

## Greenfields Academy (Secondary) - Long Term Planning – SCIENCE – Y9 Combined Science (Trilogy) & ELC Co-teaching

### Academic Year Overview 2020/21 – YEAR 9 (ELC Science 2020-21)

Term	Autumn		Spring		Summer	
	1	2	3	4	5	6
TRANSITION FROM KS3	<u>ELC Biology</u> <ul style="list-style-type: none"> <li>The Human Body</li> </ul>	<u>ELC Biology</u> <ul style="list-style-type: none"> <li>Environment, evolution &amp; inheritance</li> </ul>	<u>ELC Chemistry</u> <ul style="list-style-type: none"> <li>Elements, mixtures and compounds</li> </ul>	<u>ELC Chemistry</u> <ul style="list-style-type: none"> <li>Chemistry in our world</li> </ul>	<u>ELC Physics</u> <ul style="list-style-type: none"> <li>Energy, Forces and the structure of matter</li> </ul>	<u>ELC Physics</u> <ul style="list-style-type: none"> <li>Electricity, magnetism and waves</li> </ul>

**Required Practical** – These are the JCQ Compulsory Required Practical sessions for all KS4 courses. They are common to all examination boards and students MUST have participated / seen / discussed in detail the practical and the outcomes.

**Suggested Practical** – These are not JCQ compulsory required practicals but are strongly suggested as they demonstrate the key learning points for the topic.

Practical session to be added to Terms 2-6 once stock take for end of 2019-20 and budgets issued for 2020-21 and materials bought.

Year 10 & 11 to be planned in 2020-21 to take into account the coteaching of Y9 ELC which has not been taught previously. AQA ELC SOW identifies areas that have not been covered for appropriate topics for B,C and P.

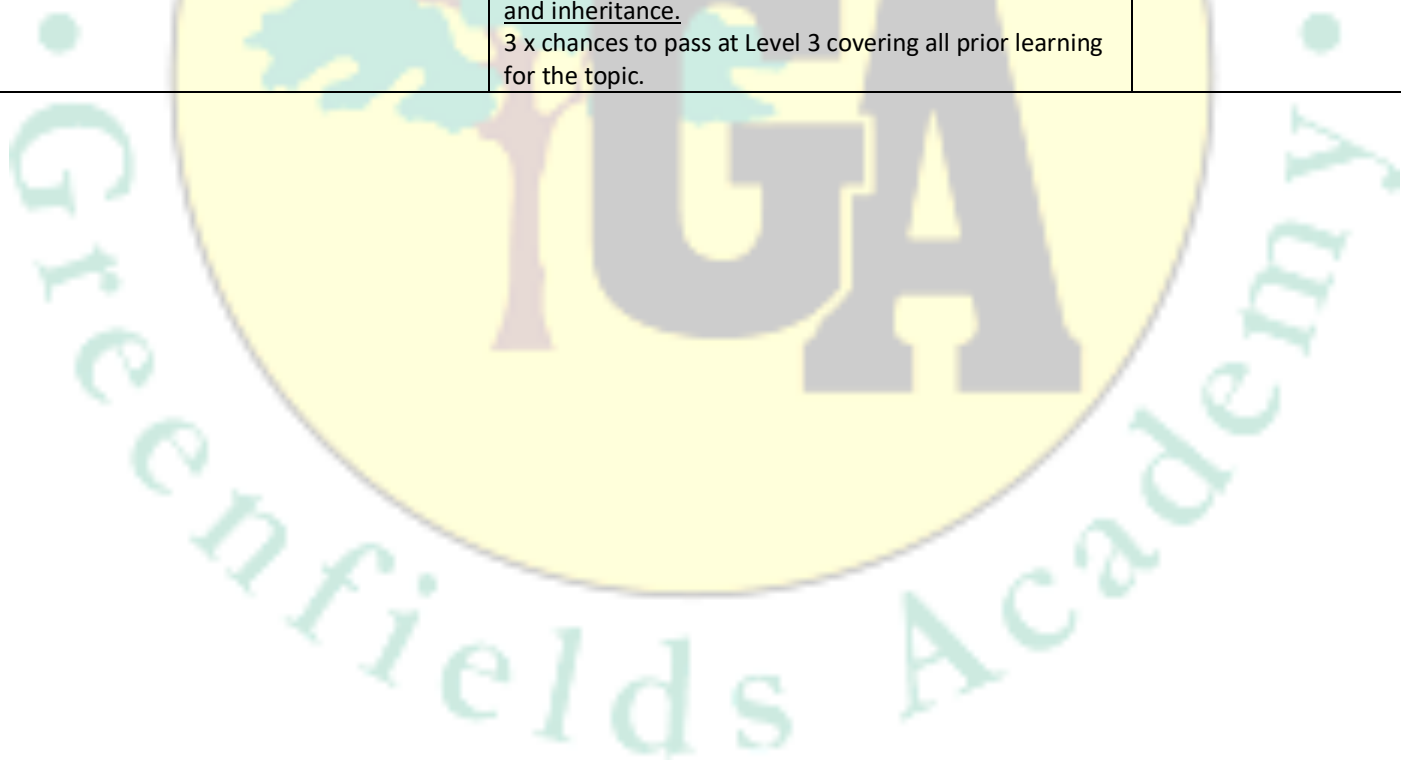
Weekly Sequence	New Learning & Knowledge	Key Question(s)	Whole School Focus (eg. Computing Week, Language Day)
1	1 . Detailed cellular structure and specialisms  2. Tissues and organ (functions and location) of circulatory and digestive system	<ul style="list-style-type: none"> <li>• What are the parts of a cell?</li> <li>• What specialisms of a cell are there?</li> <li>• Relate the structure of the cell to it's function.</li> <li>• How to use a microscope – Required Pract 1</li> <li>• How is the tissue and organ structure related?</li> <li>• Name and locate tissues and structures.</li> <li>• Explain the function of tissues and structures</li> </ul>	
2	3. The role of enzymes in the body  4. How do living things “make” energy through respiration	<ul style="list-style-type: none"> <li>• Define an enzyme.</li> <li>• What are the variables for enzyme function</li> <li>• Effect of pH on enzymes - Required Pract 4</li> <li>• What is the lock and key hypothesis?</li> <li>• What is the difference between aerobic and anaerobic respiration?</li> <li>• Where do the above processes take place and why?</li> <li>• Recall the word and symbol equations for above.</li> </ul>	
3	5. Infectious (communicable) diseases, how they are spread and how the body combats infection.  6. What white blood cells are, the different types and how they work alongside vaccinations.	<ul style="list-style-type: none"> <li>• How do pathogens cause disease? (Bacteria, virus and fungi)</li> <li>• How do you reduce or prevent infection?</li> <li>• Evaluate the effect of disinfectants and antibacterial washes in pre-inoculated petri dishes</li> <li>• What are the different types of lymphocytes (white blood cells)?</li> <li>• How do WBCs work?</li> <li>• How does a vaccination work?</li> </ul>	
4	7. Medical Drugs – How are they made, tested and the effects.	<ul style="list-style-type: none"> <li>• What is a legal / illegal drug?</li> <li>• What does a drug do?</li> </ul>	

