






# Tolworth Girls' School Curriculum Map

## Y7 Science



	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<h1>Y7</h1> <p>Due to Carousel, the topics from Autumn 2 will be taught on rotation.</p>  <p>6 Hours Per Fortnight</p>  <p><b>Brief Overview:</b> At the end of Year 7 students should be able to see the world analytically, to explain phenomena and make predictions – all skills they need for their next stage of scientific learning.</p>	<p><b>Knowledge</b> Working Scientifically</p>	<p><b>Knowledge</b> Cells Speed The Particle Model</p>	<p><b>Knowledge</b> Human Reproduction Plant Reproduction</p>	<p><b>Knowledge</b> Energy and Energy Transfer Separating Mixtures</p>	<p><b>Knowledge</b> Sound and Light Acids and Alkalis</p>	<p><b>Knowledge</b> Variation Interdependence STEM</p>
	<p><b>Skills</b> Analyse Communicate Enquire Solve</p>	<p><b>Skills</b> Use a light microscope to observe and draw cells Use the formula: speed = distance (m)/time (s) or distance-time graphs to calculate speed Use the formula: weight (N) = mass (kg) x gravitational field strength (N/kg). Measure melting points, boiling points etc.</p>	<p><b>Skills</b> Draw and annotate scientific diagrams</p>	<p><b>Skills</b> Calculate the useful energy and the amount dissipated, given values of input and output energy; Compare percentages of energy wasted by renewable energy sources; Evaluate analogies and explanations for the transfer of energy. Use techniques to separate mixtures.</p>	<p><b>Skills</b> Construct ray diagrams to show how light reflects off mirrors, forms images and refracts. Use pH probes and data loggers to log pH.</p>	<p><b>Skills</b> Make deductions based on data about what caused a change in the population of a species.</p>
<p><b>Assessment Opportunities</b></p>	<p><b>ASSESSMENT TASK</b> Graph skills</p>	<p><b>ASSESSMENT FORTNIGHT</b> 1 – written exam</p>	<p><b>ASSESSMENT TASK</b> Topic themed comprehension task</p>	<p><b>ASSESSMENT TASK</b> Topic themed comprehension task</p>	<p><b>ASSESSMENT FORTNIGHT</b> 2 – written exam</p>	<p><b>ASSESSMENT TASK</b> Topic themed comprehension task</p>
<p><b>Wider Learning</b></p> 	<p><b>PSHE: Health and wellbeing; Puberty and pregnancy; Relationships; Respecting equality and being a productive member of a diverse community, and living in the wider world.</b></p> <p><b>CEIAG: By the end of Year 7 students will have a better understanding of their strengths, achievements and weaknesses and support to evaluate how these might inform future choices in learning and work; a better understanding of the full range of 14-19 opportunities for progression; an understanding of some of the qualities, attitudes and skills needed for employability; used career resources to research information about opportunities and apply their findings to help make informed choices for Key Stage 4 options (Women in Science; People Like Me, I'm A Scientist).</b></p> <p><b>Enrichment: The Science of Health and Beauty Club; STEM Girls, Chemistry Club, Eco Club, Dissection Club, The Nobelles</b></p>			<p><b>Cross Curricular: Maths - magnification; use of data to make predictions; using formula for speed and gravity; plotting distance/time graphs. Art - observational drawings; solvents; chromatography; colours, refraction, transparent and translucent. Languages – prefix and suffix. Geography - terminology, water cycle, changes of state. Food Tech - boiling points, dissolving, solubility. History - using and evaluating sources and models; using and evaluating sources and models. Music - frequency, amplitude, pitch.</b></p> <p><b>Literacy &amp; Numeracy: Maths - magnification; use of data to make predictions; using formula for speed and gravity; plotting distance/time graphs.</b></p> <p><b>Diversity: Cells (Henrietta Lacks, Shinya Yamanaka, Abbas Ibn Firnas); Human reproduction (contraception in ancient Egypt and Mesopotamia, and Catholicism, Ben Barres – transgender scientist); variation (Al-Jahiz, Ibn Khaldun, Biruni); interdependence (Dr Goodall, Al-Tusi, biodiversity around the world, influence of religion in maintaining interdependence). Particle model (Abdus Salam, Chien-Shiung Wu); separating mixtures (James Harris); acids and alkalis (St Elmo Brady). Speed (Maglev bullet train in China); Energy (Nergis Mavalvala, Einstein (ASD?)); Sound &amp; Light (ancient Egyptians and sound, various established scientists with hearing or sight disorders)</b></p>		



# Tolworth Girls' School Curriculum Map

## Y8 Science



# Y8

Due to Carousel, the topics will be taught on rotation.



7 Hours Per Fortnight



### Brief Overview:

At the end of Year 8 students should be able to see the world analytically, to explain phenomena and make predictions – all skills they need for their next stage of scientific learning.

**Assessment Opportunities**

**Wider Learning**



	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>Knowledge</b> Metals and Non-metals Contact Forces Digestion	<b>Knowledge</b> Elements and the Periodic Table Work, Heating and Cooling Wave Effects and Wave Properties	<b>Knowledge</b> Chemical Energy Types of Reaction Electricity Magnets and Electromagnets	<b>Knowledge</b> Respiration and Photosynthesis Inheritance	<b>Knowledge</b> Evolution Universe Climate	<b>Knowledge</b> Breathing Pressure STEM	
<b>Skills</b> Write word equations. Use particle diagrams. Sketch the forces acting on an object, and label their size and direction. Calculate food requirements for a healthy diet.	<b>Skills</b> Use observations to make conclusions. Use data to describe trends. Use data to extrapolate and interpolate. Use observations to make predictions. Calculate, rearrange equations, work out the unit.	<b>Skills</b> Use observations to make conclusions. Use data to describe trends. Use data to extrapolate and interpolate. Use observations to make predictions. Write word equations. Calculate resistance. Turn circuit diagrams into real series and parallel circuits, and vice versa.	<b>Skills</b> Use word equations. Use observations to make conclusions. Use data to describe Use observations to make predictions.	<b>Skills</b> Evaluate evidence. Identify units for measuring distance. Use diagrams to explain scientific phenomenon.	<b>Skills</b> Explain observations. Given unfamiliar situations, use the formula to calculate fluid pressure or stress on a surface.	
<b>ASSESSMENT TASK</b> Topic themed comprehension task	<b>ASSESSMENT FORTNIGHT</b> 1 – written exam	<b>ASSESSMENT TASK</b> Topic themed comprehension task	<b>ASSESSMENT TASK</b> Topic themed comprehension task	<b>ASSESSMENT TASK</b> Topic themed comprehension task	<b>ASSESSMENT FORTNIGHT</b> 2 – written exam	

