that draw on the distinction between mass and weight.22. I can explain what gravity is.23. I can understand how gravity varies according to where you are in the solar system.24. I can apply ideas about gravity to various situations. | |
|--|--|



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
1.	What are the factors involved in defining speed?	Distance covered divided by time taken.	Remember to assess the units.
2.	Interpret distance–time graphs to learn about the journeys represented.	The steeper the slope of the graph the quicker the progress. Lines that are horizontally flat mean the object is not moving further away from the start point (object has stopped).	
3.	Can you relate a distance–time graphs to a situation and describe what it shows		
4.	Describe the motion of an object whose speed is changing.	The graph's line will not be straight,	
5.	Devise a question which can be explored scientifically.		
6.	How do you present data in a way which enables it to be analysed to answer questions?	Can you devise a graph and then set questions based on that time/distance graph?	
7.	Explain the concept of relative motion?	Different objects can be moving at different speed or the same speed, towards or in the same distance as each other.	
8.	What are the main types of force?	Contact and contact forces.	
9.	Can you represent forces using arrows?	Larger forces have larger arrows (relative to the smaller force with a smaller arrow)	
10.	Describe gravity as a non-contact force.	Gravity is a non-contact force as there is no physical contact with this force.	
11.	Explore the concept of gravitational field and weight.	Gravitational field strength is proportional to mass. More massive objects have bigger gravitational fields. The planet Earth is massive and has a large gravitational field. The strength by which something	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		is pulled towards the earth's core differs depending on how far an object is from the Earth's core. The measurement of this is weight. The same item will weigh different amounts on the Earth's surface or off in outer space. The number of atoms making the thing has not changed. The number of atoms is the mass. So, mass stays the same everywhere, but weight varies depending on the strength of the gravitational field acting on the object.	
12.	Relate this concept to life on Earth.	If you lived on the moon where the gravity is less (because the mass of the moon is less than that of Earth), you would weigh less. On Earth our bodies are adapted to living with the constant force of the Earth's gravity pulling down on us.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Unit Name: Ecosystems – Interdependence <i>and</i> Plant reproduction- Chapter 9	Recommended Teaching Time: 12 hours
Overview and Aims Explore food web and food chains. Understand the inter-relationships within food webs, the dynamics of the predator prey relationship. Investigate pollination and fertilization of plants. The structure of plants reproductive systems, seeds and nuts. Look at seed dispersal strategies.	
✓ I can statements	Critical Content & Common errors (star the “essentials”)
<ol style="list-style-type: none">1. I can describe how food webs are made up of food chains.2. I can make predictions about factors affecting plant and animal populations.3. I can analyse and evaluate changes in a food web.4. I can describe how toxins pass along the food chain.5. I can explain how toxins enter and accumulate in food chains.6. I can evaluate the advantages and disadvantages of using pesticides.7. I can describe the impact of low pollination on fruit production.8. I can explain why artificial pollination is used for some crops.9. I can evaluate the risks of monoculture on world food security.10. I can describe ways in which organisms affect their environment.11. I can explain why prey populations affect predator populations.12. I can evaluate a model of predator–prey populations and explain the importance of predators.13. I can identify parts of flowering plants.14. I can describe the function of the parts of flowering plants and link structure and function.15. I can evaluate the differences between wind-pollinated and insect-pollinated plants.16. I can describe the processes of pollination and fertilisation.17. I can describe the role of pollen tubes.18. I can explain how seeds are formed.19. I can recognise the variety of different structures shown by different seeds.20. I can describe the need for plants to disperse their seed.	

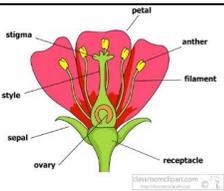


SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

- | | |
|--|--|
| <ul style="list-style-type: none">21. I can investigation into seed dispersal by wind.22. I can describe how fruits are used in seed dispersal.23. I can compare evidence about seed dispersal by wind and by fruit formation.24. I can use data to evaluate different seed dispersal mechanisms. | |
|--|--|



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
1.	Describe ways in which organisms affect their environment	All energy ultimately comes from the sun. A plant photosynthesises the sun's energy. The energy stored in the plant (the producer) is absorbed by the organism that eats the plant (primary consumer). This organism uses this energy (moving around, growing etc.), if this organism is eaten by another organism (secondary consumer) the energy in the primary consumer is passed on to the next animal.	
2.	Explain why prey populations affect predator populations.	O ver population of prey leads to more predators. This brings down prey numbers, that can no longer support such large numbers of predators, so predator numbers drop.	
3.	Evaluate a model of predator-prey populations and explain the importance of predators.	By introducing wolves to American nature reserves, this controlled the deer numbers, which allowed more trees to grow, which resulted in more habitat for a huge range of organisms, that supported even larger populations of even more species of organisms.	
4.	Identify parts of flowering plants.	 <p>The diagram shows a cross-section of a flower. Labels include: stigma (top of the female part), anther (top of the male part), filament (the stalk of the male part), style (the stalk of the female part), sepal (the green leaf-like part at the base), ovary (the base of the female part), and receptacle (the base of the flower). A watermark 'classroomclipart.com' is visible at the bottom of the diagram.</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

5.	Evaluate the differences between wind-pollinated and insect-pollinated plants.	Wind pollinated plants produce more pollen and the female stigma can be enlarged to maximize the change of catching some pollen. Insect pollinated plants have a mechanism to ensure a visiting insect collects the precious pollen.	
6.	Describe the processes of pollination and fertilisation.	Pollination is the mechanism by which pollen moves from male to female. Fertilisation is the process whereby the pollen makes it to the ovule and the genetic material is fused.	
7.	Describe the role of pollen tubes.	The pollen tube is a tunnel that develops in the style to convey the pollen from the stigma to the ovule in the ovary.	
8.	Explain how seeds are formed.	Each fertilized ovule becomes a seed.	
9.	Recognise the variety of different structures shown by different seeds.	Plants have developed many different strategies to disperse seeds including covering them with burrs so they stick to animals that brush past the, wind borne seeds like sycamore or gliders like also mitra.	
	Describe the need for plants to disperse their seed.	Seeds need to be dispersed because if they were to fall to the ground directly, they would be in direct competition with their parent for all resources.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Unit Name: Reactions – Metals and non-metals <i>and</i> Acids and alkalis- Chapter 6	Recommended Teaching Time: 12 hours
Overview and Aims Investigate the properties of metals and non-metals and why their properties dictate their uses. We look at chemical and word equations and compare the reactivity of various materials to each other. We investigate replacement reactions and what oxidation means. We are introduced to acids and alkalis, how they differ and what they do. We are introduced to p.H, what this means and what neutralisation means.	
✓ I can statements	Critical Content & Common errors (star the “essentials”)
<p>I can recognise the properties and uses of metals and non-metals.</p> <p>I can explain the uses of metals and non-metals based on their properties.</p> <p>I can describe the reaction between acids and metals using word equations and particle diagrams.</p> <p>I can explain the reaction between acids and metals.</p> <p>I can compare the re-activities of different metals.</p> <p>I can represent and explain displacement reactions using equations and particle diagrams.</p> <p>I can make inferences about reactivity from displacement reactions.</p> <p>I can recall examples of oxidation reactions.</p> <p>I can describe oxidation using word equations and particle diagrams.</p> <p>I can investigate changes caused by oxidation.</p> <p>I can describe what an acid is and give examples.</p> <p>I can evaluate the hazards that acids pose.</p> <p>I can describe what an alkali is and give examples.</p> <p>I can identify the hazards that alkalis pose.</p> <p>I can use indicators to identify acids and alkalis.</p> <p>I can analyse data from different indicators.</p> <p>I can compare the effectiveness of different indicators.</p> <p>I can describe what a pH scale measures.</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

<p>I can recall and use the neutralization equation. I can use indicators to identify chemical reactions. Explain colour changes in terms of pH and neutralisation. I can design an investigation to compare the effectiveness of indigestion remedies. I can analyse data to identify a suitable indigestion remedy and suggest improvements.</p>	
--	--



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
1.	Recognise the properties and uses of metals and non-metals.	Many metals are hard and shiny. Non-metals tend not to be hard or shiny. Many non-metals are gases at room temperature.	
2.	Explain the uses of metals and non-metals based on their properties.	Metals are often used to build with because they are strong, ductile and malleable.	
3.	Describe the reaction between acids and metals using word equations	Acid + metal = salt + hydrogen	
4.	Explain the reaction between acids and metals.	The metal forms a compound with the acid and hydrogen gas is released.	
5.	Compare the reactivities of different metals.	The reactivity of metals can be tested. More reactive metals will replace a less reactive metal in a compound.	
6.	Represent and explain displacement reactions using equations and particle diagrams.	<p>Iron is more reactive than copper and so displaces copper in the compound, freeing the copper.</p>	
7.	Make inferences about reactivity from displacement reactions.	The more reactive metal (substance) will displace a less reactive substance.	
8.	Describe oxidation using word equations and particle diagrams.	<p>Oxidation is the name given to a reaction when oxygen is added.</p> <p style="text-align: center;">copper + oxygen → copper oxide</p> <p>We can also show these reactions using particle diagrams:</p>	
9.	Describe what an acid is and give examples.	Acids are substances with a p.H less than 7, They can neutralize alkalis.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

10.	Describe what an alkali is and give examples.	Alkalis have a p.H greater than 7. Alkalis can neutralize an acid.	
-----	---	--	--



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Unit Name: Chapter 7: Earth – Earth structure <i>and</i> Universe	Recommended Teaching Time: 12 hours
Overview and Aims Investigate the Earth. The different levels from crust to core. Explore what are volcanoes, where does magma come from and what are the three main rock formation types on the Earth. Investigate what a star is, what our sun is, why is our planet where it is and what else is out there and how far away is it?	
✓ I can statements	Critical Content & Common errors (star the “essentials”)
<p>I can describe the layers of the Earth.</p> <p>I can describe the characteristics of the different layers.</p> <p>I can explain how volcanoes change the Earth.</p> <p>I can describe how igneous rocks are formed.</p> <p>I can explain how the pH of the magma affects the formation of rocks.</p> <p>I can investigate the effect of cooling rate on the formation of crystals.</p> <p>I can describe how sedimentary rocks are formed.</p> <p>I can explain how fossils give clues about the past.</p> <p>I can explain the properties of sedimentary rocks.</p> <p>I can describe how metamorphic rocks are formed.</p> <p>I can explain the properties of metamorphic rocks.</p> <p>I can describe the rock cycle.</p> <p>I can explain how rocks can change from one type to another.</p> <p>I can describe the characteristics of a star.</p> <p>I can relate our Sun to other stars.</p> <p>I can explain the concept of galaxies and the position of our galaxy compared to others.</p> <p>I can describe variation in length of day, apparent position of the Sun and seasonal variations.</p> <p>I can compare these with changes in the opposite hemisphere.</p> <p>I can explain these changes with reference to the motion of the Earth.</p> <p>I can recall that the light year is used to measure astronomical distances.</p> <p>I can explain the limitation of units such as kilometres in describing astronomical distances.</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

