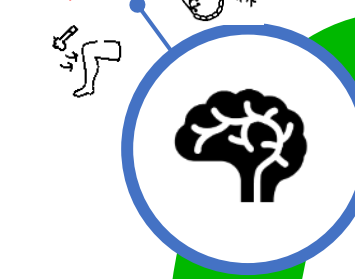


BIOLOGY LEARNING JOURNEY

(Biology only)

- Biological molecules
- Cells
- Organisms exchange substances with their environment
- Genetic information, variation and relationships between organisms
- Energy transfers in and between organisms
- Organisms respond to changes in their internal and external environments
- Genetics, populations, evolution and ecosystems
- The control of gene expression

The human nervous system
 -Principles of homeostasis
 -Structure & function of the nervous system
 -Reflex action
 -The brain
 -The eye



Hormonal coordination
 -Principles of hormonal coordination
 -Control of blood glucose level
 -Treating diabetes
 -Negative feedback
 -Human reproduction
 -Hormones & the menstrual cycle
 -Artificial control of fertility
 -Infertility treatment
 -Plant hormones & responses



Respiration
 -Aerobic respiration
 -Response to exercise
 -Anaerobic respiration



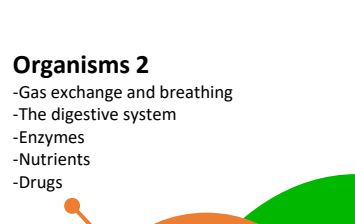
Organising an ecosystem
 -Feeding relationships
 -Materials cycling
 -The carbon cycle
 -Rates of decomposition



Adaptations, interdependence & competition
 -Communities
 -Organisms in their environment
 -Distribution of organisms
 -Competition in animals and plants
 -Adaptation in plants and animals



Non-communicable diseases
 -Cancer
 -Smoking
 -Diet, exercise & diseases
 -Alcohol & other carcinogens



Preventing & treating diseases
 -Vaccination
 -Antibiotics
 -Discovering & developing drugs
 -Pathogens & disease
 -Making monoclonal antibodies
 -Uses of monoclonal antibodies

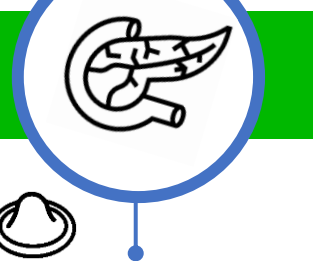


Communicable diseases
 -Health & diseases
 -Pathogens & disease
 -Growing bacteria/Preventing bacterial growth
 -Preventing infections
 -Bacterial, viral, fungal & protist diseases
 -Human defenses
 -Plant diseases & defenses

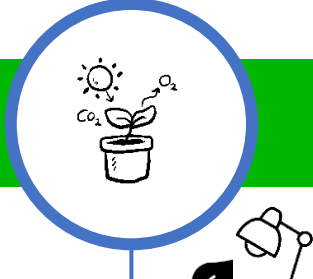


Cell division
 -Cell division
 -Cell differentiation
 -Stem cells
 -Stem cell dilemmas

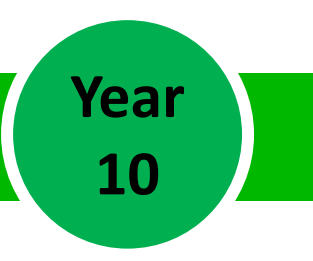
Cell structure & transport
 -Microscopes
 -Animal & plant cells
 -Eukaryotic & prokaryotic cells
 -Specialised cells
 -Transport in cells



Hormonal coordination
 -Principles of hormonal coordination
 -Control of blood glucose level
 -Treating diabetes
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 -Human reproduction
 -Hormones & the menstrual cycle
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 -Plant hormones & responses



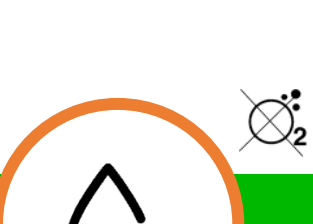
Photosynthesis
 -Photosynthesis
 -Rate of photosynthesis
 -How plants use glucose



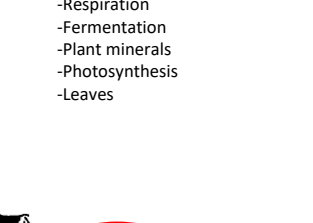
Organisation & the digestive system
 -Tissues and organs
 -The digestive system
 -The chemistry of food
 -Catalysts and enzymes