**PSHE: Health and wellbeing; Puberty and pregnancy; Relationships; Respecting equality and being a productive member of a diverse community, and living in the wider world.**

**CEIAG: By the end of Year 7 students will have a better understanding of their strengths, achievements and weaknesses and support to evaluate how these might inform future choices in learning and work; a better understanding of the full range of 14-19 opportunities for progression; an understanding of some of the qualities, attitudes and skills needed for employability; used career resources to research information about opportunities and apply their findings to help make informed choices for Key Stage 4 options (Women in Science; People Like Me, I'm A Scientist).**

**Enrichment: The Science of Health and Beauty Club; STEM Girls, Chemistry Club, Eco Club, Dissection Club**

**Cross Curricular: PE – digestion. Food technology – digestion. Maths – craters investigation; work, heating and cooling; wave effects and wave properties; Geography – Climate**

**Literacy & Numeracy: Key words embedded throughout. Maths – craters investigation; work, heating and cooling; wave effects and wave properties**  
**Diversity: Digestion (Bimaristans – first secular hospitals, organs and the Egyptians, David Cornwell (type 1 diabetes), world foods); Inheritance (Har Gobind Khorana, Rosalind Franklin, Al-Zahrawi, James Watson (controversial views regarding genetics and race). Metals and non-metals (James Harris); Chemical energy (Akira Yoshino), John Cornforth (hearing impairment); Climate (Jazmin Scarlett) Forces (Daisy Shearer (ASD), Leonardo da Vinci – ADHD?), Waves (Nergis Mavalvala), Magnets (Maglev bullet train, magnets in ancient china); Universe (Mae Carol Jemison)**




# Tolworth Girls' School Curriculum Map

## Y9 Biology




**Y9**

**GCSE AQA**

 3 Hours Per Fortnight

**Brief Overview:**




*Y9 students focus on the basics of Biology – what organisms are made from, how they are organised, and what happens when they are under attack!*

**Assessment Opportunities**

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
B1 - Cells	B1 - Cells	B2 - Organisation	B2 - Organisation	B3 – Infection & Response	B3 – Infection & Response
<p><b>Knowledge</b> Eukaryotes &amp; Prokaryotes Animal &amp; Plant Cells Cell Specialisation Cell Differentiation Microscopy Culturing Microorganisms</p>	<p><b>Knowledge</b> Chromosomes Mitosis &amp; the Cell Cycle Stem Cells Diffusion Osmosis Active Transport</p>	<p><b>Knowledge</b> Principles of Organisation Human Digestive System Food tests Enzymes</p>	<p><b>Knowledge</b> Heart &amp; Blood Vessels Cardiovascular Disease Health &amp; Lifestyle Correlations Cancer Plant Organisation</p>	<p><b>Knowledge</b> Communicable Disease Types of Pathogens (Viral, Protist, Bacterial &amp; Fungal) Human Defence Systems</p>	<p><b>Knowledge</b> Vaccination Antibiotics &amp; Painkillers Drug Discovery &amp; Development</p>
<p><b>Skills</b> Confident use of correct scientific prefixes – milli, micro etc.  Recognise, draw and interpret images of cells.  Use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included.</p>	<p><b>Skills</b> Evaluate the practical risks and benefits, as well as social and ethical issues, of the use of stem cells in medical research and treatments.  Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.</p>	<p><b>Skills</b> Use qualitative reagents to test for a range of carbohydrates, lipids and proteins  Investigate the effect of pH on the rate of reaction of amylase enzyme.</p>	<p><b>Skills</b> Evaluate methods of treatment – including risks &amp; benefits  Interpret data about risk factors for specified diseases.  Investigate transpiration rate using a potometer and analyse the resulting data set</p>	<p><b>Skills</b> Investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition.</p>	<p><b>Skills</b> Evaluate the global use of vaccination in the prevention of disease.</p>
<i>2x DMTs – extended response questions</i>	<i>DMT extended response &amp; End of Topic Test</i>	<i>AF1 – Exam &amp; DMT extended response question</i>	<i>2x DMTs – extended response questions</i>	<i>AF1 – Exam &amp; DMT extended response question</i>	<i>DMT extended response question &amp; End of Topic Test</i>

**Wider Learning**



**PSHE: Ethics & debate. Communicable disease (inc. STIs). Healthy lifestyles.**

**CEIAG: Exposure to a range of scientific careers including in healthcare and medicine, food science, microbiology & epidemiology.**

**Enrichment: Opportunity to take part in Dissection Club.**

**Cross Curricular: All units – mathematical skills. B2 links to Food Technology. B3 links to History of Medicine.**

**Literacy & Numeracy: Calculations, Graphing (Drawing/Analysis)**



**Diversity: Exposure to a range of historical and current scientific figures in these fields including Henrietta Lacks, Shinya Yamanaka & Waclaw Mayzel.**

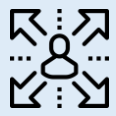


# Tolworth Girls' School Curriculum Map

## Y9 Chemistry



<p><b>Y9</b></p> <p><b>GCSE AQA</b></p>  <p>3 Hours Per Fortnight</p> <p><b>Brief Overview:</b></p>  <p>The historical development of the periodic table and models of atomic structure provide good examples of how scientific ideas and explanations develop over time as new evidence emerges</p>	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	C1 Atomic Structure and The Periodic Table		C2 Structure and Bonding		C7 Organic Chemistry	
	<p><b>Knowledge</b></p> <p>Atoms, Elements, Compounds and Mixtures</p> <p>Separation techniques</p> <p>History of the atom,</p> <p>Electronic Structure</p> <p>Development of the Periodic Table</p> <p>Metals and Non Metals</p> <p>Group 1, 7 and 0 Elements</p>		<p><b>Knowledge</b></p> <p>Formation of Ions, Ionic Bonding and Ionic Compounds</p> <p>Covalent bonding and simple molecules</p> <p>Polymers and giant Covalent structures</p> <p>Allotropes of carbon</p> <p>Changing States of matter</p> <p>Nanoparticles</p>		<p><b>Knowledge</b></p> <p>Hydrocarbons and Fractional Distillation</p> <p>Uses and Cracking of Hydrocarbons</p> <p>Alkenes</p> <p>Reactions of Alkenes</p>	
	<p><b>Skills</b></p> <p>Safe use of a range of equipment to separate chemical mixtures.</p> <p>Use SI units and the prefix nano. MS 1b Recognise expressions in standard form</p> <p>Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects.</p>		<p><b>Skills</b></p> <p>Make order of magnitude calculations.</p> <p>Calculate areas of triangles and rectangles, surface areas and volumes of cubes.</p> <p>Recognise and use expressions in standard form.</p> <p>Use ratios, fractions and percentages.</p> <p>Make estimates of the results of simple calculations.</p>		<p><b>Skills</b></p> <p>Make models of alkane molecules using the molecular modelling kits.</p> <p>Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects.</p>	
<b>Assessment Opportunities</b>	<i>2x DMTs – extended response questions</i>	<i>DMT extended response &amp; End of Topic Test</i>	<i>AF1 – Exam &amp; DMT extended response question</i>	<i>2x DMTs – extended response questions</i>	<i>AF1 – Exam &amp; DMT extended response question</i>	<i>DMT extended response question &amp; End of Topic Test</i>
<b>Wider Learning</b>	<p><b>PSHE: Opportunities to discuss scientific ideas and controversies</b></p> <p><b>CEIAG: By the end of Year 9 students will have a better understanding of the core units atomic structure, The periodic table, Bonding, structure and the properties of matter. This will set up a strong foundation in preparation for units covered in year 10 and 11.</b></p> <p><b>Enrichment: Science Club, Chemistry Clinic</b></p>		<p><b>Cross Curricular: Students will develop their mathematical skills in practical situations. History, Evaluating evidence for the development of the periodic table and atomic structure</b></p> <p><b>Literacy &amp; Numeracy: Key words highlighted throughout text Pupils develop skills in organising written work which is well sequenced and methodical. This is put into practice during 6 mark extended questions.</b></p> <p><b>Diversity: Exposure to a range of historical and current scientific figures in History of the atom and development of the periodic table</b></p>			