<p>I can explain what causes the appearance of the Moon to change. I can explore how we can use models to explain ideas in science. I can construct an explanation using ideas and evidence. I can decide if a model is good enough to be useful.</p>	
---	--



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
1.	Describe the layers of the Earth.	The layers of the Earth are called the core, the Mantle and the crust.	
2	Describe the characteristics of the different layers.	The core is very hot, super pressurized mostly solid iron and nickel. The mantle is mostly in the form of a spongy liquid. This is very thick. The mantle transfers heat from the core to the surface. The crust has two parts, is thin and covers the surface of the Earth'	
3	Describe how igneous rocks are formed.	Igneous rocks are formed by volcanic magma being brought to the surface where it cools and solidifies. The resulting rocks, we call igneous.	
4	Investigate the effect of cooling rate on the formation of crystals.	The longer the cooling process of the lava, the larger the crystals grow.	
5	Describe how sedimentary rocks are formed.	Sedimentary rocks are formed by small particles of rock being washed along by the rain and rivers until they are deposited in lakes and the seas. Over time more and more particles build up, forming thicker and thicker layers. The heat and pressure cause the sediments to become solidified into stone over time.	
6.	Explain how fossils give clues about the past.	Fossils give us clues about the past in many ways. As living organisms from the past are preserved, we can see what they looked like and learn about their lives.	
7.	Describe how metamorphic rocks are formed.	Metamorphic rocks are any rocks that had already been rock (sedimentary, igneous or metamorphic), through the movements of the Earth's crust these rocks had been sent down into the depths of the Earth. These rocks had been acted upon by heat and	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

		pressure resulting in chemical changes and producing a new type of rock.	
8.	Describe the rock cycle.	Rock that is formed from magma comes to the surface and makes igneous rock. These rocks are weathered by the elements. The products of this become sedimentary rocks. The sedimentary rocks may be acted on by tectonic forces so they are subducted and become metamorphic rocks, or else continue to be sunk into the Earth where they may reappear one day as magma and once again form igneous rock.	
9	Describe the characteristics of a star.	A star is a ball of hydrogen gas, fusing with itself to create helium (and other elements). This process is nuclear fusion and produces a huge quantity of energy (heat).	
10.	Explain the concept of galaxies and the position of our galaxy compared to others.	Our Sun is a star. Stars are not found equally spaced around the Universe. They are found together in groups. These groups are called galaxies. Our galaxy is the Milky Way. It has many hundreds of billions of stars in. There are hundreds of billions of galaxies.	
11.	Describe variation in length of day, apparent position of the Sun and seasonal variations.	The time it takes for our Earth to spin around its axis once, is a day. The time it takes for our Earth to tour around the sun once: is a year.	
12.	Recall that the light year is used to measure astronomical distances.	186, 282 miles /second is the speed of light or approximately 661 million miles an hour. In one-year, light travels 5.88 trillion miles. Our nearest star is	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		Alpha Centuri. This is approximately 4.37 light years away.	
13	Explain the limitation of units such as kilometres in describing astronomical distances.	The distances involved in space are so mind bogglingly large that special units have been invented to describe them.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Unit Name: Chapter 2: Electromagnets – Voltage and resistance and Current	Recommended Teaching Time: 12 hours
Overview and Aims: This unit is designed to investigate electricity, electrical circuits and the components in an electrical circuit. We shall also study the electrical terms: voltage, current and resistance.	
I can statements	Critical Content, Key Words and Additional Notes.
<ol style="list-style-type: none">1. I can describe circuits and draw circuit diagrams2. I can Explain what is meant by current3. I can Explain how materials allow current to flow.4. I can describe what voltage does in a circuit.5. I can recall how voltage can be measured.6. I can explain the effect of increasing the voltage supplied.7. I can explain what resistance is and how it affects the circuit.8. I can investigate and identify the relationship between voltage and current.9. I can calculate the value of a resistor used in a circuit.10. I can describe how voltage, current and resistance are related in different circuits.11. I can understand the differences between series and parallel circuits12. Investigate and explain current and voltage in series and parallel circuits.13. Explain the circuits in our houses.14. Record the effects of static charge.15. Explain how static charge can be generated.16. Use evidence to develop ideas about static charge.17. Explain static charge in terms of electron transfer.18. Apply the explanation to various examples.19. Explain static electricity in terms of fields.20. Explain how charged objects affect each other.	-



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

Assessment details

The work is assessed by the work in the books, in class questioning and an end of topic test.



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	1. Explain what is meant by current	A current is a flow of electricity.	
	2. Explain how materials allow current to flow.	All the electrons in a circuit pass through all the component parts of a circuit.	
	3. I can describe what voltage does in a circuit.	Voltage is a measure of the amount of push the electricity in the circuit has.	
	4. I can recall how voltage can be measured.	Voltage is measured using a voltmeter.	
	5. I can explain the effect of increasing the voltage supplied.	If there is a greater voltage the electricity is delivered with more power.	
	6. I can explain what resistance is and how it affects the circuit.	Electrical resistance is a measurement of how hard electricity finds it to pass through a substance or circuit.	
	6. I can investigate and identify the relationship between voltage and current.	If you think of the water in a river as the (electrical) current around a circuit. The same volume of water can flow quicker or slower. The faster the water travels can be thought of as the greater the voltage in a circuit.	
	8. I can understand the differences between series and parallel circuits	In series circuits there is only one route for the electricity to pass along. All components are in a row. In parallel circuits each component has its own separate loop. The electricity has multiple routes to travel through to complete the circuit.	
	9. Investigate and explain current and voltage in series and parallel circuits.	The voltage in a series circuit divides equally over the components. The voltage is the same at all parts of	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		the circuit for a parallel circuit, but the current is equally divided between each separate loop.	
	10. How can static electricity be generated?	By rubbing certain materials together, negatively charged electrons will be transferred to one of the materials. This will give that material a negative electrical charge.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Unit Name: Chapter 10: Genes – Variation and Human reproduction	Recommended Teaching Time: 12 hours
Overview and Aims: We look at genetic variation, what causes it and the importance of it. We study the female and male reproductive systems. We look at fertilization, implantation and the development of the foetus.	
I can statements	Critical Content, Key Words and Additional Notes.
<ul style="list-style-type: none">· I can describe what is meant by variation in a species.· I can explain the difference between continuous and discontinuous variation.· I can plot graphs to show variation.· I can identify whether a feature is inherited or determined by the environment.· I can understand that offspring from the same parents may show variation.· I can describe the importance of variation. <small>[SEP]</small>· I can explain how variation may help a species to survive.· I can apply ideas about variation and survival to specific examples. <small>[SEP]</small>· I can describe the structures and functions of different parts of the female reproductive system.· I can describe the process of menstruation.· I can describe causes of low fertility.· I can describe the structure and function of different parts of the male reproductive system.· I can describe fertilisation in humans.· I can describe the role of the mother in supporting and protecting the developing foetus.· I can recognise the development of a foetus.· I can describe the effects of different factors on a developing foetus.· I can evaluate the strength of data.· I can analyse advice given to pregnant women.· I can critique claims linked with the effects of smoking in pregnancy.· I can identify potential bias in sources of information.· I can give a reasoned opinion.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

Assessment details	
The work is assessed by the work in the books, in class questioning and an end of topic test.	



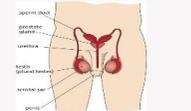
SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	1. I can describe what is meant by variation in a species.	Variation is the range of possible alternatives for one characteristic, eg brown eyes, grey eyes, blue eyes, hazel eyes etc	
	2. I can explain the difference between continuous and discontinuous variation.	Continuous variation is a characteristic that can have near infinite results, for example height between the two outermost results. Discontinuous variation is a characteristic for which there are limited possible results: for example, blood type or gender.	
	3. I can identify whether a feature is inherited or determined by the environment.	Some features are wholly and solely the product of the genetic material from your parents, but environmental factors such as food quality and availability as well as opportunities might affect how much a trait is expressed.	
	4. I can describe the importance of variation	Variation is important as it is how a species changes and adapts to specialise and take advantage of opportunities.	
	5. I can explain how variation may help a species to survive.	Anteaters did not always have such long noses, but those with long noses had an advantage and that is why they have prospered and passed this advantage on to their offspring.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

