

Information for Prospective Year 12 Students to Latymer School Studying Science Subjects

Latymer students follow the AQA Science and Additional Science GCSE programmes. If you have been offered a place at Latymer to study sciences, and you have completed the above courses or AQA single subject science courses, you will be well prepared for the AS level courses at Latymer.

If you have **not** studied the AQA courses, in order to make the transition to science courses at Latymer as smooth as possible, and to ensure that you do not struggle, the attached documents will help.

I would strongly suggest that you look at the AQA website and attempt some of the Science B and Additional Science past papers that are available there.

http://www.aqa.org.uk/qual/newgcse/science/new/scienceb_materials.php?id=03&prev=03&tabid=2

http://www.aqa.org.uk/qual/newgcse/science/new/add_materials.php?id=03&prev=03

Mr B Berndes
Head of Science

Physics

Attached you will find a list of topics covered at GCSE by the AQA course, many of them will be familiar to you. If not you should read up on them. I would suggest '*Physics For You*' by Keith Johnson, or the Hodder *AQA GCSE Physics* text book by Graham Hill.

It is important that you can cope with the application of formulae, particularly in the Motion, Energy and Current Electricity topics.

Biology:

The list attached covers all the topics studied in Biology for both Science and Additional Science. The text book used for biology is the Hodder *AQA GCSE Biology* (Houghton and Woodward) but any up to date text geared towards AQA will cover the material, alternatively '*Biology For You*' is good as a general textbook. It is important that you have a good understanding of the basic principles of biology: osmosis, diffusion, enzyme action and cellular structure and that you are able to interpret figures for example rate or reaction and frequency graphs.

Chemistry

Attached you will find a list of topics covered in Chemistry classes for the AQA Science & Additional Science GCSEs. If you are not familiar with any of the topics then you should read up on them. I would suggest Hodder *AQA GCSE Chemistry* by Graham Hill.

It is important that you can cope with quantity calculations from the Additional Science GCSE.

Science

Useful Electricity

Advantages and disadvantages of electrical devices
Power, Kilowatt hour and cost of Electricity
Examples of everyday devices and their energy transfers
National Grid
Use of Transformers and reason for high voltage

Generating Electricity

How a Power station generates electricity
Advantages/disadvantages of different types of Power station
Renewables/nonrenewables
Different types of renewables
Social/economic/environmental issues

Origins of Universe

Different types of telescopes, advs and disadvs
Doppler Effect and Red Shift
Big Bang Theory and evidence

Electromagnetic Spectrum

Regions of EM Spectrum
Hazards and precautions associated with each region
Uses of each region
Reflection/absorption/transmission of different regions by different materials
Effect on cells
Use of EM in communication, advantages and disadvantages
Digital and Analogue
Wave equation, link speed, frequency and wavelength

Radioactivity

Structure of an atom, Isotopes
Detection of radioactivity
Natural and background radiation
Types of Radiation and their different properties
Dangers and precautions
Radioactive Decay and Time (Half Life)
Uses of radioactivity

Energy

Types of Energy
Energy Transfers
Conservation of Energy
Useful and wasted energy
Work done
 $gpe = \text{weight} \times \text{height} = mgh$
Efficiency
Power
Conduction, Convection, Radiation
Heat loss in home
Design to reduce or increase heat loss

Additional

Motion

Speed and velocity
Use of Light gates
Acceleration
Use distance - time graphs
Use Speed – time graphs
Resultant, (unbalanced), force
Newtons First law and applications
Inertia
Newtons Second law ($F=ma$) and applications
Newtons Third law (Action and Reaction) and applications
Weight and mass, $W = mg$
Work done
 $gpe = \text{weight} \times \text{height} = mgh$
Kinetic Energy
Momentum and Rockets and collisions
Impulse and crumple zones

Radioactivity

Ions
Know Science material as well
Origins of Background Radiation
Masses of alpha beta and gamma
Structure of Atom related to types of radiation
Changes to atoms in decay
Rutherford Scattering
Dangers and precautions
Fission and Fusion **DETAIL NEEDED**