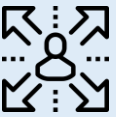


# Tolworth Girls' School Curriculum Map

## Y9 Physics



Y9 GCSE AQA  2 Hours Per Fortnight	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	<b>Brief Overview:</b>  <i>GCSE Physics studies the relationship between energy and matter in space and time. Year 9 students begin their Physics journey by exploring the fundamental concepts of Energy, the Particle Model and Forces.</i>	<b>P1 – Energy</b>  <b>Knowledge</b> Energy stores and systems Energy changes Kinetic energy Gravitational potential energy Elastic potential energy Specific heat capacity  <b>Skills</b> Apply: kinetic energy equation ( $E_k = 1/2 m v^2$ ) gravitational potential energy equation ( $E_p = m g h$ ) elastic potential energy equation ( $E_e = 1/2 k e^2$ ) specific heat capacity equation ( $\Delta E = m c \Delta \theta$ )	<b>P1 – Energy</b>  <b>Knowledge</b> Power Conservation of energy Dissipation of energy Efficiency Renewable and non-renewable energy resources  <b>Skills</b> Recall and apply: power equations ( $P=E/t$ and $P=W/t$ ) efficiency equation  <b>Required practicals:</b> 1. Determine the specific heat capacity of one or more materials. 2. Investigate the effectiveness of different materials as thermal insulators and the factors that may affect the thermal insulation properties of a material.	<b>P3 – The particle model</b>  <b>Knowledge</b> The particle model Density of materials Changes of state  <b>Skills</b> Recall and apply: density equation ( $\rho=m/v$ )  Students should be able to interpret heating and cooling graphs that include changes of state  <b>Required practicals:</b> Determine the densities of regular and irregular objects. Dimensions to be measured using appropriate apparatus such as a ruler, micrometer or Vernier callipers	<b>P3 – The particle model</b>  Specific heat capacity Specific latent heat Internal energy Particle motion in gases Pressure in gases Increasing the pressure of a gas  <b>Skills</b> Recall and apply: <ul style="list-style-type: none"> <li>specific heat capacity equation (<math>\Delta E = mc\Delta\theta</math>)</li> <li>specific latent heat equation (<math>E=mL</math>)</li> <li>pressure equation (<math>p V = \text{constant}</math>)</li> </ul> Describe and explain: relationship between volume and pressure at constant temperature.	<b>P5 – Forces</b>  <b>Knowledge</b> Scalar and vector quantities Contact and non-contact forces Gravity, Weight Resultant forces Work done Energy transfer Forces and elasticity  <b>Skills</b> Recall and apply: weight equation ( $W=mg$ ) work done equation ( $W=Fs$ ) spring equation ( $F=ke$ ) spring equation ( $E_e = 1/2 ke^2$ ) Use ratios and proportional reasoning to convert units and to compute rates.
<b>Assessment Opportunities</b>	<b>ASSESSMENT TASK</b> <i>Calculate task</i>	<b>ASSESSMENT TASK</b> <i>Evaluate written task</i>	<b>ASSESSMENT FORTNIGHT 1</b>	<b>ASSESSMENT TASK</b> <i>Describe written task</i>	<b>ASSESSMENT FORTNIGHT 2</b>	<b>ASSESSMENT TASK</b> <i>Describe task and Data analysis</i>

<b>Wider Learning</b>  	<p><b>PSHE:</b> The advantages and disadvantages of renewable and non-renewable energy resources.</p> <p><b>CEIAG:</b> By the end of year 9 students will have an increased understanding of the Physics core units of Energy and Particle Model of Matter. This will set students up with the foundations of Physics in preparation for the units covered in Years 10 and 11.</p> <p><b>Enrichment:</b> Clubs offered by the Science Department e.g. STEM Girls, Eco Club etc.</p>	<p><b>Cross Curricular:</b> Energy resources links to Geography and rearranging equations and drawing graphs links to Maths.</p> <p><b>Literacy &amp; Numeracy:</b> Recalling and applying equations and drawing and interpreting graphs. Evaluating advantages and disadvantages of different energy resources and writing a conclusion consistent with the arguments made. Describing a method to carry out a scientific investigation with appropriate terminology for variables and apparatus.</p> <p><b>Diversity:</b> Problem solving is one of the most valuable skills that an education in Physics can develop. This benefits from creativity of thought and innovative perspectives. Resources reflect today's diversity of approaches to finding solutions and give students opportunities to see relevance in the subject matter.</p>
---	---	---



# Tolworth Girls' School Curriculum Map

## Y10 Biology



# Y10

## GCSE AQA



3 Hours Per Fortnight

### Brief Overview:



*Y10 students will focus on how plants and animals obtain their energy, and how humans maintain their internal state of balance.*