	<p>6. I can describe the structures and functions of different parts of the female reproductive system.</p>	<p>The human female reproductive system has two main purposes – to produce egg cells that may be fertilised by the male sperm and to provide an environment for the growing foetus.</p>  <p>The main female organs are the vagina, cervix, uterus, oviduct and ovary. Table 1.10.4 summarises the structure and function of each of these.</p> <p>TABLE 1.10.4: MAJOR REPRODUCTIVE ORGANS</p> <table border="1"> <tr> <td>Vagina</td> <td>Muscular tube, 8 to 12 cm long, that extends up to the uterus and can stretch to allow a baby to pass.</td> </tr> <tr> <td>Cervix</td> <td>Narrow opening from the vagina to the uterus with thick walls – can extend wide enough to allow a baby to pass.</td> </tr> <tr> <td>Uterus or womb</td> <td>Pear-shaped cavity with thick muscular walls, where the developing baby grows.</td> </tr> <tr> <td>Oviduct (fallopian tube)</td> <td>The tube that carries the egg from the ovary to the uterus.</td> </tr> <tr> <td>Ovary</td> <td>Where egg cells are made and then released into the oviduct.</td> </tr> </table>	Vagina	Muscular tube, 8 to 12 cm long, that extends up to the uterus and can stretch to allow a baby to pass.	Cervix	Narrow opening from the vagina to the uterus with thick walls – can extend wide enough to allow a baby to pass.	Uterus or womb	Pear-shaped cavity with thick muscular walls, where the developing baby grows.	Oviduct (fallopian tube)	The tube that carries the egg from the ovary to the uterus.	Ovary	Where egg cells are made and then released into the oviduct.					
Vagina	Muscular tube, 8 to 12 cm long, that extends up to the uterus and can stretch to allow a baby to pass.																
Cervix	Narrow opening from the vagina to the uterus with thick walls – can extend wide enough to allow a baby to pass.																
Uterus or womb	Pear-shaped cavity with thick muscular walls, where the developing baby grows.																
Oviduct (fallopian tube)	The tube that carries the egg from the ovary to the uterus.																
Ovary	Where egg cells are made and then released into the oviduct.																
	<p>7. I can describe the structure and function of different parts of the male reproductive system.</p>	<p>The purpose of the human male reproductive system is to produce millions of male sex cells (sperm) and to transport them inside the female to fertilise an egg cell and so produce a baby. The main parts of the male reproductive system are the testicles, scrotal sac, sperm duct, prostate gland, semen, urethra and penis. Table 1.10.5 summarises the structure and function of each of these.</p>  <table border="1"> <tr> <td>Testicles</td> <td>Two organs where sperm cells are made.</td> </tr> <tr> <td>Scrotal sac</td> <td>Protection around the testicles. This sac holds the testicles outside the body where sperm is kept at the best temperature for them to function.</td> </tr> <tr> <td>Sperm duct</td> <td>The tube that carries the sperm from the testicles to the prostate gland.</td> </tr> <tr> <td>Prostate gland</td> <td>Where semen is made.</td> </tr> <tr> <td>Semen</td> <td>A liquid that mixes with sperm and provides them with nutrients for their journey.</td> </tr> <tr> <td>Urethra</td> <td>The tube leading from the prostate gland along the penis.</td> </tr> <tr> <td>Penis</td> <td>The organ around the urethra. Movement of the penis releases sperm during intercourse.</td> </tr> </table>	Testicles	Two organs where sperm cells are made.	Scrotal sac	Protection around the testicles. This sac holds the testicles outside the body where sperm is kept at the best temperature for them to function.	Sperm duct	The tube that carries the sperm from the testicles to the prostate gland.	Prostate gland	Where semen is made.	Semen	A liquid that mixes with sperm and provides them with nutrients for their journey.	Urethra	The tube leading from the prostate gland along the penis.	Penis	The organ around the urethra. Movement of the penis releases sperm during intercourse.	
Testicles	Two organs where sperm cells are made.																
Scrotal sac	Protection around the testicles. This sac holds the testicles outside the body where sperm is kept at the best temperature for them to function.																
Sperm duct	The tube that carries the sperm from the testicles to the prostate gland.																
Prostate gland	Where semen is made.																
Semen	A liquid that mixes with sperm and provides them with nutrients for their journey.																
Urethra	The tube leading from the prostate gland along the penis.																
Penis	The organ around the urethra. Movement of the penis releases sperm during intercourse.																
	<p>8. I can describe fertilisation in humans.</p>	<p>Fertilisation is when one sperm from the male reached the egg in the female, the sperms genetic material fuses with the female’s genetic material.</p>															
	<p>9. I can recognise the development of a foetus.</p>	<p>From the moment the genetic material from the two gametes (sperm and egg) fuse, the</p>															



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		<p>process of cell division starts. This occurs until there is a ball of stem cells. Stem cells can grow into any and all cells in the human body. The stem cells start to differentiate causing the increasingly complex foetus to grow.</p>  A diagram illustrating the stages of human development. It starts with a 'zygote/fertilised cell' and 'cell division' leading to a '4 celled' stage. This progresses through '8 celled', '16 celled', and '32 celled' stages, showing the formation of a ball of cells. The final stage is a '20 weeks' fetus, depicted as a small human figure in a fetal position.	
	<p>10.I can critique claims linked with the effects of smoking in pregnancy.</p>	<p>Pupils should be able to look at information from several sources, consider its veracity, assess any bias and make a judgement based on this variety of evidence as to the effects of smoking on a pregnancy.</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

Unit Name: Chapter 4: Waves – Sound and Light	Recommended Teaching Time: 12 hours
Overview and Aims: Explore the nature of sound waves, the movement, reflection and absorption of sound as well as the hearing of sound. The nature of light waves, the refraction, reflection and colours of light as well as seeing light.	
I can statements	Critical Content, Key Words and Additional Notes.
<ul style="list-style-type: none">• Identify how sounds are made.• Describe how sound waves transfer energy.• Explain how loud and quiet sounds are made.• Explain what is meant by pitch.• Understand frequency, wavelength and amplitude.• Relate sounds to displayed waveforms.• Explain what is meant by audible range.• Understand how the ear detects sounds.• Apply ideas about sound to explaining defects in hearing.• Recognise how the speed of sound changes in different substances.• Explain why the speed of sound varies between solids, liquids and gases.• Recognise which materials reflect the quality of sound.• Analyse the effect of different materials on sound waves.• Use ideas about energy transfer to explain how soundproofing works.• Describe how light passes through different materials.• Explain the difference between scattering and specular reflection.• Explain how shadows are formed in eclipses.• Describe how a mirror reflects light.• Explain the difference between specular and diffuse reflection.• Apply the law of reflection.• Describe how light is refracted when it enters a different medium.• Explain how this can cause it to change direction.	-



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

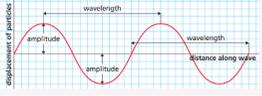
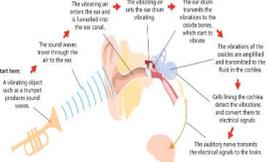
- | | |
|--|--|
| <ul style="list-style-type: none">• Apply ideas about refraction to understanding lenses.• Describing how the human eye works.• Explaining how the eye focuses on objects different distances away.• Applying ideas about lenses to the correction of vision.• Describe how a spectrum can be produced from white light.• Compare the properties of light at different frequencies.• Explain how light of different wavelengths can be split and recombined. | |
|--|--|

Assessment details

The work is assessed by the work in the books, in class questioning and an end of topic test.



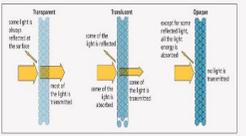
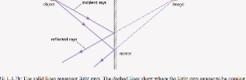
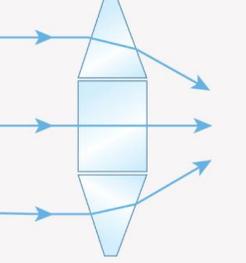
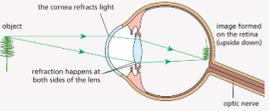
SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	1. How are sounds are made?	All vibrations result in sound. The vibrations cause waves of energy that are passed on through the particles of the air or other medium.	
	2. How are loud and quiet sounds are made?	Sound is measured in decibels. The stronger the vibration, the more energy there will be in the sound wave and therefore the sound will be louder.	
	3. What is meant by pitch?	Pitch is a measure of if the sound is a high note or a low note. If a sound has a higher frequency of new sound waves being created, it makes a higher note and is said to be of higher pitch.	
	4. What are frequency, wavelength and amplitude?	 <p>The higher the frequency of a wave, the shorter the wavelength. The maximum displacement is the amplitude. The energy transferred by the wave depends on this. The larger the amplitude of a sound wave, the louder the sound.</p>	
	5. How does the ear detect sounds?		



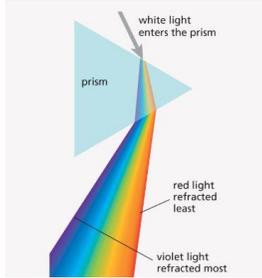
SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

	<p>6. How does light pass through different materials?</p>	<p>Other materials cast shadows by either completely or partially blocking the passage of light. Opaque materials block the passage of light waves completely producing a dark shadow, whereas translucent materials only allow some of the light to pass through, casting weak shadows.</p> 	
	<p>7. How does a mirror reflect light?</p>	 <p>FIGURE 1.1 The law of reflection experiment setup. The dashed lines show where the light rays appear to be coming from. The angle of incidence is the angle between the incident ray and the normal.</p>	
	<p>8. How can ideas about refraction be applied to understanding lenses?</p>	 <p>The shape of a lens will dictate how much the light is diverted and by how much. Opticians match the type of lens to the eye of the patient so light coming to the eye is focussed on the back of the eye (the retina).</p>	
	<p>9. How does the human eye work?</p>		



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		<p>The light entering the eye is focussed onto the retina (the back) of the eye. The retina is covered with light sensitive cells that send electrical impulses to the brain. This information is interpreted by the brain into what we see.</p>	
	<p>10. How can the spectrum be made from visible light?</p>	 <p>The diagram shows a triangular prism with a beam of white light entering from the top. The light is dispersed into a spectrum of colors: red, orange, yellow, green, blue, and violet. Labels indicate that red light is refracted the least and violet light is refracted the most.</p> <p>The wavelengths of radiation we can see is called the visible spectrum. When viewed together this is called white light. By slowing down visible light we can split it into its component colours.</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Unit Name: Energy – Energy Costs and Energy Transfer - Chapter 3	Recommended Teaching Time: 12 hours
Overview and Aims: Understand what the word energy means in physics. Talk about its form and uses in the home. How it is used, how it is measured. How energy is recorded and how it can be changed but never destroyed or created.	
I can statements	Critical Content, Key Words and Additional Notes.
<ul style="list-style-type: none">· I can describe the use of fuels in the home.· I can explain that foods are energy stores and that the amount stored can be measured.· I can explain that energy is not a material and can be neither created nor destroyed.· I can describe what is meant by 'rate of energy transfer'.· I can recall and use the correct units for rate of energy transfer.· I can calculate quantities of energy transferred when change happens.· I can describe the information a typical fuel bill provides.· I can explain and use the units used on a fuel bill.· I can explain how the cost of energy used can be calculated.· I can describe ways of generating electricity.· I can explain advantages and disadvantages of different methods.· I can evaluate the consequences of using various generating method.· I can apply the concept of energy transfers to a device such as a hand crank torch.· I can critique claims made for the running costs of fluorescent light bulbs.· I can evaluate actions that could be taken in response to rising energy demand.· I can investigate a model of energy.· I can describe energy stores and transfers.· I can apply the energy model to different situations.· I can recognise what energy is and its unit.· I can describe a range of energy transfers using simple diagrams.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

- | | |
|--|--|
| <ul style="list-style-type: none">· I can use a Sankey diagram as a model to represent simple energy changes.· I can recognise energy transfers due to falling objects.· I can describe factors affecting energy transfers related to falling objects.· I can explain how energy is conserved when objects fall.· I can describe different situations that use the energy stored in compressing and stretching elastic materials.· I can describe how elastic potential energy in different materials can be compared.· I can explain how elastic potential energy is transferred. | |
|--|--|

Assessment details

The work is assessed by the work in the books, in class questioning and an end of topic test.



