

Science Landgate School Long Term Planning KS4 2020-2022



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| Key Stage 4 | <p>Key Stage 4 Intent:</p> <p>At Landgate School we aim to create learning opportunities that inspire students to enter the wider world with the confidence and skills to succeed in their chosen future.</p> <p>In Science we aim to support them in achieving their personal and aspiring targets and in being able to use their skills of investigation, problem solving and enquiry to navigate their way. We enable learners to develop practical skills and an understanding of science knowledge, and process as well as stimulating curiosity about everyday life.</p> <p>We are committed to ensuring that all our learners leave Key Stage four with an accredited record of their achievements.</p> <p>Learners access a range of accreditations which offer the best opportunities matched to their personal needs and continuing from their individual pathway in Key Stage 3.</p> <p>Accreditation includes: AQA Science Entry Certificate, AQA Unit Awards (Entry and Pre-Entry)</p> <p>Links -</p> <p>Relationships Education, Relationships and Sex Education (RSE) and Health Education:</p> <p>Science - At key stage 3 and 4, it includes teaching about reproduction in humans; for example, the structure and function of the male and female reproductive systems, menstrual cycle, gametes, fertilisation, gestation, birth and HIV/AIDS.</p> <p>Key Stage Opportunities:</p> <p>In Key Stage Four Science is delivered through three sessions per week, which enable them to acquire, develop and apply their learning in Science. The lessons include a range of strategies including teacher directed activities, group discussion, personal investigation, and independent study both in the classroom and through structured use of the outdoors to:</p> <ul style="list-style-type: none">• develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics;• develop understanding of the nature, processes and methods of science, through different types of scientific enquiry that help them to answer scientific questions about the world around them;• develop and learn to apply observational, practical, modelling, enquiry, problem-solving skills and mathematical skills, both in the laboratory, in the field and in other environments; Science – key stage 4 4• develop their ability to evaluate claims based on science through critical analysis of the methodology, evidence and conclusions, both qualitatively and quantitatively. |
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| | | Year A 2020-2021 | Year B 2021-2022 |
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| Focus 1 | Key Focus: | CHEMISTRY – Elements, Mixtures and Compounds (Part 1) | BIOLOGY – The human body. (Part 1) |
| | Summary: (Key Vocabulary in bold) | AQA Unit Awards Pre-Entry - <ul style="list-style-type: none"> • States of Matter • The effects of heat • Chromatography AQA Unit Awards Entry Level – In addition <ul style="list-style-type: none"> • Atoms, elements and compounds • Atoms and the periodic table, Groups in the Periodic Table. • Mixtures and compounds • Separating Mixtures AQA Certificate – In addition. <ul style="list-style-type: none"> • Mixtures, • Structures of Carbon, polymers | AQA Unit Awards Pre – Entry - <ul style="list-style-type: none"> • Human body parts • The effects of exercise. • Respiration, AQA Unit Awards Entry Level – In addition <ul style="list-style-type: none"> • Identifying organs • Use of a microscope • Digestive System. • Healthy and unhealthy activities. AQA Certificate – In addition <ul style="list-style-type: none"> • Animal and Human Cells, Tissue • circulatory system, drugs, diet, • pulse rate. |
| | Accreditation Board/ Title: | AQA Science Entry 1/2/3 Level Single Award: COMPONENT 3: ELEMENTS, MIXTURES AND COMPOUNDS Entry level AQA Unit Award: Awaiting approval Pre-Entry AQA Unit Award: Awaiting approval | AQA Science Entry 1/2/3 Level Single Award: COMPONENT 1: BIOLOGY-THE HUMAN BODY Entry Level AQA Unit Award: Awaiting approval Pre-Entry Level AQA Unit Award: Awaiting approval |
| | Key Opportunities: | Activity ideas: investigating different inks – chromatography, climate change investigation, Outdoor Experiences: Investigating plants, chemical reactions I.e. coke and mentos. | Possible External Visits: Eureka, doctors, hospitals, police breathalysers, Activity ideas: blowing activities, measuring breath, making a digestive system, investigating the effects of exercise on the body, Tasting healthy foods, making cells using food. Outdoor Experiences: Using magnifying glasses and microscopes in the field, exercise, using body parts. |