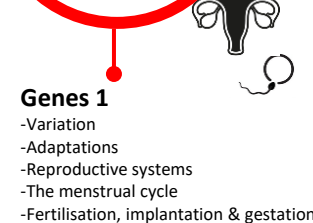
Organising animals & plants
 -The blood, blood vessels
 -The heart
 -Breathing & gas exchange
 -Tissues and organs in plants
 -Transport systems in plants
 -Evaporation & transpiration



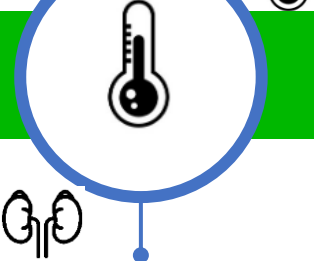
Reproduction
 -Types of reproduction
 -Cells division in sexual reproduction
 -DNA and the genome
 -DNA structure & protein synthesis
 -Gene expression & mutation
 -Inheritance in action
 -Inherited disorders & genetic screening



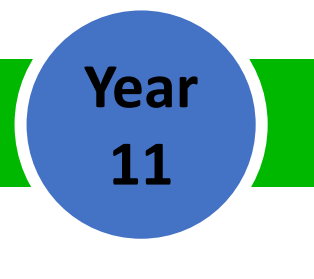
Genetics & evolution
 -The history of genetics
 -Theories of evolution
 -Accepting Darwin's ideas
 -Evolution & speciation
 -Evidence for evolution
 -Fossils & extinction
 -Antibiotic resistant bacteria
 -Classification



Variation & evolution
 -Variation
 -Evolution
 -Selective breeding
 -Genetic engineering
 -Cloning
 -Ethics of genetic technologies



Hormonal coordination
 -Controlling body temperature
 -Removing waste products
 -The human kidney
 -Dialysis
 -Kidney transplants



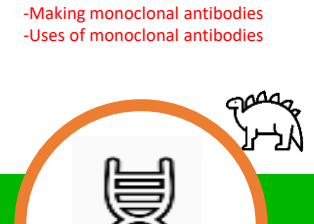
Biodiversity & ecosystems
 -The human population
 -Land, water, air pollution
 -Deforestation & peat destruction
 -Global warming
 -The impact of change
 -Maintaining biodiversity
 -Trophic levels & biomass
 -Food production; efficiency & sustainability