	8. Automatic control systems in the human body, including reflex arcs and nervous responses	<ul style="list-style-type: none"> <li>• What are the effects of the different classifications of drugs?</li> <li>• What is drug dependency and withdrawal?</li> <li>• What is the role of antibiotics?</li> <li>• Evaluate the effect of antibiotics in pre-inoculated petri dishes</li> <li>• What is the central nervous system (CNS)?</li> <li>• What does the CNS do?</li> <li>• What is a reflex arc and its associated sensors, relays and effectors?</li> <li>• Required Practical 6 – Plan and carry out a practical to compare the speed of catching reflex / response reflex of people.</li> </ul>	
5	9. The use and function of hormones in the human body	<ul style="list-style-type: none"> <li>• Where are hormones produced?</li> <li>• How are they released and transported?</li> <li>• What do the hormones do to the body (effects)?</li> <li>• Particular focus on the role of hormones in the human reproductive system, (M &amp; F)</li> <li>• Female menstrual cycle including FSH, LH and puberty</li> </ul>	
6	10. Uses of hormones to control fertility	<ul style="list-style-type: none"> <li>• What are oral contraceptives to inhibit fertility.</li> <li>• What is the role of fertility drugs in egg stimulation in IVF?</li> <li>• What are the benefits and problems of using fertility hormones?</li> </ul> <p>Research and teaching opportunity on contraceptive methods hormonal and non-hormonal, or a mixture of both?</p>	
7	Assessment Week	<p>Provided by ELC Component 1- The Human Body Biology Examination paper.</p> <p>3 x chances to pass at Level 3 covering all prior learning for the topic.</p>	

Weekly Sequence	New Learning & Knowledge	Key Question(s)	Whole School Focus (eg. Computing Week, Language Day)
1 (8)	1. Photosynthesis, formula, process and why it is required	<ul style="list-style-type: none"> <li>• What is the energy source for photosynthesis?</li> <li>• What is the word and formula equation for photosynthesis?</li> <li>• Have you met a similar equation before? (Link to respiration).</li> <li>• Do plants respire?</li> <li>• What factors affect photosynthesis?</li> <li>• Required Practical 5 - What affects the rate of photosynthesis? (Light Intensity)</li> </ul>	
2 (9)	2. Adaptations of animals and plants for life (MRS GREN)  3. What are food chains and food webs, and what do they show?	<ul style="list-style-type: none"> <li>• How are organisms adapted to live in their natural environment?</li> <li>• Give examples of both for plants and animals.</li> <li>• Design an animal / plant that can live in.....</li> <li>• Where do woodlice prefer to sleep? Use of choice chambers</li> <li>• What is a food chain?</li> <li>• What is a food web?</li> <li>• What is at the start of every chain / web?</li> <li>• How are feeding relationships represented?</li> <li>• How are they interlinked?</li> <li>• What happens if x dies out in the food chain / web?</li> <li>• What are the effects of over / under population?</li> <li>• Required Practical 7 – Measure the population size of a species and investigate the effect of a factor on the distribution of the species.</li> </ul>	
3 (10)	4. The decay cycle and how living materials are recycled for nutrients and building blocks for future organisms. When living things decay carbon is released which is then used by plants for photosynthesis.	<ul style="list-style-type: none"> <li>• What is decay?</li> <li>• What are the variables that cause organic decay? (Investigate dessication, moist environments, etc) Human Death Farm Video!?</li> <li>• What is the water cycle?</li> </ul>	