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| Focus 2 | Key Focus: | CHEMISTRY – Elements, Mixtures and Compounds (Part 2) | BIOLOGY – The human body. (Part 2) |
| | Summary: (Key Vocabulary in bold) | <p>AQA Unit Awards Pre – Entry -</p> <ul style="list-style-type: none"> • Identifying materials • Properties of materials • Uses of metal. • Classifying materials <p>AQA Unit Awards Entry Level – In addition</p> <ul style="list-style-type: none"> • Renewable and non-renewable materials • Metal as a conductor. • Plastics – positives and negatives. <p>AQA Certificate – In addition</p> <ul style="list-style-type: none"> • Metals, Alloys, • Extracting metals, • Recycling metals. | <p>AQA Unit Awards Pre – Entry -</p> <ul style="list-style-type: none"> • Human life cycle • Keeping Healthy • Reflex actions <p>AQA Unit Awards Entry Level – In addition</p> <ul style="list-style-type: none"> • Harmful substances • Contraception • Difference between actions and reflex actions. <p>AQA Certificate – In addition</p> <ul style="list-style-type: none"> • Infectious disease, • Vaccination, drugs, antibiotics. • Nervous System, Testing reactions, Hormones and the menstrual cycle, controlling fertility |
| | Accreditation Board/ Title: | <p>AQA Science Entry 1/2/3 Level Single Award: COMPONENT 3: ELEMENTS, MIXTURES AND COMPOUNDS Entry Level AQA Unit Award: Awaiting approval</p> <p>Pre-Entry Level AQA Unit Award: Awaiting approval</p> | <p>AQA Science Entry 1/2/3 Level Single Award: COMPONENT 1: BIOLOGY-THE HUMAN BODY Entry Level AQA Unit Award: Awaiting approval</p> <p>Pre-Entry Level AQA Unit Award: Awaiting approval</p> |
| Key Opportunities: | <p>Activity ideas: sorting materials, identifying properties of materials, testing the properties of metals, finding out about the effects of plastic use, panning for metals, extracting metals.</p> <p>Outdoor Experiences: sorting natural materials,</p> | <p>Possible External Visits: doctors, hospitals, Age UK</p> <p>Activity ideas: testing reflex speeds and effects, washing hands using glitter, effects of hormones.</p> | |

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| | identifying materials in around them. | |
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| Focus 3 | Key Focus: | PHYSICS - ENERGY, FORCES AND STRUCTURE (Part 1) | CHEMISTRY - CHEMISTRY IN OUR WORLD (Part 1) |
| | Summary: (Key Vocabulary in bold) | <p>AQA Unit Awards Pre – Entry -</p> <ul style="list-style-type: none"> • Experiencing energy outputs – heat, light, movement. • Pushing and pulling • Forces on their own body <p>AQA Unit Awards Entry Level – In addition</p> <ul style="list-style-type: none"> • Energy Output • Renewable and non-renewable energy. • Measuring forces - Newtons <p>AQA Certificate – In addition</p> <ul style="list-style-type: none"> • Changes in energy stores, • Energy conservation, • Energy transfer by heating, • Energy resources. • Forces and Work • Force, work done | <p>AQA Unit Awards Pre – Entry -</p> <ul style="list-style-type: none"> • Metal • Plastic • Observing chemical reactions. <p>AQA Unit Awards Entry Level – In addition</p> <ul style="list-style-type: none"> • The PH scale • Neutralisation • Origin of petrol <p>AQA Certificate – In addition</p> <ul style="list-style-type: none"> • Reactions of Acids. • Metals and acids, • Investigating acids and carbonates, • Balanced symbol equations • Energy and rate of reaction. |
| | Accreditation Board/ Title: | <p>AQA Science Entry 1/2/3 Level Single Award: COMPONENT 5: ENERGY, FORCES AND STRUCTURE</p> <p>Entry Level AQA Unit Award: Awaiting approval</p> <p>Pre-Entry Level AQA Unit Award: Awaiting approval</p> | <p>AQA Science Entry 1/2/3 Level Single Award: COMPONENT 4: CHEMISTRY-CHEMISTRY IN OUR WORLD</p> <p>Entry Level AQA Unit Award: Awaiting approval</p> <p>Pre-Entry Level AQA Unit Award: Awaiting approval</p> |
| | Key Opportunities: | <p>Possible External Visits: wind farm,</p> <p>Activity ideas: Using newton gauge to measure forces, switch based activities to identify the output, sorting renewable and non- renewable energy, Energy conservation experiment – thermal response,</p> | <p>Activity ideas: measuring PH of familiar substance, Internet investigation on the origins of petrol, Explaining how they know a reaction has occurred.</p> <p>Outdoor Experiences: Litter picking – where can we find plastic.</p> |