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	B3 – Infection & Response	B4 - Bioenergetics	B4 - Bioenergetics	B5 - Homeostasis	B5 Homeostasis	B6 – Inheritance & Evolution
	<b>Knowledge</b> Vaccination Antibiotics & Painkillers Drug Discovery & Development	<b>Knowledge</b> Photosynthesis Limiting Factors Aerobic Respiration	<b>Knowledge</b> Anaerobic Respiration Response to Exercise Metabolism	<b>Knowledge</b> Homeostasis Nervous System Reflexes Endocrine System	<b>Knowledge</b> Diabetes Menstrual Cycle Contraception Infertility Feedback Systems	<b>Knowledge</b> Sexual & Asexual Reproduction Meiosis DNA & The Genome Inheritance & Inherited Disorders Sex Determination
	<b>Skills</b> Evaluate the global use of vaccination in the prevention of disease.	<b>Skills</b> Use data to relate limiting factors to the cost effectiveness of adding heat, light or carbon dioxide to greenhouses  Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed.	<b>Skills</b> Investigations into the effect of exercise on the body.	<b>Skills</b> Plan and carry out an investigation into the effect of a factor on human reaction time.  Interpret and explain simple diagrams of negative feedback control.	<b>Skills</b> Evaluate information around the relationship between obesity and diabetes, and make recommendations taking into account social and ethical issues.  Debate the ethics of IVF treatments.	<b>Skills</b> Appreciate that embryo screening and gene therapy may alleviate suffering but consider the ethical issues which arise.
<b>Assessment Opportunities</b>	<i>DMT extended response question &amp; End of Topic Test</i>	<i>2x DMTs – extended response questions</i>	<i>End of Topic Test &amp; AF1 Exam</i>	<i>2x DMTs – extended response questions</i>	<i>End of Topic Test &amp; AF2 Mock Exam</i>	<i>2x DMTs – extended response questions</i>

### Wider Learning



**PSHE:** Ethics & debate. Contraception & Infertility. Inherited Disorders.

**CEIAG:** Exposure to a range of scientific careers including in healthcare and medicine, food science, reproductive science and genetics.

**Enrichment:** Opportunity to take part in ‘I’m a Scientist, get me out of here’ – an online discussion forum with current scientific researchers

**Cross Curricular:** B3 link to History of Medicine. B4 link to Food Technology.

**Literacy & Numeracy:** Calculations, Graphing (Drawing/Analysis)

**Diversity:** Exposure to a diverse range of both historical and current scientific figures in these fields including Har Gobind Khorana, Rosalind Franklin and David Liu.




# Tolworth Girls' School Curriculum Map

## Y10 Chemistry




**Y10**

**GCSE AQA**



3 Hours Per Fortnight

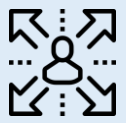
**Brief Overview:**



Understanding of chemical changes began when people began experimenting with chemical reactions in a systematic way and organizing their results logically

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2	
C9 Chemistry of the Atmosphere	C4 Chemical Changes	C3 Quantitative Chemistry	C3 Quantitative Chemistry	C6 The rate and extent of chemical change	C6 The rate and extent of chemical change	
<p><b>Knowledge</b></p> <p>Evolution of the atmosphere Greenhouse Gases Carbon Footprint Air Pollution</p>	<p><b>Knowledge</b></p> <p>Acids and Bases Strong and Weak acids The Reactivity Series Separating Metals from Metal Oxides</p>	<p><b>Knowledge</b></p> <p>Relative Formula Mass Conservation of Mass Limiting Reactants Concentration Uncertainties</p>		<p><b>Knowledge</b></p> <p>Rates of reaction Measuring Rates of Reaction Finding Reaction Rates from graphs Reversible reactions</p>		
<p><b>Skills</b></p> <p>Use scientific theories and explanations to develop hypotheses. Present reasoned explanations including relating data to hypotheses.</p>	<p><b>Skills</b></p> <p>Required practical 1: preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate</p> <p>Write chemical formulae using knowledge of charges</p>	<p><b>Skills</b></p> <p>Balance equations using the same number of atoms rule</p> <p>Use ratios, fractions and percentages. Change the subject of an equation. Recognise and use expressions in decimal form. Use ratios, fractions and percentages. Use an appropriate number of significant figures. Substitute numerical values into algebraic equations using appropriate units for physical quantities.</p>		<p><b>Skills</b></p> <p>Drawing and interpreting appropriate graphs from data to determine rate of reaction.</p> <p>Required practical 5: investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produced and a method involving a change in colour or turbidity.</p>		
<b>Assessment Opportunities</b>	<i>DMT extended response question &amp; End of Topic Test</i>	<i>2x DMTs – extended response questions</i>	<i>End of Topic Test &amp; AF1 Exam</i>	<i>2x DMTs – extended response questions</i>	<i>End of Topic Test &amp; AF2 Mock Exam</i>	<i>2x DMTs – extended response questions</i>

**Wider Learning**



**PSHE: Opportunities to discuss scientific ideas and controversies**

**CEIAG: By the end of Year 10 students will have a better understanding of applying practical skills and using data to devise conclusions reflecting on knowledge gained in year 9.**

**Enrichment: Science Club, Chemistry Clinic**

**Cross Curricular: Students will develop their mathematical skills in practical situations.**

**Literacy & Numeracy:**  
Key words highlighted throughout text  
Pupils develop skills in organising written work which is well sequenced and methodical. This is put into practice during 6 mark extended questions.  
Maths Skills as outlined above

**Diversity drives innovation and science needs innovators. We build a culture in Chemistry where difference is valued and part of what makes science inspiring.**



# Tolworth Girls' School Curriculum Map

## Y10 Physics



# Y10

## GCSE AQA

3 Hours Per Fortnight



### Brief Overview:



Y10 students explore the behaviour of fundamental particles to understand a range of applications, from electrical devices to nuclear radiation. They then build on their knowledge of forces to investigate Motion.

