YEAR 1

FORCES (~ 12 lessons):

- **Speed** [Resultant forces; s=d/t; d/t graphs; speed VS velocity; acceleration; N1; N2] (Practical 7) ~ 6 lessons
- **Gravity** [Mass VS weight; w=mg; gravitational field strength] ~ 1 lesson
- **Contact Forces** [Contact VS non-contact; equilibrium; Hooke's Law] (Practical 6) ~ 3 lessons
- **Pressure** [Pressure in a fluid; upthrust; p=F/A; atmospheric pressure] ~ 2 lessons

WAVES (~ 14 lessons):

- **Sound** [Nature of waves; nature of sound waves; amplitude and volume; frequency and pitch; oscilloscope traces; auditory range; speed of sound; applications of sound; echo] ~ 3 lessons
- **Light** [Nature of light waves; speed of light; reflection; refraction; lenses; filters] (Practical 9) ~ 5 lessons

- **Wave Effects** [Electromagnetic spectrum; uses of EM spectrum; hazards of EM spectrum; microphones and loudspeakers] ~ 2 lessons
- **Wave Properties** [Physical models; wave front diagrams; $v=f\lambda$; sound VS light; superposition] (Practical 8) ~ 4 lessons

SPACE (~ 10 lessons):

- **Solar System** [Planets; the Moon; relative positions and appearances] ~ 2 lessons
- **Seasons and Orbits** [Orbital motion; tilted axes; natural and artificial satellites] ~3 lessons
- **The Universe** [Scale of the Universe; light years; life cycle of a star] ~ 2 lessons
- **Space Exploration** [Manned and unmanned space exploration; exoplanets; extra-terrestrial life] ~ 3 lessons

19 "BUFFER" LESSON S LEFT ACROSS Y1 PHYSICS FOR REVIEW AND CONSOLIDATION

YEAR 2

ELECTRICITY (~ 12 lessons):

- **Voltage and Resistance** [Circuit diagrams; conductors and insulators; properties/models of voltage/resistance in series and parallel; V=IR] (Practical 3) ~ 6 lessons
- **Current** [Properties/models of current in series/parallel; static electricity] ~ 2 lessons
- **Magnetism** [Magnetic materials; magnetic fields; permanent VS induced magnets; attraction and repulsion] ~ 2 lessons
- **Electromagnets** [Induced magnetic fields; description of electromagnets; factors affecting field strength] ~ 2 lessons

ENERGY (~ 13 lessons):

- **Energy Transfer** [Types of energy; conservation of energy; common examples of transfers] (Practical 2) ~ 5 lessons
- **Energy Costs** [Renewables and non-renewables; E=Pt; cost = power X time X price; energy use/cost of household devices] ~ 2 lessons
- **Work** [W=Fs; newton-metres/joules; moments; M=Fd; levers] ~ 2 lessons
- **Heating and Cooling** [Thermal energy; heat VS temperature; $\Delta E = mc\Delta\theta$; conduction; convection; radiation; insulators and conductors] (Practical 1) ~ 4 lessons

18 "BUFFER" LESSONS LEFT ACROSS Y2 PHYSICS FOR REVIEW AND CONSOLIDATION

Biology (~ 55 lessons Y1; 43 lessons Y2)

YEAR 1

WORKING SCIENTIFICALLY (~ 6 lessons):

- **How Science Works** [Terminology; graph drawing; errors; uncertainty; resolution; use of models; unit conversions] ~6 lessons

CELLS (~ 22 lessons):

- **Cell Model Project – conducted as homework**
- **Structure and Function** [Organelles; animal VS plant; stem cells; viruses and bacteria] ~ 4 lessons
- **Processes and Requirements** [MRS GREN; surface exchange sites; surface area: volume ratio; agar cube practical; models; diffusion; osmosis; active transport; gummy bear/egg demo] (PAG 8) ~ 9 lessons
- **Microscopy** [Types of microscope; magnification calculations; onion cell practical; pond-dipping practical; electron microscope practical; pre-prepared slides; amoeba exchange] (PAG 1, 3, 6) ~ 9 lessons

BIOMOLECULES (~ 11 lessons):

- **Types** [Sugars; amino acids; fatty acids and glycerol; monomers and polymers; aseptic technique; bacteria on agar practical] (PAG 7) ~ 7 lessons
- **Sources** [Water; osmosis; potato practical; foods; nucleotides] ~ 4 lessons

REPRODUCTION (~ 13 lessons)