	5. What do plants and animals compete for? (relate to MRS GREN)	<ul style="list-style-type: none"> <li>• What is the carbon cycle?</li> <li>• What are abiotic factors?</li> <li>• What are biotic factors?</li> <li>• Required Pract 7 – Use sampling techniques to investigate the effect of a factor on the distribution of this species (growing cress close together and spaced out?)</li> </ul>	
<b>4 (11)</b>	6. Building upon 5, the environmental changes that effect plants and animals, eg. Temperature and predation.  7. Pollution of water, air and the land	<ul style="list-style-type: none"> <li>• What abiotic and biotic factors effect populations?</li> <li>• What happens to a population if it gets too hot / cold?</li> <li>• What happens to a population if there are too many predators?</li> <li>• Predator prey graphs – Xcurricular linkMaths</li> <li>• Required pract 9 – Measure the population size of a common species in a habitat. Using sampling techniques to investigate the effect of a factor on the distribution of the species.</li> <li>• What are the sources of pollution and how the growing population is increasing this pollution?</li> <li>• How do we manage waste?</li> <li>• How do we manage land use?</li> <li>• Required prac 13 – Analysis and purification of water samples from different sources, including pH, dissolved solids and distillation [maybe done in Chem Component 4].</li> </ul>	
<b>5 (12)</b>	8. Defining and explaining what evolution, natural selection and artificial selection are.	<ul style="list-style-type: none"> <li>• Define evolution, natural selection and artificial selection, and state the differences.</li> <li>• Evaluate evolution, natural selection and artificial selection</li> <li>• What evidence do we have for evolution? (Xcurricular with RE &amp; RSE)</li> <li>• Give examples of evolution, natural selection and artificial selection.</li> </ul>	
<b>6 (13)</b>	9. What are the two types of reproduction, give the differences between them and evaluate the advantages and disadvantages of each.	<ul style="list-style-type: none"> <li>• What s sexual reproduction?</li> <li>• What is asexual reproduction?</li> </ul>	

	<p>10. Genes, chromosomes and DNA and the principals of genetic engineering.</p>	<ul style="list-style-type: none"> <li>• How does sexual and asexual reproduction occur in animals and plants?</li> <li>• Evaluate the advantages and disadvantages of each.</li> <li>• Investigate how plants are grown from runners (strawberry, spider plants, alovera, etc.)</li> <li>• Where and what chromosomes are made of.</li> <li>• How do chromosomal pairs determine sex inheritance</li> <li>• Extracting DNA from fruit</li> <li>• What are the potential benefits and risks of genetic engineering?</li> </ul>	
<p><b>7 (14)</b></p>	<p>Assessment Week</p>	<p>Provided by ELC Component <u>2 – Environment, evolution and inheritance.</u>  3 x chances to pass at Level 3 covering all prior learning for the topic.</p>	