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>P2 Electricity</b>		<b>P4 Atomic Structure</b>		<b>P5 Forces</b>	
<p><b>Knowledge</b>            Circuit symbols            Current, Charge, Potential difference, Resistance            IV-Characteristics Required Practical            Ohmic (fixed resistor) and non-ohmic conductors (lamp and diode)            Light dependent resistor            Thermistor            Series and parallel circuits            Direct and alternating current            Mains electricity            Plug            Power            Work done            The National Grid            Static charge            Electric fields</p>		<p><b>Knowledge</b>            Structure of an atom            Isotopes            Development of the model of the atom            Random radioactive decay            Nuclear radiation (alpha, beta and gamma)            Nuclear equations            Half-life            Contamination            Irradiation            Background radiation            Uses and dangers of nuclear radiation            Nuclear fission            Nuclear fusion</p>		<p><b>Knowledge</b>            Distance and displacement            Speed, Velocity            Distance-time relationship            Acceleration            Terminal velocity            Newton's First, Second and Third Law            Forces and braking            Stopping distance, Reaction time, Braking distance            Momentum, Conservation of momentum</p>	
<p><b>Skills</b>            Recall and apply the charge equation (<math>Q=IT</math>)            Recall and apply:            potential difference equation (<math>V=IR</math>)            power equations (<math>P=IV</math> and <math>P=I^2R</math>)            energy equations (<math>E=Pt</math> and <math>E=QV</math>)</p> <p><b>Required practicals:</b>            1. Investigate the factors affecting the resistance of electrical circuits            2. Investigate the I–V characteristics of a variety of circuit elements.</p>		<p><b>Skills</b>            Recognise expressions given in standard form.            Evaluate the best sources of radiation to use in a given situation.            Carry out half-life calculations            Interpret half-life graphs            Use the dice model to explain half-life and the random nature of decay            Draw/interpret diagrams representing nuclear fission and how a chain reaction may occur.</p>		<p><b>Skills</b>            speed equation (<math>s=vt</math>)            acceleration equation (<math>a=\Delta v/t</math>)            acceleration equation (<math>v^2 - u^2 = 2 a s</math>)            force equation (<math>F=ma</math>)            momentum equation (<math>p = m v</math>)            Convert between newton-metres and joules.            Use ratios and proportional reasoning to convert units and to compute rates.            Determine speed from a distance–time graph.            Draw and interpret velocity–time graphs</p> <p><b>Required practicals:</b>            Measure the acceleration of a trolley.</p>	
<b>Assessment Opportunities</b>	<b>ASSESSMENT TASK</b> Data analysis task	<b>ASSESSMENT TASK</b> Data analysis task	<b>ASSESSMENT</b> FORTNIGHT 1	<b>ASSESSMENT TASK</b> Describe + Explain written task	<b>ASSESSMENT</b> FORTNIGHT 2 (MOCKS) <b>ASSESSMENT TASK</b> Calculate task

### Wider Learning



**PSHE: Electricity in the home and the National Grid, Nuclear Power and Speed limits.**

**CEIAG: By the end of year 10 students will have an increased understanding of the Physics units of Electricity, Atomic Structure and Forces. This will set students up with a greater understanding of Physics in preparation for the units covered in Year 11.**

**Enrichment: Clubs offered by the Science Department e.g. STEM Girls, Eco Club etc.**

**Cross Curricular: Electricity, the National Grid and Nuclear Power links to Geography and rearranging equations and drawing graphs links to Maths. Forces also links to Design and Technology. The structure of the atom links to Y9 Chemistry.**

**Literacy & Numeracy: Recalling and applying equations and drawing and interpreting graphs.**

**Diversity: Problem solving is one of the most valuable skills that an education in Physics can develop. This benefits from creativity of thought and innovative perspectives. Resources reflect today's diversity of approaches to finding solutions and give students opportunities to see relevance in the subject matter.**








# Tolworth Girls' School Curriculum Map

## Y11 Biology – Combined Science



Y11 GCSE AQA	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	B6 – Inheritance & Evolution	B6 – Inheritance & Evolution	B7 - Ecology	B7 - Ecology	Revision	Public Exams
 3 Hours Per Fortnight <b>Brief Overview:</b>  <i>Y11 students will study the processes that led to the variation seen on Earth today, and the interaction between living organisms and their environment.</i>	<b>Knowledge</b> Variation Evolution by Natural Selection Selective Breeding Ethics of Genetic Technology	<b>Knowledge</b> Genetic Engineering Fossils Extinction Classification	<b>Knowledge</b> Biotic & Abiotic Factors Sampling: Quadrats & Transects Competition, Food Chains & Food Webs	<b>Knowledge</b> Water Cycle Carbon Cycle Biodiversity Human Impact on the Environment Global Warming & Climate Change	<b>Knowledge</b> A review of all topics in B1-B7, focused on identified areas of challenge from all assessments sat to date	
	<b>Skills</b> Interpret information about genetic engineering techniques and to make informed judgements about issues concerning cloning and genetic engineering, including GM crops.	<b>Skills</b> <b>Debate:</b> should GM foods be labelled in the supermarket?	<b>Skills</b> Measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species.	<b>Skills</b> Interpreting diagrams of the Water & Carbon Cycles  Evaluate the environmental impacts of a growing human population	<b>Skills</b> A recap of key skills including the mathematical skills needed for the exam, as well as revisiting the GCSE Required Practical tasks and associated data handling.	
<b>Assessment Opportunities</b>	<i>DMT extended response question &amp; AF1 Exam</i>	<i>DMT extended response question &amp; AF2 Mock Exam</i>	<i>2x DMTs – extended response questions</i>	<i>DMT extended response question &amp; AF3 Mock Exam</i>	<i>Past Exam Practice</i>	

<b>Wider Learning</b>  	<p>PSHE: Ethics &amp; debate. Contraception &amp; Infertility. Inherited Disorders.</p> <p>CEIAG: Exposure to a range of scientific careers including in healthcare and medicine, food science, reproductive science and genetics.</p> <p>Enrichment: Opportunity to take part in “Women in Science” – a speed dating style event with local women in a range of scientific fields.</p>	<p>Cross Curricular: B7 links to Geography &amp; Chemistry.</p> <p>Literacy &amp; Numeracy: Calculations, Graphing (Drawing/Analysis)</p> <p>Diversity: Exposure to a diverse range of both historical and current scientific figures in these fields including Carl Linnaeus, Jane Goodall, Susan Solomon and Mario Molina.</p>
---	---	--




# Tolworth Girls' School Curriculum Map

## Y11 Biology – Separate Science




**Y11**

**GCSE AQA**



3 Hours Per Fortnight

**Brief Overview:**

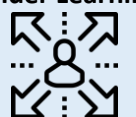


*Y11 students will study the variation seen on Earth today, and interaction between organisms and environment.*

