Contents

T	Biology
Topic 1 Biology	
	Eukaryotes and prokaryotes
	Animal and plant cells
	Microscopy
	Using a light microscope
	Cell specialisation and differentiation
	Mitosis and the cell cycle Stem cells
	Diffusion
	Osmosis
	Investigating the effect of a range of concentrations
	of salt or sugar solutions on the mass of plant tissue
	Active transport
opic 2 Biology	TISSUES, ORGANS AND ORGAN SYSTEMS
	The human digestive system
	Enzymes
	Using qualitative reagents to test for a range
	of carbohydrates, lipids and proteins
	The effect of pH on amylase
	The heart
	The lungs
	Blood vessels and blood
	Coronary heart disease
	Health issues and effect of lifestyle
	Cancer
	Plant tissues
	Transpiration and translocation
Topic 3 Biology	
	Communicable (infectious) diseases
	Viral and bacterial diseases
	Fungal and protist diseases
	Human defence systems and vaccination
	Antibiotics and painkillers
	New drugs
opic 4 Biology	
	Photosynthesis
	Rate of photosynthesis
	Investigating the effect of light intensity on the rate of photosynthesis Uses of glucose
	Respiration and metabolism
	Response to exercise
opic 4 Biology	HOMEOSTASIS AND RESPONSE
pic 4 biology	Homeostasis
	The human nervous system and reflexes
	Investigating the effect of a factor on human reaction time
	Human endocrine system
	Control of blood glucose concentration
	Diabetes
	Hormones in human reproduction
	Contraception
	Using hormones to treat infertility
	Negative feedback

INHERITANCE, VARIATION AND EVOLUTION

Sexual and asexual reproduction	55
Meiosis	56
DNA and the genome	57
Genetic inheritance	58
Inherited disorders	59
Variation	60
Evolution	61
Selective breeding	62
Genetic engineering	63
Classification	64

ECOLOGY

Communities	65
Abiotic factors and biotic factors	66
Adaptations	67
Food chains	68
Measuring the population size of a species	69
The carbon cycle and water cycle	70
Biodiversity	71
Global warming	72
Maintaining biodiversity	73

Chemistry

ATOMIC STRUCTURE AND THE PERIODIC TABLE	
Atoms, elements and compounds	
Mixtures and compounds	
Scientific models of the atom	
Atomic structure, isotopes and relative atomic mass	
The development of the periodic table and the noble gases	
Electronic structure	
Metals and non-metals	
Group 1 – the alkali metals	
Group 7 – the halogens	

BONDING, STRUCTURE AND THE PROPERTIES OF MATTER

Bonding and structure	83
lons and ionic bonding	84
The structure and properties of ionic compounds	85
Covalent bonds and simple molecules	86
Diamond, graphite and graphene	87
Fullerenes and polymers	88
Giant metallic structures and alloys	89

QUANTITATIVE CHEMISTRY

Conservation of mass and balancing equations	
Relative formula masses	
The mole and reacting masses	
Limiting reactants	
Concentrations in solutions	

CHEMICAL CHANGES

Metal oxides and the reactivity series	97
Extraction of metals and reduction	98
The reactions of acids	99
The preparation of soluble salts	100
Oxidation and reduction in terms of electrons	101
pH scale and neutralisation	102
Strong and weak acids	103

Topic 6 Biology

Topic 7 Biology

Topic 1 Chemistry

Topic 2 Chemistry

Topic 3 Chemistry

Topic 4 Chemistry

	Electrolysis
	The electrolysis of aqueous solutions
	The extraction of metals using electrolysis Investigation of the electrolysis of aqueous solutions
opic 5 Chemistry	ENERGY CHANGES
	Exothermic and endothermic reactions
	Investigation into the variables that affect temperature changes in chemical reactions
	Reaction profiles
	The energy changes of reactions
opic 6 Chemistry	RATES OF REACTION AND EQUILIBRIUM
	Ways to follow a chemical reaction
	Calculating the rate of reaction
	The effect of concentration on reaction rate and the effect
	of pressure on the rate of gaseous reactions Rates of reaction – the effect of surface area
	The effects of changing the temperature and adding a catalyst
	Investigation into how changing the concentration affects the rate of reaction
	Reversible reactions
	The effect of changing conditions on equilibrium
opic 7 Chemistry	ORGANIC CHEMISTRY
	Alkanes
	Fractional distillation
opic 8 Chemistry	CHEMICAL ANALYSIS
	Pure substances and formulations
	Chromatography Testing for gases
opic 9 Chemistry	CHEMISTRY OF THE ATMOSPHERE
	The composition and evolution of the Earth's atmosphere Climate change
	The carbon footprint and its reduction
	Atmospheric pollutants
ic 10 Chemistry	USING RESOURCES
	Finite and renewable resources, sustainable development
	Life cycle assessments (LCAs)
	Alternative methods of copper extraction
	Making potable water and waste water treatment Ways of reducing the use of resources
	Ways of reducing the use of resources
	Physics
Topic 1 Physics	ENERGY
	Energy stores and systems
	Changes in energy stores: kinetic energy
	Changes in energy stores: elastic potential energy
	Changes in energy stores: gravitational potential energy
	Energy changes in systems: specific heat capacity
	Power Energy transfers in a system
	Efficiency

Contents

ELECTRICITY	_
Standard circuit diagram symbols	146
Electrical charge and current	147
Current, resistance and potential difference, and resistors	148
Series and parallel circuits	150
Mains electricity: direct and alternating potential difference (dc/ac)	151
Mains electricity	152
Electrical power (with electrical devices)	153
Energy transfers in appliances	154
The National Grid	155

PARTICLE MODEL

Particle model of matter and density of materials	157
Changes of state and internal energy	158
Changes of temperature and specific latent heat	159
Particles motion in gases (1)	160
Particle motion in gases (2)	161

ATOMS

The structure of the atom (1)	
The structure of the atom (2)	
Developing a model of the atom	
Radioactive decay and nuclear radiation	
Nuclear equations	
Half-life of radioactive elements	
Hazards and uses of radioactive emissions (1)	
Hazards and uses of radioactive emissions (2)	
Hazards and uses of radioactive emissions (3)	

FORCES

Forces and their interactions	
Gravity	
Resultant forces	
Work done and energy transfer	
Forces and elasticity	
Distance, displacement, speed and velocity	
Acceleration	
Newton's laws of motion	
Stopping distance	
Momentum (1)	
Momentum (2)	

WAVES

Transverse and longitudinal waves	185
Properties of waves	186
Electromagnetic waves (1)	187
Electromagnetic waves (2)	188

ELECTROMAGNETISM

Magnetism	189
Electromagnetism	190
	101
Biology Paper 1	191
Chemistry Paper 1	198
Physics Paper 1	205
Answers	212

Topic 2 Physics

Topic 3 Physics

Topic 4 Physics

Topic 5 Physics

Topic 6 Physics

Topic 7 Physics