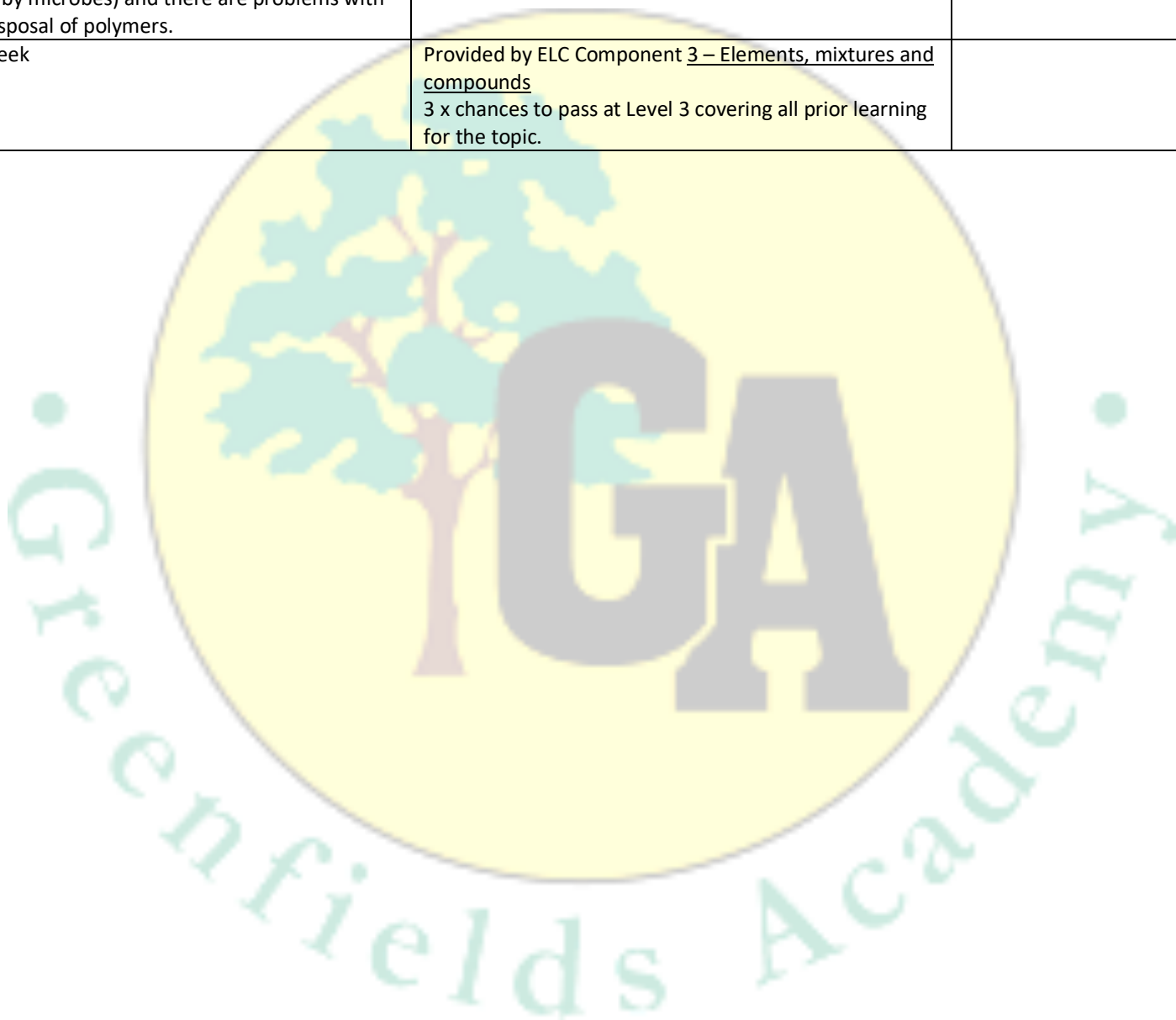


Weekly Sequence	New Learning & Knowledge	Key Question(s)	Whole School Focus (eg. Computing Week, Language Day)
1 (15)	<p>1. Atoms and Elements</p> <ul style="list-style-type: none"> <li>All substances are made of atoms.</li> <li>An atom is the smallest part of an element.</li> <li>The elements are shown in the periodic table and elements in the same group of the periodic table have similar properties.</li> </ul> <p>2. Elements and Compounds</p> <ul style="list-style-type: none"> <li>Atoms combine with different atoms to form a compound.</li> <li>Compounds can be made by metals combining with non-metals or by non-metals combining with other non-metals. Simple reactions can be described as word equations.</li> </ul>	<ul style="list-style-type: none"> <li>What is an atom?</li> <li>What is the periodic table? How is it arranged?</li> <li>Define an element, compound and mixture.</li> <li>How are compounds formed?</li> <li>State some simple reactions.</li> </ul>	
2 (16)	<p>3. States of Matter</p> <ul style="list-style-type: none"> <li>The three states of matter are solid, liquid and gas.</li> <li>Definitions of the changes between the three states using the terms melting, boiling, condensing and freezing.</li> <li>Simple particle model to explain the states of matter.</li> </ul> <p>4. Forms (allotropes) of Carbon</p> <ul style="list-style-type: none"> <li>Diamond and graphite are both forms of carbon but with different structures that determine their properties.</li> </ul>	<ul style="list-style-type: none"> <li>What are the three states of matter?</li> <li>Draw a state change diagram / triangle.</li> <li>Explain what happens in terms of particles.</li> <li>What is an allotrope?</li> <li>How is graphite and diamond structured?</li> <li>How does structure determine properties?</li> </ul>	
3 (17)	<p>5. Mixtures</p> <ul style="list-style-type: none"> <li>Mixtures contain two or more substances which are not chemically combined.</li> </ul> <p>6. Chromatography</p>	<ul style="list-style-type: none"> <li>Define a mixture.</li> <li>Give some examples.</li> <li>Describe methods for separating substances</li> </ul>	

	<ul style="list-style-type: none"> <li>Describe how to separate mixtures by chromatography.</li> <li>Recognise that in paper chromatography, a solvent moves through the paper carrying different compounds different distances.</li> </ul>	<ul style="list-style-type: none"> <li>Explain how chromatography works.</li> </ul>	
<b>4 (18)</b>	<p>7. Extraction of metals from their ores</p> <ul style="list-style-type: none"> <li>Unreactive metals are found in the Earth as metals.</li> <li>Most metals are found as compounds that need chemical reactions to extract the metal.</li> <li>Metals less reactive than carbon can be extracted by heating the metal ore with carbon.</li> <li>An ore is a rock containing enough metal to make it economic to extract it and large amounts of rock have to be quarried or mined to get metal ores.</li> <li>The effects of extracting metals can be reduced by recycling.</li> </ul> <p>8. Properties of metals</p> <ul style="list-style-type: none"> <li>Metals have giant structures of atoms with strong bonds between the atoms so most metals have high melting points.</li> <li>Properties of metals.</li> <li>Relate uses of metals to their properties. eg copper and aluminium.</li> </ul>	<ul style="list-style-type: none"> <li>Why are unreactive metals found in such good condition in the Earth?</li> <li>What is the reactivity series?</li> <li>How do you extract iron from iron ore?</li> <li>How do you extract aluminium from bauxite (aluminium ore)? Why can't you use carbon?</li> <li>Why should we recycle metals?</li> </ul> <ul style="list-style-type: none"> <li>What properties do all metals have?</li> <li>Describe metallic bonding</li> <li>What properties do aluminium and copper have for a given purpose?</li> </ul>	
<b>5 (19)</b>	<p>9. Alloys</p> <ul style="list-style-type: none"> <li>Most metals in everyday use are alloys.</li> <li>An alloy is produced by mixing a small amount of other elements with the metal eg steel.</li> </ul> <p>10. Polymers</p> <ul style="list-style-type: none"> <li>Polymers are made from small molecules called monomers joined together in very long chains.</li> <li>The uses of polymers are related to their properties.</li> </ul>	<ul style="list-style-type: none"> <li>Define an alloy</li> <li>Why do we make alloys?</li> </ul> <ul style="list-style-type: none"> <li>Define a monomer and a polymer</li> <li>What do we use polymers for? What properties do these materials have? (PVC, Polystyrene, Polyethene)</li> <li>What are the issues with non biodegradable polymers?</li> </ul>	