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| | Outdoor Experiences: Tug of war, movement activities, finding types of energy, | |
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| Focus 4 | Key Focus: | PHYSICS ENERGY, FORCES AND STRUCTURE (Part 2) | CHEMISTRY - CHEMISTRY IN OUR WORLD (Part 2) |
| | Summary: (Key Vocabulary in bold) | <p>AQA Unit Awards Pre – Entry -</p> <ul style="list-style-type: none"> • Forces – Starting and stopping • Making energy <p>AQA Unit Awards Entry Level</p> <ul style="list-style-type: none"> • Influences on breaking distance • Uses of nuclear power • Dangers of nuclear power <p>AQA Certificate</p> <ul style="list-style-type: none"> • Speed and stopping distances • Braking distance. • Atoms and nuclear radiation • Atoms and radiation, Alpha, beta, and gamma radiation, Using radiation energy. | <p>AQA Unit Awards Pre – Entry -</p> <ul style="list-style-type: none"> • Filtering water • Using fuels - cars <p>AQA Unit Awards Entry Level – In addition</p> <ul style="list-style-type: none"> • Making water safe • The positives and negatives of fossil fuel. • Greenhouse gases <p>AQA Certificate – In addition</p> <ul style="list-style-type: none"> • Fuels and the Atmosphere • Development of the atmosphere, Crude oil, Fuels and Combustion, Air Pollution, Climate change, Cracking and Carbon footprint. • Water for drinking • Investigating Water, Waste water treatment. |
| | Accreditation Board/ Title: | <p>AQA Science Entry 1/2/3 Level Single Award: COMPONENT 5: ENERGY, FORCES AND STRUCTURE)</p> <p>Entry Level AQA Unit Award: Awaiting approval</p> <p>Pre-Entry AQA Unit Award: Awaiting approval</p> | <p>AQA Science Entry 1/2/3 Level Single Award: COMPONENT 4: CHEMISTRY-CHEMISTRY IN OUR WORLD</p> <p>Entry Level AQA Unit Award: Awaiting approval</p> <p>Pre-Entry Level AQA Unit Award: Awaiting approval</p> |
| Key Opportunities: | <p>Activity ideas: Car / ramp comparison, reaction times.</p> <p>Outdoor Experiences: starting and stopping activities outside. Catching and throwing, changing direction, requesting speeds on equipment.</p> | <p>Possible External Visits: Water facility,</p> <p>Activity ideas: Cleaning water, identifying the fuel that is used for vehicles,</p> <p>Outdoor Experiences: Large scale filtering water,</p> | |

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| | | | measuring air quality, |
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| Focus 5 | Key Focus: | BIOLOGY - ENVIRONMENT, INHERITANCE AND EVOLUTION (Part 1) | PHYSICS - ELECTRICITY, MAGNETISM AND WAVES (Part1) |
| | Summary: (Key Vocabulary in bold) | <p>AQA Unit Awards Pre – Entry -</p> <ul style="list-style-type: none"> • Parts of a Plant • Needs of a plant • What do animals eat? <p>AQA Unit Awards Entry Level – In addition</p> <ul style="list-style-type: none"> • Photosynthesis • Food Chains • Habitats and territories <p>AQA Certificate – In addition</p> <ul style="list-style-type: none"> • Feeding relationships • Adaptations • Organisms and the environment • Competition, living and non-living factors, Investigating plant distribution, Pollution, • How life developed on Earth • Genetic material, Asexual and sexual reproduction, Investigating variation, Evolution and natural selection, artificial selection, Genetic engineering. | <p>AQA Unit Awards Pre – Entry -</p> <ul style="list-style-type: none"> • Simple circuits • Using plugs and switches • Observe different types of output. • Magnets – objects which are attracted or not. <p>AQA Unit Awards Entry Level – In addition</p> <ul style="list-style-type: none"> • Simple series circuits. • Renewable energy circuits and solar cells • Direct and indirect electrical currents • radio waves, microwaves, infra-red and visible light. • Magnetics poles and fields. <p>AQA Certificate – In addition</p> <ul style="list-style-type: none"> • Electrical Current • Electrical Current, Types of current, • Domestic Electricity • Wiring a plug, fuses and Earth wires, Transferring energy • Magnetism and Electromagnetism • Magnetic fields around an electric current, Electromagnets. |
| | Accreditation Board/ Title: | <p>AQA Science Entry 1/2/3 Level Single Award: COMPONENT 2: BIOLOGY- ENVIRONMENT, INHERITANCE AND EVOLUTION</p> <p>Entry Level AQA Unit Award: Awaiting approval</p> <p>Pre-Entry Level AQA Unit Award: Awaiting approval</p> | <p>AQA Science Entry 1/2/3 Level Single Award: COMPONENT 6: PHYSICS- ELECTRICITY, MAGNETISM AND WAVES</p> <p>Entry Level AQA Unit Award: Awaiting approval</p> <p>Pre-Entry Level AQA Unit Award: Awaiting approval</p> |
| | Key | Possible External Visits: Local area/ garden centre, | Activity ideas: Make a simple electro magnet, Cause |