**Assessment Opportunities**

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
B5 – Separate Only Content	B6 – Inheritance & Evolution	B6 – Inheritance & Evolution	B7 - Ecology	B7 – Ecology & B3 Separate Only	Public Exams
<p><b>Knowledge</b></p> <p>The Brain The Eye &amp; Common Problems of the Eye Control of Body Temperature Maintaining Water &amp; Nitrogen Balance Plant Hormones</p>	<p><b>Knowledge</b></p> <p>Sexual &amp; Asexual Reproduction DNA Structure Variation Evolution by Natural Selection Selective Breeding Ethics of Genetic Technology</p>	<p><b>Knowledge</b></p> <p>Genetic Engineering Cloning Fossils Extinction Classification</p>	<p><b>Knowledge</b></p> <p>Biotic &amp; Abiotic Factors Sampling: Quadrats &amp; Transects Competition, Food Chains &amp; Webs Trophic Levels Pyramids of Biomass Transfer of Biomass</p>	<p><b>Knowledge</b></p> <p>Water &amp; Carbon Cycle Decay Biodiversity Global Warming &amp; Climate Change Food Security Biotechnology</p> <p>B3 – Monoclonal Antibodies B3 – Plant Diseases</p>	
<p><b>Skills</b></p> <p>Evaluate the benefits and risks of procedures carried out on the brain and nervous system.</p> <p>Evaluate from the perspective of patients and doctors the methods of treating kidney diseases.</p>	<p><b>Skills</b></p> <p>Describe how natural selection can impact on a species over time</p> <p>Evaluation of a range of opinions on selective breeding</p>	<p><b>Skills</b></p> <p>Evaluation of a range of opinions on genetic engineering</p> <p><b>Debate:</b> should GM foods be labelled in the supermarket?</p>	<p><b>Skills</b></p> <p>Recording observations of organisms</p> <p>Calculate the efficiency of biomass transfer between trophic levels</p>	<p><b>Skills</b></p> <p>Investigate the effect of temperature on the rate of decay by measuring pH change</p> <p>Evaluate the environmental impacts of a growing human population</p>	
<i>DMT extended response question &amp; AF1 Exam</i>	<i>DMT extended response question &amp; AF2 Mock Exam</i>	<i>2x DMTs – extended response questions</i>	<i>DMT extended response question &amp; AF3 Mock Exam</i>	<i>Past Exam Practice</i>	

**Wider Learning**



**PSHE:** Ethics & debate. Contraception & Infertility. Inherited Disorders.

**CEIAG:** Exposure to a range of scientific careers including in healthcare and medicine, food science, reproductive science and genetics.

**Enrichment:** Opportunity to take part in “Women in Science” – a speed dating style event with local women in a range of scientific fields.

**Cross Curricular:** B7 links to Geography & Chemistry.

**Literacy & Numeracy:** Calculations, Graphing (Drawing/Analysis)

**Diversity:** Exposure to a diverse range of both historical and current scientific figures in these fields including Carl Linnaeus, Jane Goodall, Susan Solomon and Mario Molina.



# Tolworth Girls' School Curriculum Map

## Y11 Chemistry – Combined Science



**Y11**  
**GCSE AQA**



3/4 Hours Per Fortnight



**Brief Overview:**  
Industries use the Earth's natural resources to manufacture useful products. In order to operate sustainably, chemists seek to minimise the use of limited resources, use of energy, waste and environmental impact

**Assessment Opportunities**

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
C5 Energy Changes	C4 Chemical Changes Part 2	C8 Chemical analysis	C9 Chemistry of the Atmosphere	Revision	Public Exams
<b>Knowledge</b> Energy Changes in Reactions Calculating Bond Energies	<b>Knowledge</b> Electrolysis Electrolysis of aqueous solutions	<b>Knowledge</b> Purity, formulations and chromatography Identification of common gases	<b>Knowledge</b> Evolution of the atmosphere Greenhouse Gases Carbon Footprint Air Pollution	<b>Knowledge</b> Topics C1-C10	
<b>Skills</b> Investigate one of the variables affecting the temperature change, identifying variables to change, measure and control	<b>Skills</b> Write chemical formulae using knowledge of charges Writing balanced half equations  Required Practical 9 Investigate what happens when aqueous solutions are electrolysed using inert electrodes	<b>Skills</b> Required practical 6: investigate how paper chromatography can be used to separate substances.	<b>Skills</b> Use scientific theories and explanations to develop hypotheses. Present reasoned explanations including relating data to hypotheses.	<b>Skills</b> Exam technique	
<b>DMT extended response question &amp; AF1 Exam</b>	<b>DMT extended response question &amp; AF2 Mock Exam</b>	<b>2x DMTs – extended response questions</b>	<b>DMT extended response question &amp; AF3 Mock Exam</b>	<b>Past Exam Practice</b>	

**Wider Learning**



**PSHE: Opportunities to discuss scientific ideas and controversies**

**CEIAG: By the end of Year 11 students will have covered units 1-10 in Chemistry in preparation for formal exams. The internal assessments and DMT's over the last 3 years will have embed sufficient exam techniques to access wide range of exam questions.**

**Enrichment: Science Club, Chemistry Clinic**

**Cross Curricular : Geography, evaluating data on the earth's natural resources and suggesting alternative methods to reserve finite resources.**

**Literacy & Numeracy: Key words highlighted throughout text Pupils develop skills in organising written work which is well sequenced and methodical. This is put into practice during 6 mark extended questions.**

**Diversity: Improving our understanding of the diversity of natural chemical compounds in nature, especially those of systematic, ecological, and functional significance, but also metabolites of medicinal, cosmetic, nutritional, forensic, toxicological, or commercial importance.**



# Tolworth Girls' School Curriculum Map

## Y11 Chemistry – Separate Science



# Y11

## GCSE AQA



3/4 Hours Per Fortnight



### Brief Overview:

Industries use the Earth's natural resources to manufacture useful products. In order to operate sustainably, chemists seek to minimise the use of limited resources, use of energy, waste and environmental impact

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	C5 Energy Changes C4 Chemical Changes PART 2	C3 Quantitative Chemistry	C8 Chemical analysis	C9 Chemistry of the Atmosphere	C7 Organic Chemistry	Public Exams
	<b>Knowledge</b> Energy Changes in Reactions Calculating Bond Energies Cells and batteries Fuel cells Electrolysis Electrolysis of aqueous solutions	<b>Knowledge</b> Relative Formula Mass Conservation of Mass Limiting Reactants Concentration Uncertainties Limiting reactants (H) Using concentrations of solutions in mol/dm <sup>3</sup> (H) Yield and atom economy of chemical reactions Titrations	<b>Knowledge</b> Purity, formulations and chromatography Identification of common gases Identification of ions by chemical and spectroscopic means Instrumental method	<b>Knowledge</b> Evolution of the atmosphere Greenhouse Gases Carbon Footprint Air Pollution	<b>Knowledge</b> Addition Polymers Alcohols Carboxylic Acids Condensation Polymers Naturally occurring polymers.	
	<b>Skills</b> Investigate one of the variables affecting the temperature change, identifying variables to change, measure and control	<b>Skills</b> Use ratios, fractions, percentages. Change the subject of an equation. Recognise and use expressions in decimal form. Required practical 2: Titrations	<b>Skills</b> Required practical 6: investigate how paper chromatography can be used to separate substances. Required practical 7: Identifying ions	<b>Skills</b> Use scientific theories and explanations to develop hypotheses. Present reasoned explanations including relating data to hypotheses.	<b>Skills</b> Investigate the properties of different hydrocarbons. Use 3D Modelling to identify different functional groups	
Assessment Opportunities	DMT extended response question & AF1 Exam	DMT extended response question & AF2 Mock Exam	2x DMTs – extended response questions	DMT extended response question & AF3 Mock Exam	Past Exam Practice	

### Wider Learning



PSHE: Opportunities to discuss scientific ideas and controversies

CEIAG: By the end of Year 11 students will have covered units 1-10 in Chemistry in preparation for formal exams. The internal assessments and DMT's over the last 3 years will have embed sufficient exam techniques to access wide range of exam questions.

