QueenElizabeth's School

Faculty: Science

Subject Area: Science

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Queen Elizabeth's School QE SCIENCE

YR9 - SCIENCE

1

B1 Cell biology, C2 Bonding, P1 Energy

- Animal and plant cells
- Diffusion
- Atomic structure
- Covalent, ionic and metallic bonding
- Renewable and non-renewable energy resources

2

C1 Atomic structure and the periodic table, P3 Particle Model

- Groups and periods
- Development of the periodic table
- Solids, liquids and gases
- Changes of state
- Density

3

B2 Organisation, C4 Chemical changes, C5 Energy changes

- Circulatory system
- Digestive system
- Reactions of metals and acids
- pH
- Endothermic and exothermic reactions

4

P5 Forces and Motion, C6 Rate of Reaction

- Scalars and vectors
- Forces
- Work done
- Moments
- Collision theory and rates of reaction

5

B4 Bioenergetics, C9 Chemistry of the atmosphere, C7 Organic chemistry, P1 Energy

- Photosynthesis
- Greenhouse gases
- Alkanes and alkenes
- Energy stores and transfers
- Efficiency

6

C3 Quantitative chemistry, P3 Particle Model, C1 Atomic structure and the periodic table

- Group trends
- Changes of state
- Pressure in gases

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GCSE (YEAR 10) - SCIENCE

1

B4 Bioenergetics, C2 Bonding, P2 Electricity

- Respiration
- Metabolism
- Covalent, ionic and metallic bonding
- Current, charge, potential difference and resiatnce
- National grid

2

B3 Infection and Response, C3 Quantitative Chemistry, P4 Atoms and Radiation

- Communicable and non-communicable diseases
- Vaccines
- Calculations of moles and concentration
- Atomic structure
- Alpha, beta and gamma radiation

3

B7 Ecology, C3 Quantitative Chemistry, P2 Electricity

- Populations
- Competition
- Water cycle
- Calculations of moles and concentration
- Balancing equations
- I-V characteristics

4

C4 Chemical Changes, P5 Forces and Motion

- Metals and acids
- pH
- Extraction processes
- Titrations (triple only)
- Distance, displacement, speed and velocity
- Acceleration

5

B5 Homeostasis and Response, C5 Energy Changes, C6 Chemical Changes, P6 Waves

- Nervous system
- Reflex action
- Exothermic and endothermic reactions
- Types of waves
- Waves at a boundary

6

C7 Organic (TRIPLE ONLY), P8 Space (TRIPLE ONLY)

- Alkanes and alkenes
- Alcohols
- Carboxylic acids
- Solar system
- Star cycles
- Big bang

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GCSE (YEAR 11) - SCIENCE

7

B5 Homeostasis and Response, C2 Bonding, C9 Chemistry of the Atmosphere, P5 Forces and Momentum

- Hormones
- Reproductive system
- Fertility
- Extraction processes
- Climate change
- Newton's Las of Motion
- Momentum

8

B5 Homeostasis and Response, C7 Organic Chemistry, P6 Waves (TRIPLE ONLY)

- Contraception
- Plat reproductive systems (TRIPLE ONLY)
- Fractional distillation
- Potable water
- Ultrasound
- Seismic waves
- Black body radiation

9

B6 Inheritance, Variation and Evolution, C8 Chemical Analysis, C9 Chemistry of the Atmosphere, P7 Magnetism

- Genes and meiosis
- Evolution
- Pure substances and formulations
- Haber Process (TRIPLE ONLY)
- Electromagnetism

10

B6 Inheritance, Variation and Evolution, C10 Using Resources, P7 Magnetism

- Genetic engineering
- Classification
- Potable water
- The motor effect
- The generator effect (TRIPLE ONLY)

11

Revision

- Remaining time will be for revision and revisiting topics to prepare for the examination

12

Examination

GCSE exams include questions that allow students to demonstrate their ability to: draw together their knowledge, understanding and skills from across the full course of study as well as provide extended responses.

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ALEVEL - PHYSICS

Queen Elizabeth's School QE SCIENCE

Particles and Quantum

- The standard model
- Annihilation and pair production
- Conservation rules
- Feynman diagrams
- Photoelectric effect
- Wave-particle duality

Mechanics

- Scalars and vectors
- Principle of Moments
- Statics calculations
- Acceleration
- SUVAT equations
- Motion graph
- Acceleration due to gravity
- Projectile motion

Materials

- Density
- Stress and strain
- Young's modulus

Electricity

- Current, potential difference and charge
- Circuit rules
- Resistivity
- EMF and internal resistance
- Potential dividers

Mechanics

- Newton's Laws of Motion
- Terminal velocity
- Momentum and impulse
- Kinetic and potential energy
- Energy resources