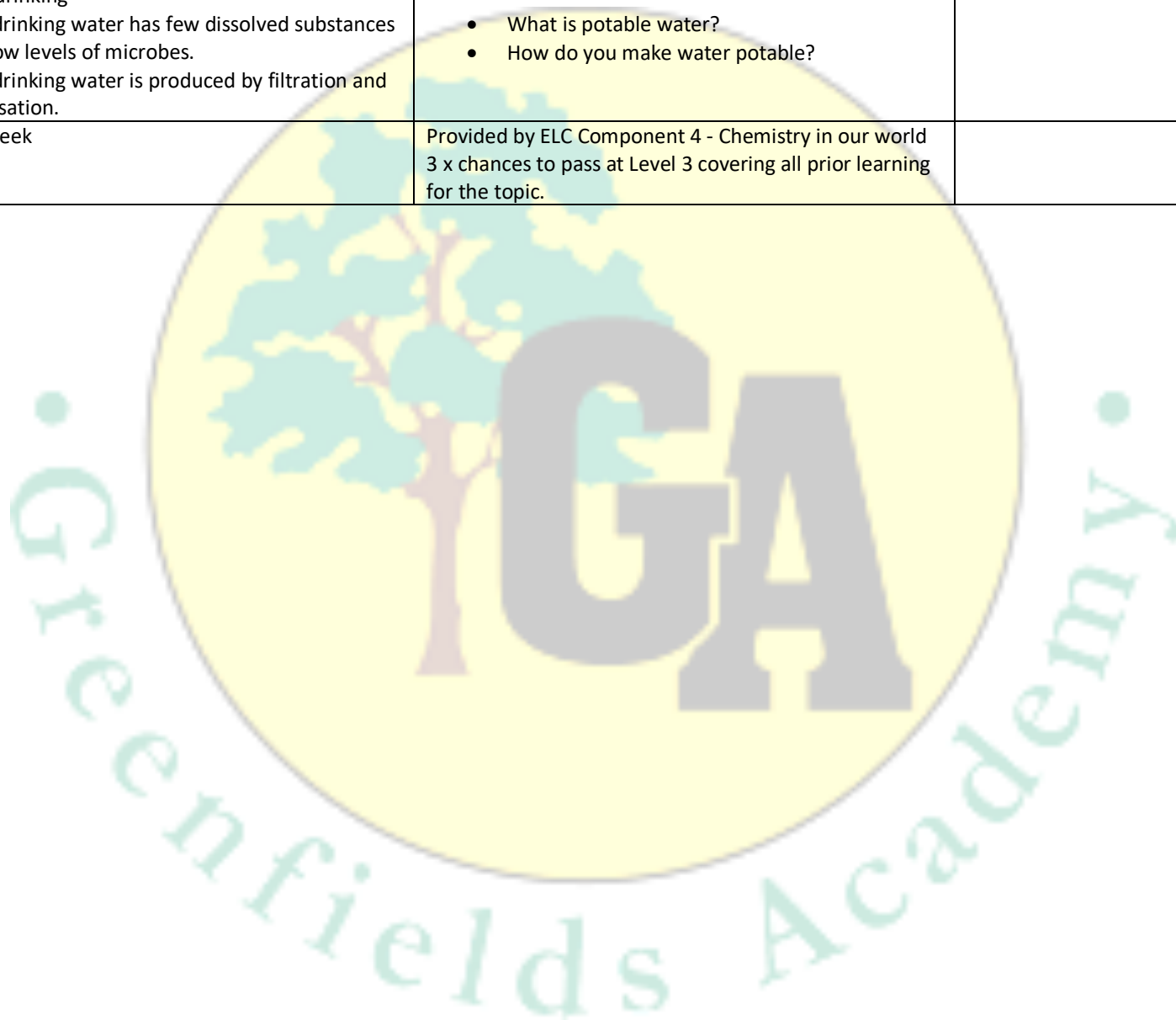
	<ul style="list-style-type: none"> <li>Polymers are not biodegradable (not broken down by microbes) and there are problems with the disposal of polymers.</li> </ul>		
<b>6 (20)</b>	Assessment Week	Provided by ELC Component <u>3 – Elements, mixtures and compounds</u> 3 x chances to pass at Level 3 covering all prior learning for the topic.	