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	1. I can describe the use of fuels in the home.	Anything in the house that needs power, uses energy. These energies are provided by fuels: gas and electricity mostly nowadays.	
	2. I can explain that energy is not a material and can be neither created nor destroyed.	Energy is not created or destroyed, merely changed. Energy stored in a lump of coal is released when the coal is burnt. The released energy turns into light, sound but mostly heat to warm the surroundings. The unit of energy is the joule (J) or kilojoule (1000 Joules = 1 kJ).	
	3. I can describe what is meant by 'rate of energy transfer'.	Transforming the rate of energy transfer is called power. Somethings demand energy is transformed very quickly for them to work. These things need more power.	
	4. I can recall and use the correct units for rate of energy transfer.	Power is measured in watts (W). 1 joule of energy transferred per second = 1 watt.	
	5. I can evaluate actions that could be taken in response to rising energy demand.	Governments have to make decisions about how to make the energy needed. Some fuels are more expensive than others. Renewable energy sources are limitless but may be less efficient than fossil fuels at producing energy on demand. Some fuels produce energy for a long time but produce very dangerous biproducts (nuclear power) that need to be disposed of safely, which may be very expensive.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

	<p>6. I can investigate a model of energy.</p>	<p>An example of this may be the light bulb. When we turn on the electricity supply to a light bulb we want the electrical energy in the wiring to be converted into light energy at the bulb. A biproduct of this was the bulb would produce heat energy, so the bulb got hotter. New energy efficient light bulbs have been constructed so the bulbs are more energy efficient, this means more energy is converted to making light and less to producing unwanted heat energy.</p>	
	<p>7. I can recognise what energy is and its unit.</p>	<p>The source of all our energy is the Sun. The sun provides direct energy with sun light, this can be harnessed by man to make poweer from solar cells. Plants convert the sun's light power by photosynthesis. The energy made and stored by plants is used by animals that eat the plants. The energy for the animals that eat the plants may be converted to energy in a predator of the animals that eat the animals that eat the plants and so on. Coal gas and oil are all derived from the ancient remains of plants and animals that died many years ago, all of whom derived their energy from the sun.</p>	
	<p>8. I can describe a range of energy transfers using simple diagrams.</p>	 <p>This is a Sankey diagram. These show the energy produced and what happens to this energy.</p>	
	<p>9. I can describe factors affecting energy transfers related to falling objects.</p>	<p>Objects can be thought of as energy stores. If an object is lifted off the surface of the earth it stores</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		<p>potential energy. Potential energy is a measure of how much of a pull on an item the gravity of the Earth has on it. When an object begins to fall this (gravitational) energy is transferred to the energy of movement (kinetic energy).</p> <p>If a fall is halted, all the kinetic energy is changed suddenly. It is the energy of movement being transferred through the bones and organs of the body that causes the broken bones or ruptures.</p>	
	<p>10. I can describe different situations that use the energy stored in compressing and stretching elastic materials.</p>	<p>When an elastic object is stretched, or compressed energy is stored. When this energy is released the object will seek to return to its original shape. It is this storing and releasing of energy that can be harnessed in springs or elastic bands (for example).</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

Unit Name: Forces – Contact Forces <i>and</i> Pressure – Chapter 1	Recommended Teaching Time: 12 hours
Overview and Aims: A more in-depth examination of the physics topic forces. How we talk more about forces in science, what drag is, what resistance is and their effects. Look at pressure, what it is and how it affects solids, liquids and gases.	
I can statements	Critical Content, Key Words and Additional Notes.
<ul style="list-style-type: none">· I can analyse situations to identify the various forces that are acting.· I can explore static situations in which objects are held in equilibrium and the nature of the forces involved.· I can describe the effects of drag and other forces on objects as they move.· I can describe factors which affect the size of frictional and drag forces.· I can evaluate how well sports or vehicle technology reduces frictional or drag forces.· I can explain the relationship between an applied force and the change of shape of an object.· I can investigate forces involved in compressing and stretching materials.· I can identify applications for compressible and stretchable materials.· I can investigate the effects of applied forces on springs.· I can generate data to produce a graph and analyse outcomes.· I can explain how pressure can be applied on a solid surface.· I can describe some effects of varying pressure.· I can describe how pressure in a liquid alters with depth.· I can describe how pressure in a gas varies with height above the Earth.· I can explain pressure changes in relation to particles and gravity.· I can identify the factors that determine the size of pressure on a solid.· I can calculate the size of pressure exerted.· I can explain why some objects float and others sink.· I can relate floating and sinking to density, displacement and upthrust.· I can explain the implications of these ideas.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	1. I can analyse situations to identify the various forces that are acting.	In order to do this, we must understand forces can be pushing forces, pulling forces or turning forces. These will either be contact or non-contact.	
	2. I can explore static situations in which objects are held in equilibrium and the nature of the forces involved.	If an object is moving it is because of all the competing forces, some or one is stronger. This will cause the object to move. This is called the Resultant force. If all the forces are balanced and the object does move, we say the forces are at Equilibrium. Equilibrium comes from 2 Latin words meaning 'equal' and 'balance'.	
	3. I can describe the effects of drag and other forces on objects as they move.	The resistance to movement through any material that will flow (liquids and gases) is called drag. Some objects experience little resistance. This is called streamlining.	
	4. I can explain the relationship between an applied force and the change of shape of an object.	If an object is compressed or stretched too much it may change shape (deform) or break. If the object cannot return to its original shape if the force is removed, it has passed its 'elastic limit'. If an object breaks easily, under little force, it is said to be 'brittle'.	
	5. I can describe some effects of varying pressure.	The same amount of force applied in a tiny area or spread over a much larger area can have radically different effects. A wide splayed foot (a snowshoe) or a camel's foot will spread the pressure and so delay sinking into a soft surface like sand or snow. A sharp point like a knife blade or a drill bit concentrates all the force at a select point.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

	6. I can describe how pressure in a liquid alters with depth.	The pressure in a liquid derives from the mass of the liquid above, pressing down. The deeper the depth the greater the volume of substance pressing down.	
	7. I can describe how pressure in a gas varies with height above the Earth.	The pressure in the atmosphere goes down as the you go higher. There are fewer gas particles as you get further from the Earth's surface.	
	8. I can explain pressure changes in relation to particles and gravity.	The pressure in the atmosphere is because the gas molecules that make up the atmosphere are held close to the Earth's surface by the gravity of the Earth. The further the gas molecules are from the Earth, the weaker the gravitational pull is upon them and the fewer of them there are. Fewer particles mean less pressure.	
	9. I can explain why some objects float and others sink.	If an object is less dense than the liquid it is in, it will float.	
	10. I can relate floating and sinking to density, displacement and upthrust.	When an object goes into water it displaces a volume of water. The weight of the volume of water is equal to the upthrust (or buoyancy effect). If the volume of displaced water weighs more than the weight of the object, the object will float. Therefore, huge ships which weigh many thousands of tons can float – because the shape of the ship's hull is designed to displace a volume of water greater than the weight of the ship.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Unit Name: Matter – Periodic table <i>and</i> Elements – Chapter 5	Recommended Teaching Time: 12 hours
Overview and Aims: Understand some of the reasoning behind the structure and presentation of the Periodic Table of the Elements. Examine some of the similar properties of different groups, starting with the group 1 metals and the group 7 Halides. Become familiar with different terminology such as metal, non-metal, compound, molecule and polymer.	
I can statements	Critical Content, Key Words and Additional Notes.
<ul style="list-style-type: none">· I can navigate the periodic table and identify some of the elements.· I can identify features of the periodic table and describe how it is organised.· I can explain why the periodic table is useful.· I can describe the physical properties of Group 1 metals.· I can describe the pattern in reactions of Group 1 metals.· I can use data to predict the reactivity and position of metals within the periodic table.· I can describe the physical properties of the halogens.· I can describe the pattern in reactions of the halogens.· I can use data to predict the reactivity and position of non-metals within the periodic table.· I can sort elements using chemical data and relate this to their position in the periodic table.· I can explain what is meant by a compound.· I can recognise how compounds are formed and named.· I can interpret the ratio of atoms and formula of compounds.· I can describe the properties of elements and the compound that they form.· I can compare the properties of elements with the properties of the compounds that they form.· I can describe what a polymer is, using examples.· I can explain how the properties of polymers relate to their function.· I can describe what is meant by ceramic and composite, using examples.· I can explain how the properties of ceramics and composites relate to their function.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	1. I can identify features of the periodic table and describe how it is organised.	<p>The Periodic Table is organised systematically. The organisation is based (according to columns) in the number of electrons in the outside shell. If there is 1 electron in the outside shell, the element is in group 1 (column 1).</p> <p>The number of rows denotes the number of rows of electrons there are. The elements progress left to right, line after line, adding one electron (and proton) each square.</p>	
	2. I can explain why the periodic table is useful.	<p>The periodic table is useful because it accurately organises and predicts elements and their properties.</p>	
	3. I can describe the physical properties of Group 1 metals.	<p>Group 1 metals are all soft, have low boiling points compared to other metals. They are extremely reactive and some float.</p>	
	4.I can describe the pattern in reactions of Group 1 metals.	<p>The elements in Group 1 get progressively more reactive as the elements go down the table.</p>	
	5.I can describe the physical properties of the halogens.	<p>The Halogens are gases except bromine which is a liquid at room temperature but quickly becomes a gas. They are all very reactive and dangerous to humans.</p>	
	8. I can describe what is meant by the word compound.	<p>A compound is a substance made of two or more elements that have chemically bonded together to make a new substance which often reacts chemically to the world differently from either of its parent elements.</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

	9. I can compare the properties of elements and the properties of their compounds.	Table salt has the chemical formula NaCl. Na is the chemical symbol for sodium. Sodium is a group 1 metal, soft, very reactive, explosive on contact with water. Cl is the chemical symbol for chlorine. Chlorine is a highly poisonous green gas, used as a weapon in wars. The result of these two reacting is a white crystalline substance, good for putting on ice to stop it freezing and very good at flavouring food.	
	10. I can describe what a polymer is, using examples.	Due to the remarkable chemical properties of Carbon some compounds are made where a chemical unit (a monomer) is repeated in a long chain. This is a polymer. Examples of this are starch and polyvinylchloride.	
	11. I can explain how the properties of polymers relate to their function.	The arrangement of the molecules within a polymer defines its shape and its properties. Chains of polymer that line up on top of each other may make a polymer flexible. Polymers that link together at many chemical bonds may make a polymer rigid and strong.	
	12. I can describe what is meant by ceramic and composite, using examples.	A ceramic is a non-organic (no carbon), non-metal compound. A ceramic is prepared by heating and then cooling. Examples of these are bricks, tiles pottery. A composite is a mix of two or more substances. Often, they do not chemically bond within the composite, but the mix brings out certain properties, often making the composite stronger than the component parts. Examples are concrete or carbon-fibre.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