Waves

- Types of waves
- Phase difference
- Constructive and destructive interference
- Stationary waves

Optics

- Refraction
- Total internal reflection
- Optical fibres
- Double slit diffraction
- Single slit diffraction
- Diffraction gratings

Circular Motion

- Centripetal force
- Centripetal acceleration
- Vertical and horizontal centripetal acceleration

Simple Harmonic Motion

- Oscillations
- Sine functions
- Simple pendulum
- Mass-spring system
- Damping

Thermal Physics and Gases

- Specific heat capacity
- Specific latent heat
- Ideal gases
- Kinetic theory

Gravitational fields

- Newton's law of gravitation
- Gravitational field strength
- Gravitational potential
- Satellites

Electric fields

- Coulombs law of electrostatic force
- Electric field strength
- Electric potential

Capacitors

- Energy stored by a capacitor
- Charging and discharging a capacitor

Magnetic Fields

- Motor effect
- Charged particles in a magnetic field

Electromagnetic Induction

- Lenz's and Faraday's Law
- Magnetic flux linkage
- Transformers

Radioactivity

- Discovery of the nucleus
- Alpha, beta and gamma radiation
- Radioactive decay
- Carbon dating
- Nuclear radius and density

Nuclear Physics

- Binding energy
- Nuclear fusion and fission

Turning Points

- Discovery of the electron
- Wave particle duality
- Einstein's theory of special relativity

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ALEVEL - CHEMISTRY

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Development of practical skills

- Practical skills demonstrated via written assessments
- Practical skills demonstrated via observation of practical investigations to include determining formula of compounds, determining molar mass of an acid and rate of reactions.

Foundations in chemistry

- Atomic structure, isotopes and electron structure
- Compounds, formulae & equations
- Quantitative chemistry to include determining the amount of a given substance
- Acids & redox reactions
- Bonding & structure

Energy Part 1

- Rates & equilibrium

Periodic table

- Periodicity
- Qualitative analysis including practical investigation
- Group 2 & halogens

Energy Part 2

- Enthalpy changes to include practical investigation

Organic Part 1

- Basic concepts
- Alkanes & alkenes
- Alcohols
- Synthesis of organic liquid

Organic Part 2

- Haloalkanes
- Synthesis of organic solid
- Aromatics

06. Geographical skills

- Cartographic Skills
- Graphical Skills
- Statistical Skills

Physical chemistry & transition elements Part 1

- Rate of reactions & quantitative approach to equilibrium
- Acids, bases & buffers

Energy Part 3

- Lattice enthalpy
- Enthalpy & entropy

Organic Part 3

- Aromatics & carbonyls
- Nitrogen compounds

Physical chemistry & transition elements Part 2

- Redox & electrode potentials
- d-block elements

Organic Part 4

- Polymers
- Organic synthesis
- Chromatography & qualitative analysis
- NMR

Organic Part 5

- Further work on spectroscopy

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ALEVEL - BIOLOGY

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Biological Molecules

- Molecular bonding
- Monosaccharides, disaccharides and polysaccharides
- Lipids
- Proteins

Enzymes

- Enzyme structure and function
- Tangents
- Inhibition

Cell structure

- Eukaryotic and Prokaryotic cells
- Viruses
- Microscopes and calculations

Transport across membranes

- Diffusion, osmosis and active transport
- Digestion and absorption

Mass transport

- Mammalian transport systems
- Tissue Fluid
- Plant transport systems

Exchange

- Mechanisms of exchange in insects, fish and plants
- Human Gas exchange
- Lung diseases

Nucleic acids

- DNA and RNA
- ATP and water
- Ions

DNA

- Protein synthesis
- Mutations

Immunity

- Phagocytosis and lymphocytes
- Vaccination

Genetic diversity

- Meiosis
- Natural selection and evolution
- Antibiotics

Biodiversity

- Classification
- Biodiversity

Energy and Ecosystems

- Nutrient cycles

Populations in ecosystems

- Biotic and Abiotic factors
- Log Scales
- Succession and conservation

Photosynthesis

- Light dependent reaction
- Light Independent reaction

Respiration

- Glycolysis
- Link and Krebs
- Oxidative Phosphorylation

Response and stimuli

- Receptors
- Reflex arc
- Plant growth factors

Nervous system

- Action potential
- Synapses
- muscles

Homeostasis

- Negative and positive feedback
- Glucose control
- Kidneys

Inherited change

- Inheritance crosses
- Codominance
- Epistasis

Gene expression

- Cancer
- Stem cells
- Epigenetics

Recombinant DNA

- In vivo and in vitro cloning
- Gene therapy
- Genetic fingerprinting
- GM

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