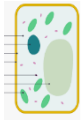
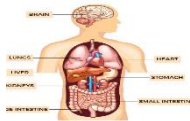


## Big Ideas

Cell  
Biology



Organisation



Infection and  
response



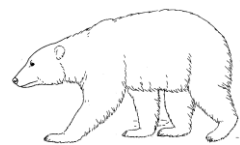
Homeostasis  
and response



Bioenergetics



Ecology



Genetics,  
Variation and  
Evolution



6

- Transportation of nutrients in the body
- Plants, animals and Microorganisms

- Identify Heart, lungs, blood vessels and blood and their function

- Diet & Exercise and the impact on the body
- Drugs and the impact on the body
- Lifestyle and health and the impact on the body

- Fossils as evidence of change over time of species
- Adaptation of organisms to their environment
- Characteristics and how they are inherited
- Variation of offspring
- Classification of plants and animals based on specific

7

- Cells and Organelles (excluding bacterial)
- DNA/role and structure
- Tissues- Definition and a few examples
- Organs and Organ systems
- The skeleton
- Microscopy
- Adaptation and Natural selection

- Healthy diet & Nutrition

- Menstrual cycle & Hormones
- Body systems & their components

- Enzymes- What are they
- Food groups/ food tests
- Aerobic respiration
- Exercise and its effects

- Reproduction in Plants & animals
- Gametes & Fertilisation
- Gestation & birth
- Pollination
- DNA & Inheritance

8

- Pathogens (no protist diseases)
- Health and Disease
- Deficiency diseases
- Drugs & their effects (including alcohol & smoking)

- Photosynthesis
- Leaf structure & gas exchange
- Measuring rates
- Aerobic & Anaerobic Respiration
- Energy in food

- Ecosystems & habitats
- Biodiversity
- Cycling materials- Carbon cycle only
- Food chains & food webs
- Trophic levels
- Insects & food security

9

- Cells, Organelles & their function (addition of ribosomes)
- Prokaryotes & Eukaryotes
- Tissues & Organs (plants & animals)
- Microscopy & calculations
- Stem cells-their advantages & limitations
- Mitosis

- Pathogens & Disease (Including Malaria)
- Main disease caused by specific pathogens
- Communicable/ non diseases
- Effects of alcohol, smoking & drugs on the body
- Vaccination
- Antibiotics

- The Nervous system
- Reflex actions
- Synapse & pathway
- The Endocrine system- Including specific hormones (Adrenaline + Thyroxine H)
- Homeostasis-specific examples (Role of glucagon H)
- *Body temperature*

10

- Transport in & out of cells
- Diffusion, Osmosis, Active transport
- Adaptations of organism for above
- Transpiration & translocation

- Structure of the heart & adaptations of three types of blood vessels
- Circulation in mammals & other organisms
- Blood composition
- Problems & solutions relating to the Circulatory system
- Digestive system & its role
- Respiratory system & its adaptations
- *Brain, Eye, Kidney*

- Photosynthesis
- Tissues involved in photosynthesis (inverse square law H)
- Measuring the rate of photosynthesis
- Uses of products of photosynthesis
- Aerobic & Anaerobic respiration in animals, plants & yeast & Equations
- Enzymes their structure & function
- Metabolism

11

- Adaptation & Competition
- Ecosystems & habitats (Trophic levels)
- Biodiversity & sustainable development
- Abiotic & Biotic factors
- Cycling materials- Water & Carbon
- Global Warming
- Land use & Deforestation
- Population growth & its effects
- Distribution & sampling
- Waste & the environment (*Impact of Change*)
- *Decomposition*

- DNA structure
- Inheritance & inherited disease
- Variation
- Sexual & Asexual Reproduction (*Adv+Disadvantages*)
- Meiosis
- Genetic Engineering & Selective Breeding
- *Cloning*
- *Theory of Evolution*
- Fossils & extinction
- Classification
- *Speciation*

12

- Cells- Eukaryotic & Prokaryotic including specific organelles
- Using Microscopes
- Transport across cell membranes

- Cell recognition & the Immune system

- Biological Molecules
- Monomers & Polymers
- Lipids
- Carbohydrate
- Water
- Inorganic ions

- Organisms exchange & the environment
- SA:V ratio
- Mass transport in plants & animals
- Cohesion in the xylem
- Digestion & absorption

- Genetics & Inheritance
- DNA & RNA
- DNA & Protein synthesis
- Mutations during Meiosis
- Diversity & taxonomy
- Adaptation

# Big Ideas

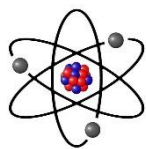
Substances, structures & properties



Chemical reactions



Atomic structure & the Periodic table



Quantitative



Earths' resources



6

- Solids, liquids & gases - properties
- Change of state
- Properties of materials
- Separating mixtures
- Dissolving

- Compare different rocks

7

- Recall separation techniques
- Solutions
- Dissolving – explain in terms of particles

- Acids & Alkalis – properties & pH
- Neutralisation
- Indicators

- Earths structure
- The rock cycle

8

- Exothermic & endothermic – understand the difference
- Chemical & physical reactions
- Combustion
- Thermal decomposition
- Reactions of metals
- Displacement
- Conservation of mass
- Corrosion
- Catalysts

- Periodic table arrangement
- Atoms, elements, compounds & mixtures
- Structure of the atom
- Groups of the Periodic table