Unit Name: Organisms – Breathing <i>and</i> Digestion – Chapter 8	Recommended Teaching Time: 12 hours
Overview and Aims: Understand the structure and function of the lungs. Distinguish between gaseous exchange and respiration. Understand the structure and purpose of the digestive system. The importance of food, diet and the results of deficiency.	
I can statements	Critical Content, Key Words and Additional Notes.
<p>I can describe the mechanism of breathing in and out.</p> <p>I can explain how changes in pressure help us to breathe.</p> <p>I can evaluate a model of breathing.</p> <p>I can describe what is meant by lung volume and identify some simple methods to measure it.</p> <p>I can identify independent, dependent and control variables in a lung volume investigation.</p> <p>I can interpret and evaluate data linked to lung volume.</p> <p>I can describe the features of the human gas exchange system.</p> <p>I can explain how the features enable gases to be exchanged.</p> <p>I can distinguish between breathing and respiration.</p> <p>I can describe the physical effects of disease and lifestyle on the breathing system.</p> <p>I can explain the physical effects of disease and lifestyle on the breathing system.</p> <p>I can describe how our understanding about the effects of smoking has changed over time.</p> <p>I can describe the components of a healthy diet.</p> <p>I can examine the importance of each component of a healthy diet.</p> <p>I can compare the energy requirements of different healthy diets.</p> <p>I can describe the physical effects of eating too much and eating too little.</p> <p>I can identify the causes and effects of some deficiencies in the diet.</p> <p>I can identify the organs of the human digestive system.</p> <p>I can describe the process of digestion.</p> <p>I can evaluate a model of the digestive system.</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

<p>I can describe the roles of the organs of the digestive system. I can describe the importance of enzymes and gut bacteria in digestion. I can explain how the structure of each of the organs is adapted to its function.</p>	
--	--



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	1. Describe the mechanism of breathing in and out.	The lungs are housed inside the ribcage. When the muscles in the rib cage contract, they lift and expand the chest. The diaphragm is a large muscle below the lungs. This contracts at the same time as the rib cage, resulting in the lungs being pulled down, up and outwards. As the breath is breathed out the diaphragm and muscles in the rib cage relax, the rib cage contracts the diaphragm rises and air is pushed out of the lungs.	
	2. Describe the features of the human gas exchange system.	Air enters the lungs it passes along bronchioles down to alveoli. The walls of these are so thin. As are the walls of the sea of capillaries surrounding the lungs. The capillaries mean a greater volume of blood is brought close to the lungs.	
	3. Explain how the features enable gases to be exchanged.	Once air enters the lungs it passes along bronchioles down to alveoli. The walls of these are so thin gases can pass through them, through the walls of the sea of capillaries surrounding the lungs and into the blood stream. Similarly, unwanted gases can move back from the blood system, into the lungs and be breathed out.	
	4. Distinguish between breathing and respiration.	Breathing is the process by which gases are exchanged into and out of the body. Respiration is the process that occurs within each cell where oxygen is used to	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		react with glucose. This reaction creates energy that the cell can use to do work.	
	<p>5. Describe the physical effects of disease and lifestyle on the breathing system.</p> <ul style="list-style-type: none"> • Explain the physical effects of disease and lifestyle on the breathing system. 	Regular exercise is thought to increase the number and quality of the blood carrying capillaries that surround the lungs. Diseases may scar the lungs or adversely affect the lungs such that they lose efficiency in exchanging gases. Asthma is thought to constrict the alveoli of the lungs so the surface area over which gases can be exchanged is lessened, so less oxygen can be absorbed into the body.	
	6. Describe the components of a healthy diet.	A healthy diet is one that provides enough calories (energy) to fuel the body and has all of the main food groups represented (proteins, carbohydrates, fruit and veg [vitamins and minerals], dairy and fats), and in the right proportions.	
	7. Describe the physical effects of eating too much and eating too little.	Eating too much risks the excess energy being stored as fat around the body. This might lead to joint pain, heart disease, high blood pressure, difficulty breathing to name a few. Under eating is called malnutrition. The body has insufficient energy to power itself and must cannibalise itself. This will lead to muscle loss, inefficient body biochemistry, cracked skin, organ failure, infertility etc.	
	8. Identify the organs of the human digestive system.	The main organs in the digestive system are the mouth (tongue, teeth and salivary enzymes), The oesophagus which carries food to the stomach. Leaving the stomach food goes through the small and then the large intestines, before entering the body at the anus.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

	<p>9. Describe the process of digestion.</p>	<p>0 hours Food enters the mouth where it is chewed up, rolled into a ball by the tongue and moistened by saliva ready for swallowing.</p> <p>1 hours Food is swallowed and passes into the oesophagus which carries the food to the stomach.</p> <p>2 hours The stomach breaks down food physically by muscle contraction and chemically by enzymes. The acid conditions kill bacteria and help the enzymes to work.</p> <p>6 hours The small intestine digests the food further using different enzymes and absorbs it into the blood.</p> <p>10 hours In the large intestine water is absorbed to make the waste (faeces) more solid.</p> <p>16-24hrs The faeces are then passed out through the anus.</p>	
	<p>10. Describe the importance of enzymes and gut bacteria in digestion.</p>	<p>Enzymes are chemicals that act as catalysts. Catalysts speed up chemical reactions. The body produces countless enzymes to make the digestive process more efficient. Gut bacteria live in the gut (intestines) they are used by the body to further breakdown our food so we can</p>	



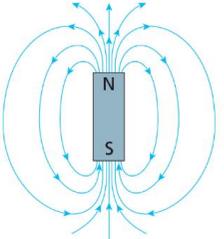
SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

Unit Name: Electromagnets – Magnetism <i>and</i> Electromagnetism - Chapter 2	Recommended Teaching Time: 12 hours
Overview and Aims: Exploring and experimenting with magnets and electromagnets. What is a magnetic field? What is the effect of a magnetic field, and on what? What is an electro-magnet? How can an electro-magnet be made more powerful?	
I can statements	Critical Content, Key Words and Additional Notes.
<ul style="list-style-type: none">• I can know the laws of magnetic attraction.• I can explain how a magnetic field can be represented by field lines.• I can apply ideas about attraction to magnetic materials placed in a field.• I can describe key features of the Earth’s magnetic field.• I can explain why fields vary in strength.• I can explore the fields around combinations of magnets.• I can describe what an electromagnet is.• I can investigate the factors affecting the strength of electromagnets.• I can describe different applications of electromagnets.• I can identify and manage variables• I can investigate the effect of changing variables.• I can draw conclusions about how the strength of an electromagnet can be controlled.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	1. I know the laws of magnetic attraction.	Like poles of magnets repel and unlike poles of magnets attract.	
	2. I can explain how a magnetic field can be represented by field lines.	 <p>A magnetic field can be represented as lines of force that leave one pole of the magnet only to reach around and enter the magnet at the opposite pole.</p>	
	3. I can apply ideas about attraction to magnetic materials placed in a field.	Magnetic items will behave differently if placed in a sufficiently strong magnetic field. The objects will be attracted by a strong enough magnetic field.	
	4. I can describe key features of the Earth's magnetic field.	The Earth acts as a huge bar magnet. This means waves of the magnetic field extends for many thousands of kilometres around our planet. The Earth's magnetic poles have switched from North to South and back again, frequently over the life of our planet. Currently the magnetic south is near the North pole. This means it attracts things to the North, and so why we have magnetic North.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

	5. I can explain why fields vary in strength.	Magnetic field strengths are affected by 1) the strength of the magnet and 2) Distance. The further away, generally the field strength will be weaker. 3) Position. The magnetic field is stronger at the poles where there is a greater concentration of the fields than at the periphery.	
	6. I can explore the fields around combinations of magnets.	If the two magnets are aligned with unlike poles facing, the attractive field between them will be very strong. If the magnets are aligned with like poles facing, the magnetic fields will seek to avoid each other and turn away from each other.	
	7. I can describe what an electromagnet is.	If an electric current passes through a wire a magnet field is generated. Any magnet that relies upon electricity to create its magnetic field is an electromagnet.	
	8. I can describe different applications of electromagnets.	Electro-magnets are used to separate magnetic metals from non-metallic metals in scrap yards. They can be used as a magnetic crane, they are also used as circuit breakers, in loudspeaker mechanisms or to sound an electronic bell. They are used to encrypt data within modern computers.	
	<ul style="list-style-type: none"> I can identify and manage variables 	In making an electromagnet we have three components. <ol style="list-style-type: none"> An electric current passing through a wire. A variable number of coils of the wire. There must be in iron ore. 	
	<ul style="list-style-type: none"> I can draw conclusions about how the strength of an electromagnet can be controlled. 	The strength of an electro-magnet: The strength of the magnet is basically directly proportional to the strength of the current.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		<p>The strength of the magnet is basically directly proportional to the number of coils. The strength of the magnet is greater if the core is made of iron or steel.</p>	
--	--	--	--



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Unit Name: Reactions – Chemical energy <i>and</i> Types of reaction – Chapter 6	Recommended Teaching Time: 12 hours
Overview and Aims: Consider what are chemical reactions. Look at what exo and endothermic reactions are. Why they are what they are and practical examples. We'll understand what is happening at the atomic level in these reactions. We look at chemical decomposition as well as combustion and how we use combustion. Finally, we look at one of the fundamental laws of chemistry: The Law of Conservation of Mass.	
I can statements	Critical Content, Key Words and Additional Notes.
<ul style="list-style-type: none">• I can describe examples of exothermic reactions.• I can explain the energy changes taking place during an exothermic reaction.• I can describe examples of endothermic reactions.• I can choose a suitable range and interval of values in an investigation.• I can consider how to present data to make conclusions.• I can describe what a catalyst is.• I can explain how catalysts work.• I can summarise combustion using an equation.• I can make observations during chemical reactions.• I can write word equations to represent chemical changes.• I can explain chemical changes using a model.• I can identify applications of combustion reactions.• I can identify fuels used in different applications.• I can compare the energy content of different fuels.• I can recognise and explain thermal decomposition reactions.• I can describe some uses of thermal decomposition.• I can observe and explain mass changes for chemical and physical processes.• I can use particle diagrams to explain chemical processes.	

