COWLEY INTERNATIONAL COLLEGE UPPER SCHOOL LEARNING JOURNEY

KS4 BIOLOGY



Sixth form

11. Cell division

Mitosis, cell differentiation.

stem cells, stem cell research

14. Genetics and evolution

Charles Darwin, Jean-Baptiste Lamarck, Speciation, fossils, extinction, Antibiotic resistant bacteria, Carl Linnaeus, Carl Woese

12. Reproduction

Sexual and asexual reproduction, meiosis in gamete production, DNA and the genome, DNA structure and protein synthesis, gene expression and mutation, Mendelian genetics, sex inheritance, cystic fibrosis, polydactyl, genetic screening

10. Cells and

Eukaryotic and prokaryotic cells, light and electron microscopes, magnification calculations, diffusion, osmosis, active transport

organisation

9. Biodiversity and ecosystems

Pollution, deforestation, peat bog destruction, global warming, food security and sustainable food production, 13. Variation and evolution

Natural selection, selective breeding, genetic engineering, cloning by tieeus culture, adult cell cloning, ethics of genetic technologies

Year 11

6. Homeostasis in action

Temperature control, water control, the kidney, kidney transplants

7. Adaptations, interdependence and competition

Biotic and abiotic factors, sampling using quadrats, belt transects, survival in animals and plants

5. Hormonal coordinartion

Controlling blood sugar, diabetes, negative feedback, menstrual cycle, fertility, plant hormones

2. Photosynthesis

Writing photosynthesis as an equation,, Reasons plants need to make glucose, measuring the rate of photosynthesis, starch test, farmers and economics

8. Organising an ecosystem

Energy flow in food webs, predator-prey cycles, pyramid of biomass, energy transfer between organisms, carbon cycle, decay, rates of decomposition

4. The human nervous system

Homeostasis, reflex actions, the brain, the eye

3. Respiration

Aerobic, anaerobic, the response to exercise, oxygen debt, metabolism

Non communicable diseases

Smoking, alcohol, ionizing radiation, cancer

Year 10

COWLEY INTERNATIONAL COLLEGE UPPER SCHOOL LEARNING JOURNEY

KS4 CHEMISTRY



12. Using our resources

Rusting, useful alloys, the properties of polymers, glass, ceramics and composites, making ammonia, the economics of the Haber process, making fertilisers in the lab, making fertilisers in industry



10. The Earth's atmosphere

The History of our atmosphere, our evolving atmosphere, greenhouse gases, global climate change, atmospheric pollutants

9. Chemical analysis

Pure substances and mixtures, chromatogram analysis, testing gases, testing positive ions, testing negative ions, instrumental analysis

8. Polymers

Addition polymerization, condensation polymerization, natural polymers, DNA

Earth's resources

11. The

Finite and renewable resources, water safe to drink, treating waste water, extracting metals from ores, Life cycle assessments, reduce reuse recycle.

Year 11

7. Organic

reactions

Reactions of the

alkenes, structure

of alcohol, carboxylic acid and the esters, reactions and uses of alcohols,

5. Rates of equilibrium

Collision theory and rate of reaction, the effect of temperature, catalysts, concentration and pressure, reversible reactions, dynamic equilibrium, La Chatelier's principle

6. Crude oil and fuels

Hydrocarbons, fractional distillation of oil, burning hydrocarbon fuels, cracking

4. Energy changes

Endothermic and exothermic reactions, using the energy from reactions, reaction profiles, bond energy calculations, chemical cells, batteries and fuel cells

2. Chemical calculations

Relative masses and moles. Balancing equations, the yield of a chemical reaction, atom economy, titrations, volume of gases and the law of the conservation of mass.

Year 10

3. Electrolysis

Electrolysis and the changes at the electrode, the extraction of aluminium, electrolysis of aqueous solutions

1. Periodic table.

The development of the periodic table and what you can learn about an element just by its position on the periodic table. The Alkali metals, halogens and transition metals

COWLEY INTERNATIONAL COLLEGE UPPER SCHOOL LEARNING JOURNEY

KS4 PHYSICS





10. Space

Formation of the solar system, The life history of a star, planets, satellites and orbits, the expanding universe, the beginning and future of your universe

7. Force and pressure

Pressure and surfaces, pressure in liquid at rest, atmospheric pressure, upthrust and flotation,

8. Motion

Speed, distance-time graphs, velocity, acceleration, analysis motion-time graphs

6. Forces in balance

Forces, vectors and scalars, resultant forces, moments at work, levers and gears, centre of mass, moments and equilibrium, parrallelogram of forces, resolution of forces

3. Electricity in the home

Alternating current, cables and plugs, power and potential difference, electrical currents and energy transfer, appliances and efficiency.

4. Electromagnetism

Magnetic fields, electromagnets, the motor effect, the generator effect, the AC generator, transformers.

2. Electric circuits

Component characteristics in series and parallel circuits. Calculating "charge" and "Resistance" using an equation.

9. Force and motion

Force and acceleration, weight and terminal velocity, forces and braking, momentum, using conservation of mass, impact forces, safety, forces and elasticity

Year 11

5. Radioactivity

Atoms and radiation, the discovery of the nucleus, alpha, beta and gamma radiation, half life, nuclear fission, nuclear fusion, nuclear radiation in medicines, nuclear issues

Year 10

1. Electro- magnetic waves

The electromagnetic spectrum. Light, infrared, microwaves radiowaves, UV waves, Xrays and gamma rays. Waves in communication and medicine.