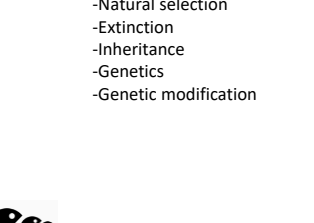
Year 11



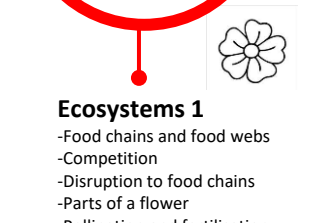
Year 10



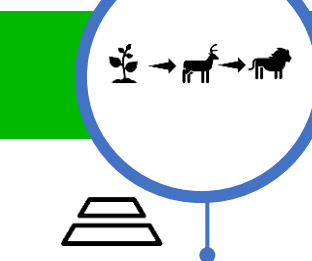
Year 9



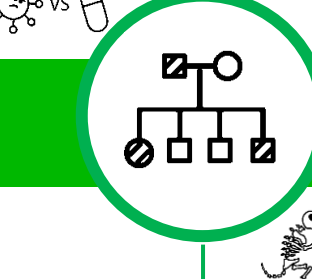
Year 8



Year 7



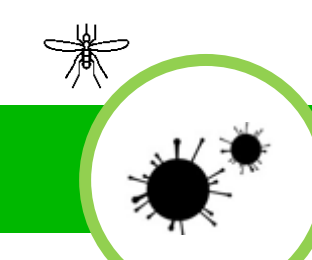
Year 12/13



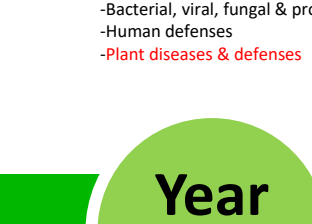
Year 11



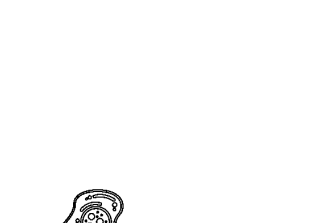
Year 10



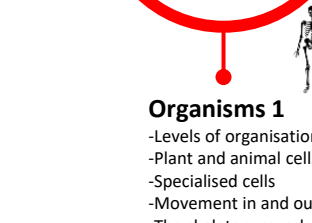
Year 9



Year 8



Year 7



Year 6



Year 12/13

Year 11

Year 10

Year 9

Year 8

Year 7

Year 6

welcome

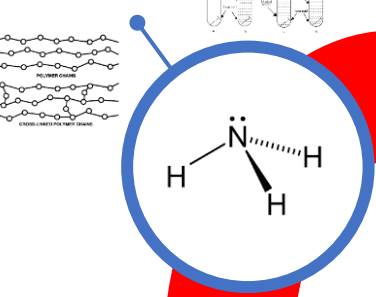


CHEMISTRY LEARNING JOURNEY

(Chemistry only)

Using our resources

- Rusting
- Useful alloys
- Properties of polymers
- Glass, ceramics & composites
- Haber process
- Making fertilisers



Year 12/13

Organic Chemistry

- Introduction to organic chemistry
- Alkanes, halogenoalkanes, alkenes & alcohols
- Organic analysis
- Optical isomerism
- Aldehydes, ketones & carboxylic acid
- Aromatic chemistry, amines & polymers
- Amino acids, proteins & DNA
- Organic synthesis
- Nuclear magnetic resonance spectroscopy
- Chromatography

Inorganic Chemistry

- Periodicity
- Group 2, the alkaline earth metals & Group 7(17), the halogens
- Properties of Period 3 elements and their oxides
- Transition metals
- Reactions of ions in aqueous solution

Physical chemistry

- Atomic structure
- Amount of substance
- Bonding
- Energetics
- Kinetics
- Chemical equilibria, Le Chatelier's principle and K_c
- Oxidation, reduction and redox equations
- Thermodynamics
- Rate equations
- Equilibrium constant K_p for homogeneous systems
- Electrode potentials and electrochemical cells
- Acids & bases

Year 11

Chemical analysis

- Pure substances & mixtures
- Analysing chromatograms
- Testing for gases
- Testing for positive & negative ions
- Instrumental analysis

Chemical calculations

- Relative masses & moles
- Equations & calculations
- Yield & atom economy
- Expressing concentrations
- Rates of decomposition
- Titrations
- Volumes of gases

Polymers

- Addition polymerisation
- Condensation polymerisation
- Natural polymers
- DNA

Organic reactions

- Reactions of alkenes
- Structure of alcohols, acids & esters
- Reactions & uses of alcohols
- Carboxylic acids and esters

Crude oil & fuels

- Hydrocarbons
- Fractional distillation
- Burning hydrocarbons
- Cracking hydrocarbons

Rates and equilibrium

- Rate of reaction
- Collision theory
- Effect of temperature, concentration & pressure
- The effect of catalysts
- Reversible reactions
- Dynamic equilibrium & altering conditions

Year 10

Chemical changes

- Reactivity series
- Displacement reactions
- Extracting metals
- Salts from metals & insoluble bases
- Making salts
- Neutralisation & the pH scale
- Strong & weak acids

Electrolysis

- Introduction to electrolysis
- Changes at the electrodes
- The extraction of aluminium
- Electrolysis of aqueous solutions

Energy changes

- Exothermic & endothermic reactions
- Reaction profiles
- Bond energy calculations
- Chemical cells and batteries
- Fuel cells

The Periodic Table

- Development of the periodic table
- Group 1 and 7
- Transition metals
- Explaining trends

The Earth's resources

- Finite & renewable resources
- Water safe to drink
- Treating wastewater
- Extracting metals
- Life cycle assessments
- Reduce, recycle, reuse

The Earth's atmosphere

- History of the atmosphere
- Our evolving atmosphere
- Greenhouse gases
- Global climate change
- Atmospheric pollutants

Structure & bonding

- States of matter
- Ionic bonding & giant ionic structures
- Covalent bonding & simple molecules
- Giant covalent structures
- Fullerenes & graphene
- Bonding in metals & giant metallic structures
- Nanoparticles

Year 9

Reactions 2

- Conservation of mass
- Combustion
- Thermal decomposition
- Exothermic & endothermic
- Energy level diagrams
- Bond energies

Earth 2

- Global warming
- The carbon cycle
- Climate change
- Extracting metals
- Recycling