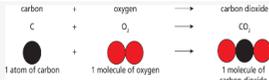


SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	1. I can describe examples of exothermic reactions.	Exothermic reactions are reactions that give out heat. The products of a reaction will be hotter than the reactants were. When chemical bonds are broken in the reactants and reformed creating the products. If the breaking creates more energy than is absorbed by the remaking of chemical bonds – the reaction will be exothermic. Any combustion reaction is exothermic.	
	2. I can choose a suitable range and interval of values in an investigation.	When displaying the results of an experiment it is important to assess the size of the range of the dependent variable results, so if a graph is composed the values will be coherent.	
	3. I can describe what a catalyst is.	A catalyst is something added to a reaction to affect the rate of the reaction. Catalysts are not chemically changed themselves through the reaction.	
	4. can explain how catalysts work.	Catalysts are said to produce an 'alternative pathway' for the original reaction to occur. This means the results are the same, but these reactions can occur tens of thousands of times quicker with a catalyst.	
	5.I can summarise combustion using an equation.	Fuels such as gas, oil, petrol, wood, coal are all made with carbon and hydrogen atoms. Complete combustion can be written as: Hydrocarbon + oxygen = carbon dioxide + water	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

	13. I can explain chemical changes using a model.		
	14. I can compare the energy content of different fuels.	<p>If a selection of different fuel oils are combusted and the resultant heat used to heat a set volume of water. The fuel oil that heated the water the most would be the one storing the most energy.</p>	
	15. I can recognise and explain thermal decomposition reactions.	<p>Thermal decomposition is different from combustion. Combustion is an oxidation reaction, that is to say, oxygen is added. With thermal decomposition, under heat a substance reverts to its simpler chemical forms. Many metal carbonates decompose on heating.</p> <p><small>metal carbonate → metal oxide + carbon dioxide</small></p>	
	16. I can observe and explain mass changes for chemical and physical processes.	<p>French genius Antoine Lavoisier described the Law of Conservation of Mass in 1789. This states that during a chemical reaction there is no change in mass. The mass of the reactants is equal to the mass of the products of a reaction.</p>	
	17. I can use particle diagrams to explain chemical processes.	<p>If calcium carbonate decomposes, the mass of the calcium carbonate at the start is equal to the mass of the calcium oxide and carbon dioxide at the end.</p> <p><small>calcium carbonate → calcium oxide + carbon dioxide</small> $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ 100g 56g 44g</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Unit Name: Ecosystems – Respiration <i>and</i> Photosynthesis – Chapter 9	Recommended Teaching Time: 12 hours
Overview and Aims: Look at and clearly identify the meaning of respiration. Look at aerobic and anaerobic respiration in plants and animals. Study photosynthesis in more detail, look at leaf structure and function as well as the role of water and minerals in plants and the factors that affect the rate of photosynthesis.	
I can statements	Critical Content, Key Words and Additional Notes.
<p>I can recall the equation for respiration and describe what it shows.</p> <ul style="list-style-type: none">· I can explain the importance of respiration.· I can apply what we know about respiration.· I can describe what is meant by anaerobic respiration.· I can explain why some sports involve more aerobic or more anaerobic respiration.· I can explain what is meant by oxygen debt.· I can recall that plants and microbes carry out anaerobic respiration.· I can recall the word equation for fermentation in plants and microbes.· I can describe some evidence to show that anaerobic respiration can produce carbon dioxide.· I can describe some applications of fermentation.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

- | | |
|---|--|
| <ul style="list-style-type: none">· I can identify dependent, independent and control variables in an investigation.· I can analyse data and identify next steps.· I can describe some similarities and differences between aerobic and anaerobic respiration.· I can describe a method to show that chlorophyll is essential for photosynthesis.· I can identify risks and control measures.· I can relate the size of a leaf to the availability of light.· I can relate the function of the leaf to its structure and the types of cell.· I can evaluate the structure of a cell related to its function.· I can identify how water and minerals move through a plant.· I can explain how water and minerals move through a plant.· I can evaluate the cell structures that allow the movement of water and minerals through a plant.· I can identify the minerals essential to healthy plant growth.· I can explain the effects of a deficiency in essential minerals.· I can evaluate the limitations of evidence.· I can identify the factors that can affect photosynthesis. | |
|---|--|



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

<ul style="list-style-type: none">· I can predict results of investigations.· I can interpret secondary data about photosynthesis.	
---	--



**SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1**

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	1. I can recall the equation for respiration and describe what it shows.	<p>The basic equation for respiration is below. $\text{glucose} + \text{oxygen} \rightarrow \text{carbon dioxide} + \text{water} (+ \text{energy})$ This is the main way a living cell gains energy. It is why we need oxygen and why we breathe out carbon dioxide. The equation for respiration is the opposite for the equation of photosynthesis.</p>	
	2. I can explain the importance of respiration.	Respiration is the mechanism by which living organisms, from the smallest to the tallest realise energy from their food that has been converted to glucose and sent around the organism to all its cells	
	3. I can describe what is meant by anaerobic respiration.	<p>Anaerobic respiration is another process by which living organisms can elicit energy from glucose, but this time in the absence of oxygen. Respiration without oxygen is 19 x less efficient at generating energy.</p> <p style="background-color: #e0ffe0; padding: 5px;"> $\text{glucose} \longrightarrow \text{lactic acid} + \text{energy}$ $\text{C}_6\text{H}_{12}\text{O}_6 \longrightarrow 2\text{C}_3\text{H}_6\text{O}_3 + \text{energy}$ </p>	
	4. I can recall that plants and microbes carry out anaerobic respiration.	Plants can respire anaerobically; it produces carbon dioxide and ethanol (alcohol).	
	5. I can identify dependent, independent and control variables in an investigation.	When conducting an experiment in science one must identify	



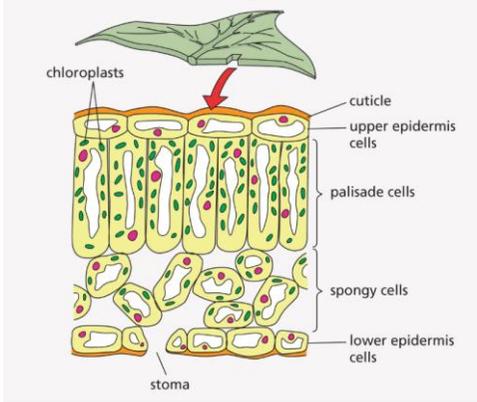
SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		<p>1) The thing in the experiment that we are going to measure. This is the dependent variable.</p> <p>2) The thing that we change in the experiment is called the independent variable.</p> <p>3) apart from the thing we are changing, we try to keep all other component parts the same. We called these elements the control variables.</p>	
	<p>6. I can describe a method to show that chlorophyll is essential for photosynthesis.</p>	<p>If a plant is deprived of light for 5 days and then tested for starch in its leaves, we would not expect to find any.</p> <p>If the same plant is kept in sunlight for 5 days and then its leaves tested for starch, we would expect to find starch. This is because the green colour in a leaf is chlorophyll which converts sunlight to glucose. This is an energy source for the plant. The plant transfers the glucose around the plant and then stores it as starch. If we test and find starch, it is because the plant is photosynthesising. If there is no starch after being kept in the dark it means the plant has used up the energy source and cannot make any more without sunlight.</p>	
	<p>7. I can relate the function of the leaf to its structure and the types of cell.</p>	<p>The leaf has a waxy coating on the upper side. This is the cuticle. This is waxy to stop water evaporating up and out of the top side of the leaf. The sun side of the leaves have a layer of the thick palisade mesophyll cells. These are full of chloroplasts containing chlorophyll. Chlorophyll is essential to convert sunlight into food (glucose). The spongy mesophyll cells have space between them so the gases of photosynthesis</p>	



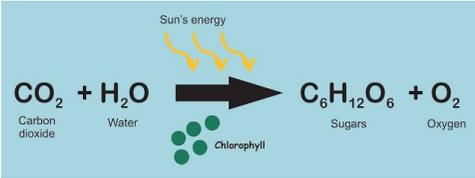
SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

		<p>can exchange. The lower epidermis cells have the stoma within them. These are closable pores within the leaves that open and close depending on the leaf's need to retain water and gases.</p> 	
	<p>8. I can explain how water and minerals move through a plant</p>	<p>Water and minerals both enter the plant, mostly, through the roots. Water moves by a process called osmosis initially, to enter the plant. There is a system within the plant called xylem that runs the length of the plant. This is designed so water is pulled up from the roots up to the very top. Minerals may move by a process called diffusion, but the plants use a system called active transport to transport the vital minerals around the plant through its phloem system.</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

