

Block E

Concepts to prioritize for 2022-23

I've Got the Power!

- **Static electricity** – Knows how objects can be charged and when and why charged objects are attracted to each other or repelled. Understands how to use the triboelectric series to determine how two charged objects will react to one another.
- **Conductors and Insulators** - Defines conduction as the ability to conduct electricity - Distinguishes between electrical conductors and insulators in a technical object - Identifies various materials as either electrical conductors or electrical insulators.
- **Simple Circuits** - Describes the function of different elements of an electrical circuit (e.g. the wires transmit electrons along the circuit, resistors transform electrical energy into another form of energy) - Represents a simple electrical circuit using a diagram
- **Circuit symbols and diagrams** - Recognises basic circuit symbols when reading circuit diagrams and uses them to draw their own circuit diagrams.
- **Current Intensity, Potential Difference, and Resistance** - Understands the relationship between current intensity, potential difference, and resistance.
- **Ohm's Law** - Applies the mathematical relationship between voltage, resistance, and current intensity in a series circuit ($V = RI$)
- **Series and parallel circuits** – Can draw and build both types of circuits as well as understands the basics of how they work and their advantages and disadvantages.
- **Switches**- Identifies the circuit symbol of each type of switch and understands in what type of circuit each type would be used.
- **Power** - Knows what a kilowatt is and calculates the electrical energy used by an appliance in kilowatt hours - Understands the relationship between Ohm's Law and power and voltage or amperage - calculates the power used from the energy label of an appliance.
- **Links** - Describes the advantages and disadvantages of different types of links - Names the types of links used in a technical object (ex. the spiral link between a jar and its lid) - Describes the characteristics of the links in a technical object (direct or indirect, rigid or flexible, removable or permanent, partial or complete)
- **Guiding controls** - Explains the choice of a type of guiding control in a technical object (e.g. the slide guides a drawer and reduces friction)
- **Materials – metals, plastics, alloys** - Describes the mechanical properties of different materials (hardness, ductility, elasticity, malleability, corrosion resistance)

- **Constraints** - Describes the constraints to which different technical objects are subject: tension, compression, torsion, deflection, shearing (e.g. a diving board is subject to deflection)
- **Scale** - Understands the use of scale in technical drawings - Calculates the appropriate scale in reduction of an object for a drawing or the enlargement of a drawing to the real life object.

Molecules in Motion

- **Characteristic properties** – Understands and can identify characteristic properties and non-characteristic properties of a substance or object.
- **Physical and chemical changes** - Identifies which changes are physical and which are permanent chemical changes.
- **Structure of atoms** - Determines the number of protons and electrons from the atomic number and the number of neutrons by subtracting the atomic number from the rounded atomic mass - determines the number of electrons in each energy shell – identifies atoms from Bohr-Rutherford models - Draws Bohr-Rutherford models of each element.
- **Periodic table** – Understands the arrangement of the elements in periods according to the number of electron energy shells - Understands the importance of valence electrons in creating chemical bonds and the arrangement of the columns or groups of elements according to how many valence electrons can be found in the last shell.
- **Atomic families** – Understands that elements in each group or column share similar properties because they have the same number of valence electrons - Identifies the properties of the Alkali metals, the Alkaline Earths, the Halogens and the Noble Gases.
- **Lewis dot diagrams** – Uses the knowledge of valence electrons to draw simple Lewis dot diagrams of atoms.
- **Bonds** – Understands ionic and covalent bonding of binary and other simple compounds - Uses the octet rule for obtain stable electron energy shells - Understands how many electrons would be available from or needed by each atom of an element to create a molecule of a compound and how many bonds would be formed.
- **Chemical equations** – Can balance the chemical equations of reactions by adjusting the number of molecules of each of the reactants and products.