Atomic structure

- Atoms & atomic structure
- Electronic structure
- History of the atom
- Chemical equations
- Separating mixtures
- Fractional distillation & chromatography

Year 8

Earth 1

- Structure of the Earth
- Ceramics
- Properties of ceramics

Reactions 1

- Chemical reactions
- Acids, alkalis, indicators, pH & neutralisation
- Making salts
- Reactions of metals & non-metals
- Reactions of metals & acids, oxygen & water
- Displacement reactions

Matter 1

- Particle model
- States of matter & changing state
- Diffusion
- Pressure
- Elements, compounds & mixture
- Separating mixtures

Year 7

welcome



PHYSICS LEARNING JOURNEY

(Physics only)

- Measurements and their errors
- Particles and radiation
- Waves
- Mechanics and materials
- Electricity
- Further mechanics and thermal physics
- Fields and their consequences
- Nuclear physics
- Optional topic: astrophysics, medical physics, engineering, turning points, electronics

Electricity in the home

- Alternating current
- Cables & plugs
- Electrical power & potential difference
- Electrical currents & energy transfer
- Appliances & efficiency

$\rho = \frac{m}{V}$

Molecules & matter

- Density
- States of matter
- Changes of state
- Internal energy
- Specific latent heat
- Gas pressure & temperature
- Gas pressure & volume

Electromagnetism

- Magnetic fields
- Magnetic fields & electric current
- Electromagnets in devices
- The motor effect
- The generator effect & A.C generators
- Transformers

Year 12/13

Electric circuits

- Electrical charges & fields
- Current & charge
- Potential difference & resistance
- Component characteristics
- Series & parallel circuits

Year 11

Force & pressure

- Pressure & surfaces
- Pressure in liquids
- Atmospheric pressure
- Upthrust & floatation

Force & motion

- Forces & acceleration
- Weight & terminal velocity
- Forces & braking
- Momentum
- Conservation of momentum
- Impact forces & safety
- Forces & elasticity

Motion

- Speed & distance time graphs
- Velocity & acceleration
- Velocity-time graphs
- Analysing motion graphs

Radioactivity

- Atoms & radiation
- The discovery of the nucleus
- Changes in the nucleus
- Alpha, beta & gamma radiation
- Activity & half life
- Use of radiation in medicine
- Nuclear fission & fusion
- Nuclear issues

Year 10

Conservation of energy

- Energy stores
- Conservation of energy
- Energy & work
- Gravitational potential energy
- Kinetic & elastic energy
- Energy dissipation
- Energy & efficiency
- Energy & power

Energy transfer by heating

- Energy transfer
- Infrared radiation
- Specific heat capacity
- Heating and insulating building

Forces in balance

- Vectors & scalars
- Forces between objects
- Resultant forces
- Moments, levers & gears
- Centre of mass
- Parallelogram of forces
- Resolving forces

Energy resources

- Energy demands
- Energy from wind & water
- Power from the Sun & the Earth
- Energy & the environment
- Energy issues

Space

- Formation of the Solar System
- Lifecycle of a star
- Planets, satellites & orbits
- The expanding Universe
- The beginning & future of our universe

Light

- Reflection
- Refraction
- Light & colour
- Lenses
- Using lenses

Electromagnetic waves

- The electromagnetic spectrum
- Light, infrared, microwaves & radio waves
- Communications
- Ultraviolet, X-rays & gamma rays

Wave properties

- The nature of waves
- Properties of waves
- Reflection & refraction
- Sound waves
- Uses of ultrasound
- Seismic waves

Year 8

Energy 2

- Work, energy & machines
- Energy & temperature
- Energy transfers: particles
- Energy transfers: radiation & insulation

Forces 2

- Friction & drag
- Squashing & stretching
- Turning forces
- Pressure in gases & liquids
- Stress on solids

Electromagnets 2

- Magnets & magnetic fields
- Electromagnets
- Using electromagnets

Year 9

Electromagnets 1

- Potential difference
- Resistance
- Series & parallel circuits
- Current
- Charge

Forces 1

- Introduction to forces
- Balanced & unbalanced forces
- Gravity
- Speed
- Distance-time graphs

Earth 1

- The night sky
- The Solar System
- The Moon & changing ideas
- The Universe

Energy 1

- Food & fuels
- Energy resources
- Energy & power
- Conservation of energy
- Energy dissipation

Year 7



welcome