Weekly Sequence	New Learning & Knowledge	Key Question(s)	Whole School Focus (eg. Computing Week, Language Day)
1 (21)	<p>1. Acids and metal reactions</p> <ul style="list-style-type: none"> <li>• Acids react with some metals to produce hydrogen.</li> <li>• Hydrochloric acid produces chlorides.</li> <li>• Sulfuric acid produces sulfates.</li> </ul> <p>2. Neutralisation</p> <ul style="list-style-type: none"> <li>• An acid is neutralised by an alkali or base to produce a salt and water.</li> <li>• An acid is neutralised by a carbonate to produce a salt, water and carbon dioxide.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Know how acids react with metals</li> <li>• State the reactants and products of a reaction.</li> <li>• What is the test for hydrogen gas?</li> <li>• Write word equations for the reactions when given the names of the reactants.</li> <li>• Describe and carry out the test for hydrogen.</li>   <li>• How can you neutralise an acid / alkali?</li> <li>• What are the products of neutralisation?</li> <li>• Write word equations for the reactions when given the names of the reactants.</li> <li>• Describe and carry out the limewater test for carbon dioxide.</li> </ul>	
2 (22)	<p>3. Energy and rate of reaction</p> <ul style="list-style-type: none"> <li>• Describe reactions that transfer energy to the surroundings so that temperature increases.</li> <li>• Describe reactions that take in energy from the surroundings so the temperature decreases.</li> </ul> <p>4. Increasing the rate of chemical reaction</p> <ul style="list-style-type: none"> <li>• Increasing the rate of a reaction can be done by increasing the: <ul style="list-style-type: none"> <li>○ temperature</li> <li>○ concentration of reactants</li> <li>○ surface area of reactants</li> <li>○ <b>or by adding a catalyst.</b></li> </ul> </li> <li>• Measure and record the: <ul style="list-style-type: none"> <li>○ time for a reactant to be used up.</li> <li>○ volume of gas produced</li> <li>○ time for a solution to change colour/clarity.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Describe the terms endothermic and exothermic.</li> <li>• What happens to the bonds in exothermic and endothermic reactions?</li>   <li>• Describe (in terms of particles and bonds) the increase in the rate of a reaction caused by increasing the: <ul style="list-style-type: none"> <li>○ temperature</li> <li>○ concentration of reactants</li> <li>○ surface area of reactants</li> <li>○ <b>or by adding a catalyst.</b></li> </ul> </li> </ul>	

<b>3 (23)</b>	<p>5. Changes in the Earth's atmosphere</p> <ul style="list-style-type: none"> <li>• Development of the Earth's current atmosphere.</li> <li>• Photosynthesis and changes in the early atmosphere.</li> </ul> <p>6. The current atmosphere</p> <ul style="list-style-type: none"> <li>• Carbon dioxide from the early atmosphere has been locked up as carbonates and fossils in rocks.</li> <li>• The present composition of the Earth's atmosphere.</li> </ul>	<ul style="list-style-type: none"> <li>• How has the atmosphere of the Earth changed since its creation?</li> <li>• Why?</li> <li>• How has carbon dioxide been locked up?</li> <li>• What is the current composition of the Earth's atmosphere?</li> </ul>	
<b>4 (24)</b>	<p>7. Crude oil and fuels</p> <ul style="list-style-type: none"> <li>• Crude oil is a mixture of a large number of compounds.</li> <li>• Fractional distillation to produce useful fuels, such as petrol and diesel.</li> </ul> <p>8. Burning fuels</p> <ul style="list-style-type: none"> <li>• The products of total combustion of a fuel are carbon dioxide, water vapour and oxides of nitrogen.</li> <li>• Some fuels produce sulfur dioxide when burned.</li> <li>• Partial combustion due to a limited air supply results in the production of carbon monoxide and, often, soot particles.</li> <li>• Potential harm to the environment by burning fossil fuels: <ul style="list-style-type: none"> <li>○ oxides of sulfur and nitrogen (Nox) cause acid rain and may harm human health.</li> <li>○ carbon monoxide can cause death.</li> <li>○ solid particles can cause global dimming and harm human health.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• What makes up crude oil?</li> <li>• How do we separate these fractions?</li> <li>• What are the products of combustion?</li> <li>• What pollutants are produced during combustion?</li> <li>• What harm do these have on the environment and population?</li> <li>• What are the products of partial combustion?</li> <li>• What harm do these have on the environment and population?</li> </ul>	
<b>5 (25)</b>	<p>9. Human influences on the atmosphere</p> <ul style="list-style-type: none"> <li>• Carbon dioxide is produced by burning fossil fuels.</li> <li>• Methane is produced from landfills and farming.</li> <li>• The effects of increased carbon dioxide and methane on the temperature of the atmosphere.</li> </ul>	<ul style="list-style-type: none"> <li>• Give ways that humans have influenced the atmosphere beneficially and destructively.</li> </ul>	

	<p>10. Water for drinking</p> <ul style="list-style-type: none"> <li>• Safe drinking water has few dissolved substances and low levels of microbes.</li> <li>• Safe drinking water is produced by filtration and sterilisation.</li> </ul>	<ul style="list-style-type: none"> <li>• What is potable water?</li> <li>• How do you make water potable?</li> </ul>	
<b>6 (26)</b>	Assessment Week	Provided by ELC Component 4 - Chemistry in our world 3 x chances to pass at Level 3 covering all prior learning for the topic.	



