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| **Substantive knowledge Science Curriculum**  Kensington Junior Academy |

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| **Autumn** | | | |
| **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **Chemistry - Rocks**  *Properties of rocks, fossils and soils*.   * Compare and group rocks based on their appearance and physical properties, giving reasons * Know how soil is made and how fossils are formed * Know about and explain the difference between sedimentary, metamorphic and igneous rock | **Chemistry – States of matter**  *Compare and group materials, Solids, liquids and gases, Changing state and Water cycle.*   * Group materials based on their state of matter (solid, liquid, gas) * Know about and explore how some materials can change state * Know the part played by evaporation and condensation in the water cycle | **Physics - Forces**  *Gravity, friction, forces and motion of mechanical devices*   * Know what gravity is and its impact on our lives * Identify and know the effect of air and water resistance * Identify and know the effect of friction * Explain how levers, pulleys and gears allow a smaller force to have a greater effect   **Physics – Earth and space**  *Movement of the Earth and the planets*, m*ovement of the Moon*, n*ight and day*   * Know about and explain the movement of the Earth and other planets relative to the Sun * Know about and explain the movement of the Moon relative to the Earth * Know and demonstrate how night and day are created * Describe the Sun, Earth and Moon (using the term spherical) | **Physics - Electricity**  *Electrical components, simple circuits, fuses and voltage*   * Draw circuit diagrams using the correct symbols * Compare and give reasons for why components work/do not work in a circuit. * Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer.   **Physics - Light**  *How light travels, reflection, ray models of light*   * Know how light travels * Know and demonstrate how we see objects. * Know why shadows have the same shape as the object that casts them. * Know how simple optical instruments work eg mirror, magnifying glass, periscope, telescope |

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| **Spring** | | | |
| **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **Biology - Animals, including humans**  *Skeleton and muscles, Nutrition, Exercise and health*   * Know about the skeletal and muscular system of a human and some other animals * Know that humans and some other animals have skeletons and muscles for support, protection and movement * Know about the importance of a nutritious, balanced diet * Know how nutrients, water and oxygen are transported within animals and humans   **Physics - Forces**  *Different forces and magnets*   * Know about and describe how objects move on different surfaces * Know how a simple pulley works and use to on to lift an object * Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials * Know about and explain how magnets attract and repel * Predict whether magnets will attract or repel and give a reason | **Biology – Livings things and their habitats**  *Grouping living things*, *classification keys* and a*daptation of living things.*   * Use classification keys to group, identify and name living things * Know how changes to an environment could endanger living things.   **Animals incl humans**   * Use and construct food chains to identify producers, predators and prey | **Biology – Livings things and their habitats**   * Create a timeline to indicate stages of growth in humans   **Animals incl humans**  *Life cycles – plants and animals, reproductive processes, famous naturalists*   * Know the life cycle of different living things e.g. mammal, amphibian, insect and bird * Know the differences between different life cycles * Know the process of reproduction in animals | **Biology – Livings things and their habitats**  *Classification of living things and the reasons for it, Identical and non identical off-spring, Fossil evidence and evolution, Adaptation and evolution*   * Classify living things into broad groups according to observable characteristics and based on similarities and differences * Know how living things have been classified * Give reasons for classifying plants and animals in a specific way   **Evolution and inheritance**   * Know how the Earth and living things have changed over time * Know how fossils can be used to find out about the past * Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents) * Know how animals and plants are adapted to suit their environment * Link adaptation over time to evolution * Know about evolution and can explain what it is |

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| **Summer** | | | |
| **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **Biology - Plants**  *Plant life, basic structure and functions, Life cycle and water transportation.*   * Know the function of different parts of flowing plants and trees * Know how water is transported within plants * Know the plant life cycle, especially the importance of flowers.   **Physics - Light**  *Reflections and shadows.*   * Know that dark is the absence of light * Know that light is needed in order to see and is reflected from a surface * Know and demonstrate how a shadow is formed and explain how a shadow changes shape * Know about the danger of direct sunlight and describe how to keep protected.   Forces   * Identify everyday materials that are attracted to magnets. * Know about and explain how magnets attract and repel. * Predict whether magnets will attract or repel items, and give a reason. | **Biology - Animals, including humans**  *Digestive system, teeth, food chains*   * Identify and name the parts of the human digestive system * Know the functions of the organs in the human digestive system * Identify and know the different types of human teeth * Know the functions of different human teeth   **Physics - Sound**  *How sounds are made, sound vibrations, pitch and volume*   * Know how sound is made, associating some of them with vibrating * Know how sound travels from a source to our ears * Know the correlation between pitch and the object producing a sound * Know the correlation between the volume of a sound and the strength of the vibrations that produced it * Know what happens to a sound as it travels away from its source   **Physics - Electricity**  *Uses of electricity, simple circuits and switches, conductors and insulators*   * Identify and name appliances that require electricity to function * Construct a series circuit * Identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers) * Predict and test whether a lamp will light within a circuit * Know the function of a switch * Know the difference between a conductor and an insulator; giving examples of each. | **Chemistry – Properties and changes in materials**  *Compare properties of everyday materials, soluble/ dissolving, reversible and irreversible substances*   * Compare and group materials based on their properties, e.g. hardness, solubility transparency, conductivity, [electrical & thermal], and response to magnets * Know and demonstrate how some materials can be separated, e.g. through filtering, sieving and evaporating * Know and explain how a material dissolves to form a solution * Know and show how to recover a substance from a solution * Know and demonstrate that some changes are reversible and some are not * Know how some changes result in the formation of a new material and that this is usually irreversible | **Biology - Animals, including humans**  *The circulatory system, Water transportation, Impact of exercise on body*   * Identify and name the main parts of the human circulatory system. * Know the function of the heart, blood vessels and blood. * Know the impact of diet, exercise, drugs and lifestyle on health. * Know the ways in which nutrients and water are transported in animals, including humans. |