- Composites
- Polymers
- Ceramics

9

- Evaluate Separation techniques
- Chromatography

- Displacement
- Metals & acids – word & chemical equations
- Testing gases
- Polymerisation – definition

- Atomic structure – charge & mass of particles
- Electron configuration
- Group 1 - properties

- Rf value
- Balancing equations

- Extracting metals
- Crude oil
- LCA
- Carbon footprint
- Sustainability
- Earth's atmosphere
- Global warming

10

- Bonding (ionic, covalent & metallic)
- Nanoparticles
- purity

- Reversible reactions
- Equilibrium
- Le Chateliers Principle (H)
- Rates of reaction
- Exothermic & endothermic – interpret reaction profiles

- Atomic structure
- Electron configuration
- Ion formation
- Isotopes
- Size of the atom
- Groups of the Periodic table (1, 7 & 0)
- Patterns in the Periodic Table
- *Transition metals*

- Standard form
- Calculating rate
- Tangents (H)
- Relative formula mass
- Percentage by mass
- Moles (H)
- Mass of solute
- Reacting masses (H)
- Moles to balance equations (H)

- Water (potable and waste water)

11

- DNA
- *Instrumental methods*

- *Ion testing*
- Electrolysis
- Corrosion
- Polymerisation – condensation & additional
- Reactions of alkenes
- Alcohols, esters & carboxylic acids
- Reactions of metals – making salts
- Fuel cells & hydrogen cells

- % yield
- Atom economy
- Volumes of gases
- Titrations calculations

- Composites
- Polymers – thermosoftening & thermosetting
- Ceramics
- Metals & alloys

12

- Bonding
- Shapes of molecules
- Electronegativity & polarity
- Intermolecular forces

- Enthalpy changes
- Bond energies
- Hess's Law
- Enthalpy cycles
- Dynamic equilibrium & constants
- Rate of reaction
- Boltmann distribution
- Redox
- Acids & alkalis
- Titrations

- Atomic structure
- Isotopes & ions
- Electronic structure – orbitals
- Trends in the Periodic table
- Ionisation energies
- Halogens

- Moles
- Quantities
- Gas equations

- Isomers
- Alkanes, alkenes, alcohols & haloalkanes
- Mass spectroscopy
- Infrared spectroscopy
- Ion testing



# Big Ideas

Space & weight



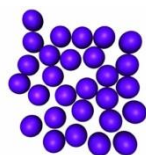
Forces & motion



Waves



Particles



Nuclear



Energy & circuits



6

- Light travelling in straight lines
- Reflection and shadows
- Objects reflecting light so we can see them

- Making simple circuits
- Drawing circuit diagrams
- Understanding more cells means more light from bulb

7

- Space
- Gravity
- Mass & weight

- What forces can do
- Names of basic forces
- Upthrust
- Describing motion
- DT graphs not including calculations

- Basic Kinetic theory – arrangement of particles in SLG
- Physical changes
- Brownian motion
- Changes to systems

8

- Work done & energy changes
- Magnetic fields and basic magnetism
- Introduction to electromagnetism
- Static electricity
- Moments

- Ultrasound & ultrasonic cleaners
- Electrical signals by microphones

- Pressure in fluids

- Current electricity
- Fuel costs
- Simple force machines
- Energy in food
- Energy in fuels
- Power ratings
- Static electricity

9

- Contact and non-contact forces
- Hooke's law
- Mass & weight

- Key definitions and how to draw amplitude, wavelength and frequency.
- EM Spectrum
- Refraction
- Wave equation
- Waves in ripple tank/on a rope
- Absorption of IR

- Kinetic theory arrangement, energy and movement of particles in SLG
- Specific heat capacity and practical
- Density

- Energy stores with qualitative transfers
- Power
- Efficiency
- Energy resources – renewable & non-renewable

10

- Solar system
- Orbital motion
- Life of a star
- Red shift

- Newton's laws of motion
- Resultant forces
- Terminal velocity
- DT and VT graphs including calculations
- Electromagnetism and motor effect

- Refraction diagram
- Wave front diagrams
- Reflection
- Sound waves
- Uses of waves
- Lenses & light
- Black body radiation

- Changes of state involving kinetic theory and latent heat

- Atomic structure
- History of atomic models
- Rutherford scattering
- Nuclear radiation, half life and decay equations
- Hazards and uses
- Fission and fusion

- Energy stores with quantitative energy transfers
- Thermistors and LDRs

11

- Momentum (H)
- Inertia & inertial mass (H)
- SUVAT
- Distance and displacement
- Moments, levers, gears
- Pressure in fluids

- Pressure in a gas linked to kinetic theory
- $pV = \text{constant}$
- Work to increase pressure/temperature of a gas (H)

- Series and parallel circuit rules
- Circuit calculations
- Control in circuits
- Motor effect
- Fleming's LH rule & electric motors (H)
- Loudspeakers (H)
- Induced potential, transformers, National Grid (H)
- Static electricity

12 (AQA)

- Scalars, vectors, resolving forces
- Moments
- Projectile motion
- Momentum and impulses

- Travelling waves, stationary waves
- refraction, diffraction, superposition and interference

- Particles and nuclear combined
- Strong force and stability of nuclei
- Anti-particles
- Fundamental interactions (link to FORCES) and their exchange particles
- Classification of particles including baryons and leptons.
- Quarks
- Conservation laws in particle interactions

- Resistivity
- Parallel resistance
- EMF & internal resistance
- Ideal ammeters and voltmeters