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| <p>Opportunities:</p> | <p>specific ecosystems such as a pond or forest, zoo</p> <p>Activity ideas: UV animal shelter, creating animals with adaptations, matching animals to habitats and identifying the</p> <p>Outdoor Experiences: Testing photosynthesis,</p> | <p>and effect plugs and switches, observing the outputs of different devices ie hair dryers, wiring plugs</p> <p>Outdoor Experiences: finding outdoor magnetic objects, using a compass, finding solar panels, wind farms, wires. (Playing Safe)</p> |
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| <p>Focus 6</p> | <p>Key Focus:</p> <p>BIOLOGY - ENVIRONMENT, INHERITANCE AND EVOLUTION (Part 2)</p> | <p>PHYSICS - ELECTRICITY, MAGNETISM AND WAVES (Part 2)</p> |
| | <p>Summary: (Key Vocabulary in bold)</p> <p>AQA Unit Awards Pre – Entry</p> <ul style="list-style-type: none"> • Local environment – Litter • Fossils • Animal characteristics natural selection. • Climate change the effects of heat on the arctic. <p>AQA Unit Awards Entry Level – In addition</p> <ul style="list-style-type: none"> • Effects of climate change on animals. • types of pollution. • Inherited/ environmental characteristics in animals and humans. • DNA model. <p>AQA Certificate – In addition</p> <ul style="list-style-type: none"> • Environmental changes • living and non-living factors that alter environments. E.g. rainfall, average temperature, competitors and predators • effects of human population growth on pollution, resource use and waste. • Water pollution, Air pollution – acid rain • Landfill and toxic chemicals, pesticides and herbicides. • Darwin’s theory - Evolution, natural and artificial selection • sexual and asexual reproduction, clones • DNA - chromosomes and genetic engineering. | <p>AQA Unit Awards Pre – Entry -</p> <ul style="list-style-type: none"> • Experience the effects of a magnet. • Make and hear high and low sounds. • Shadows • Microwaves to cook • How light travels. <p>AQA Unit Awards Entry Level – In addition</p> <ul style="list-style-type: none"> • Prisms and spectrums • Rays of light – direction and change. • Reflection • Seven wavelength groups • Soundwave mediums • Simple electromagnets <p>AQA Certificate – In addition</p> <ul style="list-style-type: none"> • Longitudinal and transverse waves • Properties of waves • Electromagnetic Waves • Electromagnetic spectrum |
| | <p>Accreditation Board/ Title:</p> <p>AQA Science Entry 1/2/3 Level Single Award: COMPONENT 2: BIOLOGY- ENVIRONMENT, INHERITANCE</p> | <p>AQA Science Entry 1/2/3 Level Single Award: COMPONENT 6: PHYSICS- ELECTRICITY, MAGNETISM AND</p> |

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| | <p>AND EVOLUTION</p> <p>Entry Level AQA Unit Award: Awaiting approval</p> <p>Pre-Entry Level AQA Unit Award: Awaiting approval</p> | <p>WAVES</p> <p>Entry Level AQA Unit Award: Awaiting approval</p> <p>Pre-Entry Level AQA Unit Award: Awaiting approval</p> |
| <p>Key Opportunities:</p> | <p>Possible External Visits: Local nature reserves, Town centres,</p> <p>Activity ideas: melting ice and observing the effect on a polar bear, fake snow, matching animals with habitats, identifying learner and parents pictures, making fossils, creating an animal,</p> <p>Outdoor Experiences: looking after the environment – litter picking, improving a space,</p> | <p>Possible External Visits: hall of mirrors ?, Jodrell bank - sound garden</p> <p>Activity ideas: playing instruments, making rainbows, moving objects though tables with a magnet, exploring reflection of self/ light/ sound</p> <p>Outdoor Experiences: Shadow games, drawing, moving, pictures. Changing light – spectrums, Kaleidoscopes, large scale waves demonstration (large slinky etc)</p> |