	9. I can explain the effects of a deficiency in essential minerals.	Minerals are necessary in a plant to make new cells and new chemicals like chlorophyll. Without the minerals the plant cannot grow well.	
	10. I can identify the factors that can affect photosynthesis.	<p>The equation for photosynthesis requires Carbon dioxide and water. Without either there can be no photosynthesis. Experiments have been performed when the rate of photosynthesis is measured at different concentrations of carbon dioxide. Photosynthesis increases with the concentration of Carbon dioxide until a point.</p> <p>The same with water. Too much water can also drown a plant.</p> <p>Plants need sunlight to photosynthesis. Experiments show that like carbon dioxide the efficiency of photosynthesis will increase until the rate of return lessens.</p>  <p>The diagram illustrates the chemical equation for photosynthesis: $CO_2 + H_2O \xrightarrow{\text{Sun's energy, Chlorophyll}} C_6H_{12}O_6 + O_2$. On the left, 'Carbon dioxide' (CO₂) and 'Water' (H₂O) are listed. On the right, 'Sugars' (C₆H₁₂O₆) and 'Oxygen' (O₂) are listed. A large black arrow points from left to right. Above the arrow, 'Sun's energy' is written with three yellow arrows pointing down. Below the arrow, 'Chlorophyll' is written with three green circles.</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Unit Name: Energy – Work and Heating and cooling – Chapter 3	Recommended Teaching Time: 12 hours
Overview and Aims: Examine the physics concept of work. Learn the equation and apply the equation to different circumstances. Examine temperature and heat, what they are and how to explain the movement, containment or sharing of heat.	
I can statements	Critical Content, Key Words and Additional Notes.
<ul style="list-style-type: none">I can recognise situations where work is done.I can describe the relationship work done = force \times distance.I can apply the equation for work done to different situations.I can understand what simple machines are.I can explain why they are useful.I can compare and contrast different machinesI can describe how temperature differences lead to energy transfer.I can explain how heat can travel by conduction, convection and radiation.I can give examples of each of these happening.I can explain the difference between conductors and insulators.I can explain how insulation works.I can apply ideas about insulation to practical applications.I can describe the warming and cooling of objects.I can explain the relationship between energy transfer and temperature change.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	1. I can recognise situations where work is done	Work is done when force is used to transfer energy.	
	2. I can describe the relationship work done = force × distance.	Work done = force x distance. What force is needed to start the movement must be multiplied over the distance the force is needed to be exerted. Work (J) = force (N) x distance (m)	
	3. I can apply the equation for work done to different situations.	Work done can calculate the energy required to make a car race for 400m, the same equation can be used to calculate the work done to apply the brakes and bring the car to a halt.	
	4. I can understand what simple machines are.	All simple machines share the same principle, they are designed to make work easier, to apply less force to gain the same result. Examples of this are pivots and levers (door handles, spanners, taps)	
	5. I can describe how temperature differences lead to energy transfer.	If two objects are of a different temperature energy will (always) flow from the hot object to the cold object, until both objects are the same temperature. This is a universal law that governs how the universe works –called entropy.	
	6. I can explain how heat can travel by conduction, convection and radiation.	Conduction is heat transferal through a solid. Convection is how energy is transferred through materials that flow. of	
	7. I can give examples of conduction, convection and radiation.	Examples:	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		<p>Conduction- If a piece of metal has one end put in a fire, the other end soon gets hot.</p> <p>Convection- When radiators are turned on, they warm the air around them, this rises and new cold air comes into the radiator, which is similarly warmed and so on until all the air in the room is warm.</p> <p>Radiation-Unlike conduction and convection radiation does not need a medium to convey it. Infrared radiation carries heat in waves with a frequency and wavelength.</p>	
	8. I can explain the difference between conductors and insulators.	<p>Energy will make its way through different mediums at different rates. If a type of energy moves through a particular material slowly, we say the material is an insulator.</p>	
	9. I can explain how insulators work.	<p>Insulators need to guard against three different forms of heat transfer. Convection means liquids and gases that can move will leak heat, conduction rules out metals and radiation can be guarded against by a shiny surface which can be effective at reflecting heat radiation.</p>	
	10. I can describe the warming and cooling of objects.	<p>Objects that are hot lose energy to their cold surrounding. As the hot objects cool their particles lose energy, the particles vibrate less. As objects get warmer, their particles vibrate more.</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

Unit Name: Earth – Climate <i>and</i> Earth resources – Chapter 7	Recommended Teaching Time: 12 hours
<p>Overview and Aims: An introduction to the Earth's atmosphere, the Carbon Cycle and Global Warming. What these phenomena are and how they might affect the world. Look at the World's resources and consider how and why they are exploited.</p>	
I can statements	Critical Content, Key Words and Additional Notes.
<ul style="list-style-type: none">· I can describe the composition of our atmosphere.· I can describe how the atmosphere has changed over time.· I can explain why the atmosphere has changed.· I can describe the carbon cycle.· I can understand that human activities affect the carbon cycle.· I can appreciate the scale of this impact.· I can explain how the impact relates to carbon stores as well as carbon dioxide producers.· I can describe the effects of global warming.· I can explain the consequences of global warming for living things.· I can evaluate the arguments for human activity impacting on global warming.· I can describe resources that the Earth provides.· I can explain how human activity limits these resources.· I can justify decisions about making changes to the environment.· I can describe examples of recycling.· I can explain the benefits and limitations of recycling schemes.· I can compare the efficiency of recycling methods.· I can understand that most metals are found as ores.· I can understand how less reactive metals can be extracted.· I can understand how more reactive metals can be extracted.	



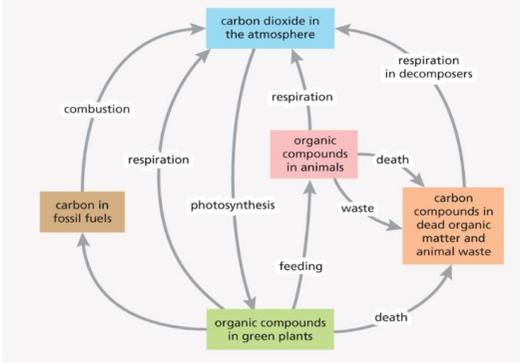
SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)														
	1. I can describe the composition of our atmosphere.	<p>The composition of the atmosphere is:</p> <table border="1"><thead><tr><th>Gas</th><th>Percentage</th></tr></thead><tbody><tr><td>nitrogen</td><td>78</td></tr><tr><td>oxygen</td><td>21</td></tr><tr><td>argon</td><td>0.9</td></tr><tr><td>carbon dioxide</td><td>0.04</td></tr><tr><td>water vapour</td><td>variable</td></tr><tr><td>other gases</td><td>trace</td></tr></tbody></table>	Gas	Percentage	nitrogen	78	oxygen	21	argon	0.9	carbon dioxide	0.04	water vapour	variable	other gases	trace	
Gas	Percentage																
nitrogen	78																
oxygen	21																
argon	0.9																
carbon dioxide	0.04																
water vapour	variable																
other gases	trace																
	2. I can describe how the atmosphere has changed over time.	<p>Our atmosphere has remained roughly the same over the last 200 million years.</p>															
	3. I can describe the carbon cycle.	<p>The carbon cycle describes how carbon dioxide in the atmosphere becomes plant material through photosynthesis, which in turn becomes organic compounds in animals as the plants are eaten. Some is</p>															



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

		<p>returned to the atmosphere through respiration, some is converted to fossil fuels over time.</p>  <p>The diagram illustrates the carbon cycle with the following components and processes:</p> <ul style="list-style-type: none"> carbon dioxide in the atmosphere (top blue box) carbon in fossil fuels (left orange box) organic compounds in green plants (bottom green box) organic compounds in animals (middle pink box) carbon compounds in dead organic matter and animal waste (right orange box) <p>Processes shown:</p> <ul style="list-style-type: none"> photosynthesis: carbon dioxide in the atmosphere → organic compounds in green plants feeding: organic compounds in green plants → organic compounds in animals respiration: organic compounds in green plants → carbon dioxide in the atmosphere; organic compounds in animals → carbon dioxide in the atmosphere respiration in decomposers: carbon compounds in dead organic matter and animal waste → carbon dioxide in the atmosphere death: organic compounds in animals → carbon compounds in dead organic matter and animal waste; organic compounds in green plants → carbon compounds in dead organic matter and animal waste waste: organic compounds in animals → carbon compounds in dead organic matter and animal waste combustion: carbon in fossil fuels → carbon dioxide in the atmosphere 	
	<p>4. I can understand that human activities affect the carbon cycle.</p>	<p>Humans burning fossil fuels releases a great deal of carbon dioxide that had been trapped away for millions of years.</p>	
	<p>5. I can describe the effects of global warming.</p>		



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		<p>A rise in the global mean temperature will cause climate change, which may result in:</p> <ul style="list-style-type: none"> • polar ice sheets melting, causing sea levels to rise, low-lying areas of the world becoming submerged and habitat loss for many species • some areas having less available water, causing food shortages, drought and desertification of land • longer growing seasons in temperate regions and faster growth for some crop species due to increased carbon dioxide concentrations • agricultural pests thriving in warmer environments • tropical diseases, for example malaria, affecting a larger area • an increase in severe weather events. 	
	6. I can explain the consequences of global warming for living things.	<p>The impacts of global warming are manifold. If crops cannot grow, there may be food shortages. If ice caps melt, there may be flooding and the seas reclaiming the land.</p> <p>If species die out, a thinning of bio-diversity may adversely affect ecosystems worldwide.</p>	
	7. I can describe resources that the Earth provides.	<p>The Earth's resources can be easily divided into groups such as water, land (there are renewable energy sources that can be exploited). The Earth's biological resources are the plants and animals, there are fossil fuels, metal ores and minerals.</p>	
	8. I can describe examples of recycling.	<p>Many materials can be recycled, like paper, glass, metals but there are many types of plastics or composite materials made from several materials that cannot be recycled.</p>	
	9. I can understand that most metals are found as ores.	<p>Most metals, apart from the most unreactive are found in the ground in ores (compounds).</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

	10. I can understand how more reactive metals can be extracted.	Less reactive metals are often found in oxide form. They can easily be displaced by reacting them with a more reactive metal – leaving the target metal free. Aluminium is extracted by electrolysis. Electricity is passed through a molten ore, freeing up the aluminium.	
--	---	--	--



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

Unit Name: Genes – Evolution <i>and</i> Inheritance – Chapter 10	Recommended Teaching Time: 12 hours
Overview and Aims: We look at the world of genetics and reproduction as well as genetics. We look at Charles Darwin and ideas of biodiversity and extinction. We study ways man-kind has tried to keep a genetic record of life on Earth for safe keeping. We look at sexual reproduction, how it occurs and what happens to the genetic material that carries the codes that make new life.	
I can statements	Critical Content, Key Words and Additional Notes.
<ul style="list-style-type: none">I can describe how variation causes competition for resources and drives natural selection.<ul style="list-style-type: none">○ I can describe what is meant by biodiversity.○ I can explain the importance of biodiversity.○ I can identify changes that can cause a species to become extinct.○ I can explain the use of gene banks to preserve hereditary material before a species becomes extinct.○ I can analyse and evaluate theories of what caused the extinction of the dinosaurs.○ I can identify that the nucleus contains chromosomes, which carry inherited genetic information.○ I can describe the link between chromosomes, genes and DNA.○ I can describe the structure of DNA.● I can assess the work of Watson, Crick, Wilkins and Franklin on DNA structure.<ul style="list-style-type: none">○ I can identify that a fertilised egg contains a full set of chromosomes, half from each parent.○ I can explain the number of chromosomes in gametes.● I can explain how some genetic disorders arise.<ul style="list-style-type: none">○ I can identify inherited characteristics in plants and animals that vary between offspring.○ I can explain how inherited differences arise by genetic material from both parents combining.○ I can describe how identical twins occur and analyse data about their features.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

<ul style="list-style-type: none">○ I can use a model to represent inheritance of a trait.○ I can predict likelihood of offspring inheriting specific traits.	
--	--