Cross Curricular: Students will develop their mathematical skills in practical situations. Geography, evaluating data on the earth's natural resources and suggesting alternative methods to reserve finite resources.

Literacy & Numeracy: Key words highlighted throughout text  
 Pupils develop skills in organising written work which is well sequenced and



# Tolworth Girls' School Curriculum Map


## Y11 Physics – Combined Science




**Y11**

**GCSE AQA**

4 Hours Per Fortnight



**Brief Overview:**




*Y11 Combined Science students explore the human understanding and the applications of phenomena such as Waves and Electromagnetism.*

**Assessment Opportunities**

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>P6 Waves</b>		<b>P7 Magnetism and Electromagnetism</b>	<b>Revision</b>		<b>Public Exams</b>
<b>Knowledge</b> Transverse and longitudinal waves Properties of waves Methods to measure the speed of sound in air and water Reflection and Refraction (HT only) Types of electromagnetic waves	<b>Knowledge</b> Properties of electromagnetic waves Uses and applications of electromagnetic waves	<b>HT only</b> Fleming's left-hand rule Electric motors	P1-P7 Revision particularly focusing on required practicals, calculations and data analysis.		
	<b>P7 Magnetism and Electromagnetism</b>	<b>Revision</b>			
	<b>Knowledge</b> Poles of a magnet Attraction and repulsion Induced magnets Magnetic fields Solenoids Electromagnetism	P1-P7 Revision particularly focusing on required practicals, calculations and data analysis.			
<b>Skills</b> Recall and apply the period equation ( $T=1/f$ ) Recall and apply the wave speed equation ( $v = f \lambda$ )  <b>Required practicals:</b> 1. Measure the speed of a wave in a ripple tank. Make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements. 2. Investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface.  Describe the magnetic field of permanent magnets and of electrical currents. Describe and explain the properties of electromagnets.		<b>Skills</b>  <b>HT only:</b> Apply the magnetic flux density equation ( $F = B I l$ )	<b>Skills</b> Recall and apply all relevant equations Recall and apply knowledge of required practicals. Identify experimental variables; drawing, reading and interpreting graphs. Reading charts and tables; describing and analysing data. Problem solving.		
<b>ASSESSMENT FORTNIGHT 1</b>	<b>ASSESSMENT FORTNIGHT 2 (MOCKS)</b>	<b>ASSESSMENT TASK</b> <i>Describe + Explain written task</i>	<b>ASSESSMENT FORTNIGHT 3 (MOCKS)</b>	<b>ASSESSMENT TASK</b> <i>Past paper questions</i>	

**Wider Learning**



**PSHE: Uses and dangers of electromagnetic waves e.g. microwaves**

**CEIAG: By the end of year 11 students will have an increased understanding of the Physics units of Waves and Magnetism and Electromagnetism. This, along with revision will set students up with a greater understanding of Physics in preparation for their public exams at the end of Year 11.**

**Enrichment: Clubs offered by the Science Department e.g. STEM Girls, Eco Club etc.**

**Cross Curricular: Rearranging equations and drawing graphs links to Maths.**

**Literacy & Numeracy: Recalling and applying equations and drawing and interpreting graphs.**

**Diversity: Problem solving is one of the most valuable skills that an education in Physics can develop. This benefits from creativity of thought and innovative perspectives. Resources reflect today's diversity of approaches to finding solutions and give students opportunities to see relevance in the subject matter.**



# Tolworth Girls' School Curriculum Map

## Y11 Physics – Separate Science



# Y11

## GCSE AQA

4 Hours Per Fortnight



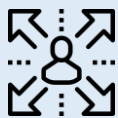
### Brief Overview:



*Y11 Separate Science Physics students explore the human understanding and the applications of phenomena such as Waves and Electromagnetism. They are introduced to current ideas in Astrophysics and Cosmology. Finally they complete their study of object interactions by integrating ideas on Forces, Energy and Pressure.*

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>P6 Waves</b>	<b>P6 Waves</b>	<b>P7 Magnetism and Electromagnetism</b>	<b>P8 Space</b>	<b>P5 Forces</b>	<b>Public Exams</b>
<p><b>Knowledge</b> Transverse and longitudinal waves Properties of waves Methods to measure the speed of sound in air and water Reflection and Refraction (HT only) Types of electromagnetic waves Properties of electromagnetic waves Uses and applications of electromagnetic waves</p>	<p><b>Knowledge</b> Sound waves Ultrasound Black body radiation Light: reflection and refraction Colour Lenses and using lenses</p>	<p><b>Knowledge</b> Solenoids Electromagnetism Fleming's left-hand rule Electric motors Electromagnetic devices Loudspeakers Microphones Induced potential Transformers The National Grid</p>	<p><b>Knowledge</b> Solar System Life cycle of a star Fusion Orbital motion Natural and artificial satellites Red-shift Big Band Theory Dark mass and dark energy</p>	<p><b>Knowledge</b> Moments Levers and gears Fluid pressure Changes in momentum</p>	
	<b>P7 Magnetism and Electromagnetism</b>			<b>Revision</b>	
	<p><b>Knowledge</b> Poles of a magnet Attraction and repulsion Induced magnets Magnetic fields</p>			P1-P8 Revision particularly focusing on required practicals, calculations and data analysis.	
<p><b>Skills</b> Recall and apply the period equation (<math>T=1/f</math>) Recall and apply the wave speed equation (<math>v = f \lambda</math>)</p> <p><b>Required practicals:</b> 1. Measure the speed of a wave in a ripple tank. Make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements. 2. Investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface. 3. Investigate the reflection of light by different types of surface and the refraction of light by different substances.</p>		<p><b>Skills</b> Describe the magnetic field of permanent magnets and of electrical currents. Describe and explain the properties of electromagnets. Apply the magnetic flux density equation (<math>F = B I l</math>) Describe and explain applications of electromagnets and the generator effect. Recall and apply: <math>v_p/v_s = n_p/n_s</math> <math>V_s \times I_s = V_p \times I_p</math></p>	<p><b>Skills</b> Apply speed and acceleration equations to orbit calculations</p>	<p><b>Skills</b> Apply moment equation and the principle of moments (<math>M=Fd</math>) Relate pressure and density (<math>P=h\rho g</math>)</p> <p>Recall and apply all relevant equations Recall and apply knowledge of required practicals. Identify experimental variables; drawing, reading and interpreting graphs. Reading charts and tables; describing and analysing data. Problem solving.</p>	
<b>Assessment Opportunities</b>	<b>ASSESSMENT FORTNIGHT 1</b>	<b>ASSESSMENT FORTNIGHT 2 (MOCKS)</b>	<b>ASSESSMENT TASK Describe + Explain written task</b>	<b>ASSESSMENT FORTNIGHT 3 (MOCKS)</b>	<b>ASSESSMENT TASK Past paper questions</b>

### Wider Learning



**PSHE:** Uses and dangers of electromagnetic waves e.g. microwaves  
**CEIAG:** By the end of year 11 students will have an increased understanding of the Physics units of Waves and Magnetism and Electromagnetism. This, along with revision will set students up with a greater understanding of Physics in preparation for their public exams at the end of Year 11.  
**Enrichment:** Clubs offered by the Science Department e.g. STEM Girls, Eco Club etc.