Mains Electricity

Wiring and parts of a plug, electric cable structure
Fuses and how they work
Earthing, Double Insulation
Safe use of mains electrical devices
AC and DC, Using an oscilloscope

Static and Current Electricity

Producing static by rubbing
Attraction and repulsion
Uses and dangers of static
Flow of charge to ground, conductors v insulators
Electric current, in series and parallel
Circuit diagrams and symbols
Potential difference
I – V curves for different devices, Resistance, $R = V/I$
Effect of temp on resistance
Resistors in series and parallel
Power current voltage formula and calculations
Voltage, energy, Charge formula and calculations

Topics covered in GCSE Biology

Unit	Spec.	Key topics
Physiology	Core and Additional	Skeleton Muscle action Breathing and lungs Circulation Heart
Health	Core	<p>Drugs: Types Nerves and synapses Alcohol Smoking Caffeine</p> <p>Diet: Balance diet (not burning food as they did this in yr 8!) Cholesterol Fast food Statins BMI</p> <p>Disease: Pathogens Defence mechanisms Immunity Selective toxicity and the development of new drugs Changing pathogens</p>
Ecology and human impact on the environment	Core	<p>Food chains and energy transfers Pyramids of numbers, biomass, energy Efficient farming techniques</p> <p>Carbon Cycle Climate change Acid Rain Deforestation Sustainability Bio-indicators</p>

Unit	Spec.	Key topics
Homeostasis	Core and additional	Nerves and synapses Reflex reactions Basic Osmoregulation and glucose control Menstrual cycle Contraception Thermoregulation Kidney and Osmoregulation Kidney failure
Enzymes	Additional	Enzyme theory Specificity Rates of reactions Enzymes in digestion Factors effecting enzymes Respiration Enzyme uses in industry
Natural selection and evolution	Core and Additional	Competition Adaptation Natural selection Evolution Extinction Genetic Engineering Cloning DNA structure Mitosis + Meiosis Inherited dis. E. Screening DNA fingerprinting
Photosynthesis	Additional	Leaf structure Photosynthesis equation Fates of glucose Starch in leaves Limiting factors Mineral uptake and uses Water uptake
Cells	Additional	Structure of Animal and Plant cells Specialised cells Organisation of cells and how systems supply the body.

Core Science Chemistry C1	Additional Science Chemistry C2
<p>How do rocks provide useful materials? Atoms, molecules, elements, compounds. Symbols, formulae, equations. Building materials & metals from rocks. Uses of Limestone.</p>	<p>How sub-atomic particles explain structure & reactions? Sub-atomic particles. Atomic no., mass & the Periodic Table. Empirical formulae & % composition. Bonding & electrons arrangements. Bonding, reactivity & the Periodic Table.</p>
<p>How does crude oil provide useful materials? Refining & cracking. Combustion Alkanes & alkenes. Polymers. Recycling. Development of alternative fuels Ethanol.</p>	<p>How do the structures of substances affect properties & uses? Particle packing. Atoms, ions & molecules. Giant & simple structures. Nano-materials.</p>
<p>How can plant oils be used? Culinary use. Extraction of plant oil. Additives. Health issues & food. Analysis of food. Bio-fuel.</p>	<p>How do we control rates of reaction & measure energy transfer? Calculations of chemical quantities. Atom economy & yield. Influence of temperature, pressure, concentration, surface area & catalysts. Collision theory. Measuring energy change. Equilibrium reactions & the Haber Process. Selection of reaction conditions.</p>
<p>What changes have occurred in the Earth & its atmosphere? Structure of the Earth. Tectonic theory. Evolution & composition of the atmosphere. Predicting change.</p>	<p>How can we use ions in solutions? Electrolytes. Crystallisation & precipitation. Acids, bases & neutralisation. Electrolysis, oxidation & reduction & its uses (water, brine, copper purification & aluminium production.)</p>