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	1. I can describe what is meant by biodiversity.	'Bio' is the Greek for life and 'diversity' means to show variety. Biodiversity is a count of all the forms of life there are in an ecosystem.	
	2. I can identify changes that can cause a species to become extinct.	Scientists agree there have been at least 7 mass extinctions on our planet. Periods of time when great percentages of all species of life on the planet have died. The causes of these may be lack of food, or disease or over hunting or severe change of habitat.	
	3. I can explain the use of gene banks to preserve hereditary material before a species becomes extinct.	A gene bank is a man-made way of saving some genetic material (sperm, eggs or even other tissues). This occurs with seed banks also, where examples of the seeds of as many plants as can be found have their seeds or genetic material saved to hopefully grow at some time in the future if the species is wiped out in the wild.	
	3. I can analyse and evaluate theories of what caused the extinction of the dinosaurs.	At the end of the Cretaceous period (approx 65 million years ago), the planet's dominant species (DINOSAURS) died out. There are several theories why. Below is a table that assess some of the evidence.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		Evidence	Explanation	
		<p>The sedimentary clay layer that was laid down at the time of the extinction contains high levels of iridium.</p> <p>Soot is found in the clay layer.</p> <p>Huge crater (180 km) found in Chicxulub, Mexico age dated at 65 million years.</p>	<p>Iridium is expected to be found only in the Earth's core, not on the surface, but is expected to be a component of an asteroid.</p> <p>A huge asteroid would cause fires on Earth.</p> <p>This ageing fits with the K/T time.</p>	
	4. I can identify that the nucleus contains chromosomes, which carry inherited genetic information.	Inside nearly every cell is a nucleus. The nucleus stores genetic material. This forms as chromosomes when the cell divides.		
	5. I can describe the link between chromosomes, genes and DNA.	Chromosomes are made of a protein called Deoxyribonucleic acid (DNA). When a cell divides it marshals all the genetic material together and it forms into chromosomes. The chromosomes are in a strict order. Along the length of the chromosomes there are sections of DNA that perform jobs at the time of reproduction. Each of these smaller sections is called a gene.		
	6. I can explain the number of chromosomes in gametes.	Gametes are the sex cells (sperm in men, eggs in women). When the sex cells are made they undergo a different type of duplication from normal. The purpose of which is to ensure the gamete has only half the genetic material of a standard cell.		
	7. I can explain how inherited differences arise by genetic material from both parents combining.	When fertilization occurs there is a fusing of the male and female sex cells. In humans, when the sperm		

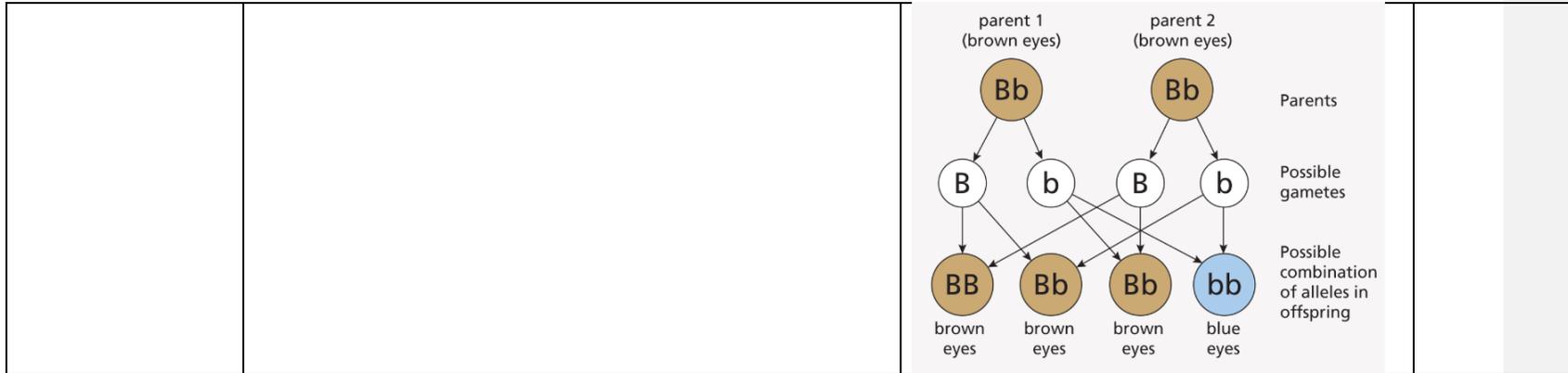


SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		reaches the egg. As the chromosomes line up in their strict order, they do so to mirror the chromosome order from their sexual partner. When these chromosomes join, the offspring's genetic material is a result of two different sources. This is why offspring are similar but different from their parents.	
	7. I can describe how identical twins occur and analyse data about their features.	When an egg is fertilised by a sperm, sometimes this genetic material splits into two. Each half grows normally from that point onwards. Non-identical twins occur when two sperm fertilize two eggs.	
	11. I can predict likelihood of offspring inheriting specific traits.	When there is more than one option for the genes to predict for we see how dominant and recessive genes work. In the example below, both parents have brown eyes but they both carry a recessive gene for blue eyes. What this means is should there be a genetic mix with any instruction for brown eyes, this will be dominant, and the child will have brown eyes. We can see there is a 1:4 change both recessive blue eye genes will be united, this will result in blue eyes.	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1





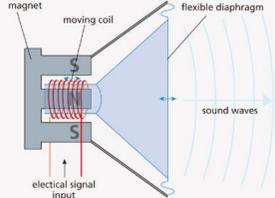
SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level

Year 8 Y1

Unit Name: Wave effects <i>and</i> Wave properties – Chapter 4	Recommended Teaching Time: 12 hours
Overview and Aims: This topic covers sound and light. Both are produced by waves. We look in more details at the composition of waves and the different types of waves.	
I can statements	Critical Content, Key Words and Additional Notes.
<ul style="list-style-type: none">• I can understand how sound waves vary in frequency.• I can apply ideas about frequency to understand ultrasound.• I can understand practical applications of ultrasound.• I can understand the function of microphones and loudspeakers.• I can understand how audio equipment responds to different frequencies.• I can understand light can vary in frequency.• I can describe UV light and its risks.• I can explain the uses of UV light.• I can use water waves to model wave behaviour.• I can understand and apply the processes of reflection and absorption.• I can understand longitudinal waves.• I can understand transverse waves.• I can compare types of wave	

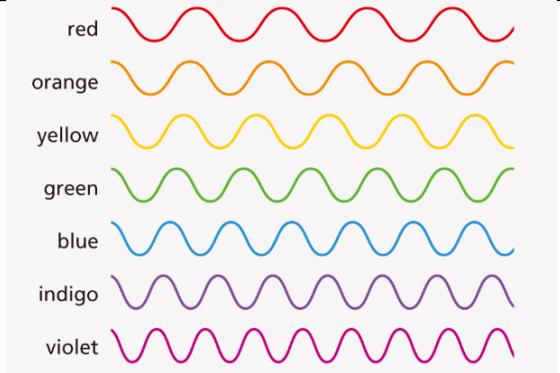


SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

Lesson No (if applicable)	Question	Answer	Probable misconceptions (if applicable)
	1. I can understand how sound waves vary in frequency.	Sounds are made from vibrations. If the vibrations happen more quickly, the sounds frequency increases and the pitch is higher.	
	2. I can apply ideas about frequency to understand ultrasound.	Ultrasound vibrates at very high frequencies. These frequencies can be used for cleaning or massaging muscle tissue.	
	3. I can understand how audio equipment responds to different frequencies.	<p>It's not a great deal of use turning the pressure wave of sound into an electrical signal unless you can turn it back again afterwards. This is done with a loudspeaker. Earphones can be used instead, of course; these are essentially tiny loudspeakers.</p> <p>The electrical signal is fed into a coil of wire, which sits in a magnetic field. As the signal changes, so the coil vibrates. The coil is attached to a cone and this vibrates too. The vibrating cone makes the air vibrate.</p> 	
	4. I can understand light can vary in frequency.	Colours within light each have their own wavelength. Red light has the longest wavelength.	

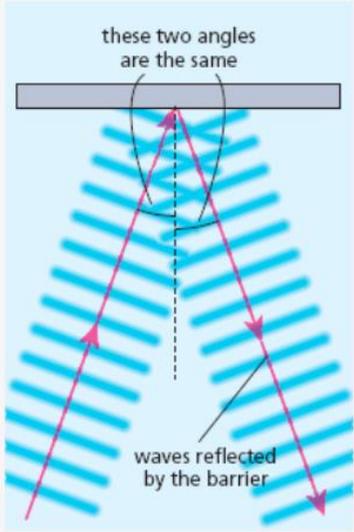
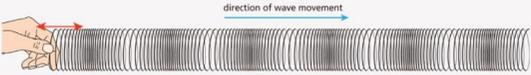


**SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1**

			
	5. I can describe UV light and its risks.	Ultraviolet or UV light has the shortest wavelength. It is UV light that is both beneficial but also harmful in sunlight. Too much UV can cause sunburn and even skin cancer.	
	6. I can use water waves to model wave behaviour.	We will experiment with water in a tank to model how waves work. They are transverse waves.	
	7. I can understand and apply the processes of reflection and absorption.	Sound waves and water waves can both be reflected. If a wave hits an angled surface the wave will rebound from it at an angle.	

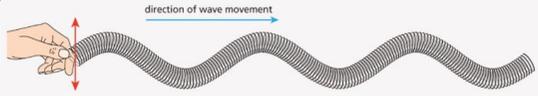


SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		 <p>these two angles are the same</p> <p>waves reflected by the barrier</p>	
	<p>8. I can understand longitudinal waves.</p>	<p>Longitudinal waves move energy forwards and backwards. Sound waves are longitudinal waves.</p>  <p>direction of wave movement</p> <p>FIGURE 2.4.4b: Demonstrating a longitudinal wave.</p>	
	<p>9. I can understand transverse waves.</p>	<p>Transverse waves move energy at right angles to the direction the energy moves.</p>	



SUBJECT YEAR PLAN 20/21 Subject: Science Year Group: Entry Level
Year 8 Y1

		 A diagram showing a hand on the left moving up and down, indicated by a red double-headed vertical arrow. A wave pulse travels to the right, indicated by a blue arrow labeled 'direction of wave movement'. The wave pulse is a transverse wave, with the oscillation perpendicular to the direction of travel.	
	10. I can compare types of wave	Both wave types have a frequency, a speed and both carry energy. The main difference is energy is delivered in the direction of the wave in longitudinal waves and at right angles to the direction of the wave in transverse.	