Weekly Sequence	New Learning & Knowledge	Key Question(s)	Whole School Focus (eg. Computing Week, Language Day)
1 (27)	<p>1. Changes in energy storage</p> <ul style="list-style-type: none"> <li>When a kettle boils the way energy is stored in a simple system changes.</li> <li>Not all the changes are useful.</li> <li>Different devices have different energy wastages.</li> </ul> <p>2. Energy transfers and efficiency</p> <ul style="list-style-type: none"> <li>Energy cannot be created or destroyed.</li> <li>In any energy transfer, some energy is stored in less useful ways and is described as ‘wasted’ energy.</li> <li>Unwanted energy transfers can be reduced.</li> <li>The rate of cooling of a building is affected by the thickness and thermal conductivity of its walls.</li> <li>The higher the thermal conductivity of a material, the higher the rate of energy transfer by conduction across the material.</li> </ul>	<ul style="list-style-type: none"> <li>Give examples of stores.</li> <li>What is waste energy?</li> <li>How is most waste energy changed?</li> <li>Give examples of energy transfers?</li> <li>How can systems be made more efficient?</li> <li>How does a house “save energy”? Label and identify on a diagram.</li> </ul>	
2 (28)	<p>3. Energy resources</p> <ul style="list-style-type: none"> <li>Define ‘fuel’ and ‘fossil fuel.’</li> <li>Energy resources are renewable or non-renewable.</li> </ul> <p>4. Types of forces</p> <ul style="list-style-type: none"> <li>Forces are either a push or pull acting on an object due to an interaction with another force.</li> <li>Forces are either:</li> <li>contact forces or non-contact forces</li> </ul>	<ul style="list-style-type: none"> <li>Define the terms fuel and fossil fuel, stating where they come from?</li> <li>What are renewable and non-renewable energy resources? What are the advantages / disadvantages of each?</li> <li>Identify forces as push or pull</li> <li>Identify if a force is a contact or non-contact, give examples.</li> </ul>	
3 (29)	<p>5. Effects of forces</p> <ul style="list-style-type: none"> <li>Work is done when a force causes an object to move through a distance. (No calculations needed)</li> </ul>	<ul style="list-style-type: none"> <li>What is the work-done equation?</li> <li>What is work? What is it measured in?</li> <li>What is waste energy lost as?</li> </ul>	

	<ul style="list-style-type: none"> <li>When work is done against frictional forces acting on an object, there is a rise in temperature.</li> </ul> <p>6. Speed</p> <ul style="list-style-type: none"> <li>Speed is measured by the distance travelled in a certain time.</li> <li>The units for speed as metres per second, kilometres per hour and miles per hour.</li> <li>Calculate average speed using the equation:</li> <li><math>speed = distance/time</math></li> </ul>	<ul style="list-style-type: none"> <li>What is speed and its units?</li> <li>Use the equation and rearrange to find a new subject.</li> </ul>	
<b>4 (30)</b>	<p>7. Stopping Distances</p> <ul style="list-style-type: none"> <li>The stopping distance of a vehicle is the sum of the distance the vehicle travels during the driver's reaction time (thinking distance) and the distance it travels under the braking force (braking distance).</li> <li>For a given braking force, the greater the speed of the vehicle, the greater the stopping distance.</li> </ul> <p>8. Reaction times and stopping distances</p> <ul style="list-style-type: none"> <li>A typical reaction time for a person ranges from 0.5s to 0.9s.</li> <li>A driver's reaction time can be affected by tiredness, drugs and alcohol and distractions.</li> </ul>	<ul style="list-style-type: none"> <li>Explain what a stopping distance is made up of?</li> <li>What factors effect thinking distance?</li> <li>What factors effect braking distance?</li> <li>What is a reaction time?</li> <li>What factors affect the rate of reaction?</li> <li>How can reactions be improved?</li> </ul>	
<b>5 (31)</b>	<p>9 Weather conditions and braking distances</p> <ul style="list-style-type: none"> <li>The braking distance of a vehicle can be affected by adverse road and weather conditions and poor condition of the vehicle.</li> </ul> <p>10. Radioactivity</p> <ul style="list-style-type: none"> <li>Some atomic nuclei are unstable and produce ionising radiation.</li> <li>Nuclear radiation may be emitted as: <ul style="list-style-type: none"> <li>alpha particles</li> <li>beta particles</li> <li>gamma rays</li> </ul> </li> <li>These have different penetration of materials and range in air.</li> </ul>	<ul style="list-style-type: none"> <li>How does weather and road condition affect braking distance?</li> <li>What is meant by unstable nuclei? Why is it unstable?</li> <li>What are the three radioactive particles?</li> <li>How does the penetration change for each three particles?</li> <li>What are the uses and dangers for alpha, beta and gamma radioactivity?</li> </ul>	

	<ul style="list-style-type: none"> <li>The uses and dangers associated with the three types of radiation.</li> </ul>		
<b>6 (32)</b>	Assessment Week	Provided by ELC Component <u>5 – Energy, forces and structure of matter</u> 3 x chances to pass at Level 3 covering all prior learning for the topic.	