- **Rotting Banana Project – conducted as homework**

- **Humans** [Hormones; endocrine system; oestrogen; progesterone; FSH; LH; testosterone; menstrual cycle; hormone/time graphs; placenta; foetal development; vestigial organs; chicken/sea monkey practical] ~ 7 lessons
- **Plants** [Auxin; gibberellin; ethene; flower structure; fertilisation; pollination; ripening; loss of leaves; seed germination practical] ~ 6 lessons

3 "B UFF ER" LE SSO NS L EFT AC ROSS Y1 BIOLOGY FOR REVIEW AND CONSOLIDATION

YEAR 2

WORKING SCIENTIFICALLY (~ 6 lessons):

- **How Science Works** [Terminology; graph drawing; errors; uncertainty; resolution; use of models; unit conversions] ~6 lessons

TISSUES, ORGANS AND SYSTEMS (~ 20 lessons):

- **Stem Cell Project – conducted as homework**
- **Specialised Cells** [Stem cells: adult, embryonic and meristem; blood cells; neurones; rods and cones; root hair cells; pre-prepared slides; cloning cauliflower practical] (PAG 1, 7) ~ 5 lessons
- **Tissues** [Blood; xylem; phloem] ~ 2 lessons
- **Organs** [Structure and function of eye; structure and function of brain; structure and function of heart; artificial organs; issues, ethics and treatments related to eye and brain; optical illusions; eye dissection practical; brain bio-viewer] ~ 9 lessons

- **Organ Systems** [Nervous system; circulatory system; reactions practical: ruler drop and cold water] (PAG 6) ~ 4 lessons

PLANT CIRCULATION (~ 10 lessons):

- **Uptake** [Osmosis *removed 2017-18*; active transport *removed 2017-18*; root hair cell microscopy] (PAG 1) ~ 3 lessons
- **Variables** [Structure and function of stomata; transpiration; nail varnish on leaves practical; 10m tube video; factors affecting water uptake: light, air and temperature; photometer demo] (PAG 1, 6, 8) ~ 7 lessons

7 "BUFFER" LESSONS LEFT ACROSS Y2 BIOLOGY FOR REVIEW AND CONSOLIDATION

Chemistry (~ 55 lessons Y1; 43 lessons Y2)

YEAR 1

SAFETY, PRACTICAL SKILLS, PARTICLE MODEL (~ 14 lessons):

- **Safety and Practical Skills** [Hazards; reducing risk; apparatus; communication; representing data]
- **Physical Changes** [Conservation; changes of state; density; Brownian motion; diffusion; chemical/physical changes]
- **Particle Model** [arrangements; density; anomaly of ice-water]
- **Energy in Matter** [Changes with temperature; internal energy]
- **Particle Nature** [States of matter; pressure; particle model]

MIXTURES, SOLUTIONS, PERIODIC TABLE AND ELEMENTS (~12 lessons):

- **Pure and Impure** [Pure substances; identification; dissolving; diffusion of particle model]
- **Separating Mixtures** [Filtration; distillation; chromatography]

ELEMENTS, MIXTURES, COMPOUNDS, METALS AND NON-METALS (~14 lessons):

- **Atoms, Elements and Compounds** [Simple atomic model; differences; chemical symbols; formulae; conservation of mass]
- **Periodic Table** [Physical and chemical properties of elements; Mendeleev; periods and groups; metals and non-metals; patterns; predictions]

- **Materials** [Properties of metals and non-metals; properties of metal and non-metal oxides; reactivity series; reduction using carbon; properties of ceramics, polymers and composites]

15 "BUFFER" LESSONS LEFT ACROSS Y1 CHEMISTRY FOR REVIEW AND CONSOLIDATION

YEAR 2

CHEMICAL REACTIONS 1 (~ 15 lessons):

- **Atomic Behaviour** [Reactions and rearrangement of atoms; formula; equations]
- **Types of Reaction** [Combustion; thermal decomposition; oxidation; displacement; pH scale; acidity/alkalinity; indicators; acids with metals/alkalis; catalysts]
- **Energetics** [energy changes of state; endothermic/exothermic]

CHEMICAL REACTIONS 2 (~ 13 lessons):

- **Reactions** [Formula; equations; combustion; thermal decomposition; oxidation; displacement; pH scale; acidity/alkalinity; indicators; acids with metals/alkalis; catalysts]
- **Earth and Atmosphere** [Source of limited resources; recycling; carbon cycle; composition of the atmosphere; human CO_2 production; impact on climate]

15 "BUFFER" LESSONS LEFT ACROSS Y2 CHEMISTRY FOR REVIEW AND CONSOLIDATION

Assessment will be continuous based on classwork completed under controlled conditions in addition to homework tasks. Summative assessment will also be through an exam covering all topics at the end of each academic year.