Weekly Sequence	New Learning & Knowledge	Key Question(s)	Whole School Focus (eg. Computing Week, Language Day)
1 (33)	<p>1. Current in a circuit</p> <ul style="list-style-type: none"> <li>• Current is a flow of electrical charge which can be measured using an ammeter in series.</li> <li>• Voltage is measured using a voltmeter in parallel across a component.</li> <li>• The current in a component depends on the resistance in the circuit.</li> </ul> <p>2. d.c and a.c current</p> <ul style="list-style-type: none"> <li>• Direct current is supplied by cells and batteries.</li> <li>• Mains electricity is alternating current.</li> <li>• UK mains electricity has a frequency of 50Hz and is 230V.</li> </ul>	<ul style="list-style-type: none"> <li>• How are ammeters and voltmeters connected in a circuit?</li> <li>• What are their functions?</li> <li>• What is resistance?</li> <li>• What is d.c and a.c?</li> <li>• Give an example of a producer for each.</li> <li>• What are the quantities of mains electricity?</li> </ul>	
2 (34)	<p>3. Wiring a plug</p> <ul style="list-style-type: none"> <li>• The colour-coding for three-core flex and the appropriate terminal for each wire in a plug.</li> <li>• The earth wire protects the user; the fuse protects the appliance.</li> <li>• Double-insulated appliances do not need an earth wire.</li> </ul> <p>4. Energy transfer in electrical appliances</p> <ul style="list-style-type: none"> <li>• Domestic electricity meters measure the amount of energy used.</li> <li>• The unit for power (W).</li> <li>• Heating devices have the highest power ratings.</li> <li>• The unit used in a domestic electricity meter to measure energy is the kilowatt-hour (kWh).</li> </ul>	<ul style="list-style-type: none"> <li>• Identify live, neutral and Earth on a plug. State what each wire is for.</li> <li>• What is the symbol for double insulated. Why do they not need an Earth wire?</li> <li>• What is the unit of electricity called?</li> <li>• Which devices use most power?</li> <li>• Most electricity is about 14p per kWh. What is a kWh, and perform a cost calculation for a device.</li> </ul>	
3 (35)	<p>5. Magnets</p> <ul style="list-style-type: none"> <li>• The poles of a magnet are where the magnetic forces are strongest.</li> <li>• Like poles repel and unlike poles attract; these are non-contact forces.</li> </ul>	<ul style="list-style-type: none"> <li>• How does a magnet work in terms of domains?</li> <li>• Where are magnets the strongest?</li> <li>• What do like and opposite poles do?</li> <li>• Identify the magnetic field pattern.</li> </ul>	



	<ul style="list-style-type: none"> <li>There is a pattern of magnetic fields between two magnets.</li> </ul> <p>6. Electromagnets and solenoids</p> <ul style="list-style-type: none"> <li>Current in a wire produces a magnetic field around the wire.</li> <li>Increasing the current increases the strength of a magnetic field.</li> <li>A simple electromagnet can be made from a solenoid and an iron core.</li> <li>Electromagnets are used in relays and scrapyards.</li> </ul>	<ul style="list-style-type: none"> <li>What is an electromagnet?</li> <li>Where is the field strongest?</li> <li>How do you construct an electromagnet?</li> <li>How do you increase the strength of an electromagnet?</li> <li>How does a relay and solenoid work?</li> </ul>	
<b>4 (36)</b>	<p>7. Longitudinal and transverse waves</p> <ul style="list-style-type: none"> <li>Waves transfer energy not physical materials.</li> <li>Waves may be transverse or longitudinal.</li> <li>Sound waves need a medium (material) to travel through.</li> </ul> <p>8. Wave properties</p> <ul style="list-style-type: none"> <li>A transverse wave can be described by its wavelength and amplitude.</li> <li>The wave equation; the correct units for wave speed, frequency and wavelength</li> </ul>	<ul style="list-style-type: none"> <li>What do waves transfer?</li> <li>Identify longitudinal and transverse waves.</li> <li>Describe the difference in terms of particle movement to energy transfer.</li> <li>Why does sound need a medium?</li> <li>Label a transverse wave diagram.</li> <li>Identify and use the wave equation correctly.</li> </ul>	
<b>5 (37)</b>	<p>9. The electromagnetic spectrum</p> <ul style="list-style-type: none"> <li>The order of the spectrum (but not the values of wavelength or frequency).</li> <li>The risks associated with ultraviolet waves, X-rays and gamma rays.</li> </ul> <p>10. Uses of the electromagnetic spectrum</p> <ul style="list-style-type: none"> <li>The seven components of the e-m spectrum.</li> <li>The uses of electromagnetic radiation.</li> </ul>	<ul style="list-style-type: none"> <li>State in order the EM spectrum.</li> <li>What are the uses and dangers for each of the EM spectrum sections?</li> </ul>	
<b>6 (38)</b>	Assessment Week	<p>Provided by ELC Component <u>6 – Electricity, magnetism and waves</u></p> <p>3 x chances to pass at Level 3 covering all prior learning for the topic.</p>	
<b>7 (39)</b>	xxx	xxx	xxx