**Cross Curricular:** Rearranging equations and drawing graphs links to Maths.  
**Literacy & Numeracy:** Recalling and applying equations and drawing and interpreting graphs.  
**Diversity:** Problem solving is one of the most valuable skills that an education in Physics can develop. This benefits from creativity of thought and innovative perspectives. Resources reflect today's diversity of approaches to finding solutions and give students opportunities to see relevance in the subject matter.



# Tolworth Girls' School Curriculum Map

## Y12 Applied Science



# Y12

## BTEC Pearson

9 Hours Per Fortnight  
*Brief Overview:*



A fundamentally learner-centred approach to the curriculum, with a flexible, unit-based structure and knowledge applied in project-based assessments.



Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>Unit 1 Principles and Applications of Science I</b> External	<b>Unit 1 Principles and Applications of Science I</b> External	<b>Unit 3 Science Investigation Skills</b> External	<b>Unit 3 Science Investigation Skills</b> External	<b>Unit 10 Biological Molecules and Metabolic Pathways</b> Internal	Public Exams
<b>Knowledge</b> Periodicity and properties of elements Structure and functions of cells and tissues Waves in communication	<b>Knowledge</b> Periodicity and properties of elements Structure and functions of cells and tissues Waves in communication	<b>Knowledge</b> Enzymes in action Diffusion of molecules Plants and their environment Energy content of fuels Fuels Electrical circuits	<b>Knowledge</b> Enzymes in action Diffusion of molecules Plants and their environment Energy content of fuels Fuels Electrical circuits	<b>Knowledge</b> Understand the structure and function of biological molecules and their importance in maintaining biochemical processes Explore the effect of activity on respiration in humans and factors that can affect respiratory pathways	<b>Knowledge</b> Explore the factors that can affect the pathways and the rate of photosynthesis in plants.
<b>Skills</b> Analyse, interpret and evaluate scientific information to make judgements and reach conclusions Make connections, use and integrate different scientific concepts, procedures, processes or techniques		<b>Skills</b> Planning a scientific investigation; Developing a hypothesis for an investigation; Selection of appropriate equipment, techniques and standard procedures; Health and safety associated with the investigation; Variables in the investigation; Method for data collection and analysis; Data collection, processing and analysis/ interpretation; Collection of quantitative/qualitative data; Processing data Drawing conclusions and evaluation; Interpretation/ analysis of data; Evaluation		<b>Skills</b> A report or a visual display with explanations. Practical work and results, which can be recorded in lab notebooks, signed off by the teacher/observer Record of analysis, conclusions, evaluation and any research work can be by a written essay, diagrams, flow charts.	
<b>Assessment Opportunities</b>	<b>ASSESSMENT TASK</b> <i>Unit 1 Exam Practice</i>	<b>ASSESSMENT FORTNIGHT 1</b> <i>Unit 1 Exam Practice</i>	<b>ASSESSMENT TASK</b> <i>Unit 1 Exam</i>	<b>ASSESSMENT TASK</b> <i>Unit 3 Exam Practice</i>	<b>ASSESSMENT FORTNIGHT 2</b> <i>Unit 3 Exam and End of Year Mock(s)</i>

**Wider Learning**



**PSHE: Health and wellbeing; Relationships; Living in the wider world**

**CEIAG: Practice employability skills, both within the classroom and with employers. This includes developing their IT skills, opportunities to practice presenting, and helping to build contacts and networks across a range of industries.**

**Enrichment: Opportunities to assist in KS3 Science Lessons**

**Cross Curricular: Maths: PSHE**

**Literacy & Numeracy: Learners will be able to use appropriate mathematical terminology (for example rapid increase, decrease, approximately constant, etc.)**

**Diversity: Diversity drives innovation and science needs innovators. Therefore, we want to build a culture in science lessons where difference is valued and part of what makes science inspiring.**



# Tolworth Girls' School Curriculum Map

## Y12 Biology



# Y12

## A Level OCR A



9 Hours Per  
Fortnight

### Brief Overview:



AS students study foundations of Biology, Exchange & Transport and Biodiversity, Evolution & Disease. These three modules give the grounding needed for A2.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Module 2 & 3	Module 2 & 3	Module 2 & 4	Module 2 & 4	Module 2 & 4	Module 2 & 4
	<p><b>Knowledge</b></p> <p><b>Cell Structure:</b> Microscopes Eukaryotic Cells Prokaryotic Cells</p> <p><b>Exchange Surfaces &amp; Breathing:</b> Exchange Surfaces Gas Exchange in Mammals, Fish &amp; Insects</p> <p><b>Transport in Animals:</b> Blood Vessels Heart Structure</p>	<p><b>Knowledge</b></p> <p><b>Biological Molecules:</b> Bonding Properties of Water Carbohydrates Lipids &amp; Proteins</p> <p><b>Transport in Animals:</b> Cardiac Cycle Transport of O<sub>2</sub> Transport of CO<sub>2</sub></p> <p><b>Transport in Plants:</b> Water movement Transpiration stream Translocation</p>	<p><b>Knowledge</b></p> <p><b>Nucleic Acids:</b> DNA Structure DNA Replication Transcription &amp; Translation</p> <p><b>Communicable Disease:</b> Pathogens Plant Defences Primary &amp; Secondary Defences Specific Immune Response Antibodies Vaccination</p>	<p><b>Knowledge</b></p> <p><b>Enzymes:</b> Cofactors Factors affecting enzyme action Inhibitors</p> <p><b>Biodiversity:</b> Sampling plants Sampling animals Factors affecting biodiversity In- and ex-situ conservation</p>	<p><b>Knowledge</b></p> <p><b>Membranes:</b> Fluid mosaic model Diffusion, Osmosis &amp; Active Transport Factors affecting membranes</p> <p><b>Classification:</b> Features used in classification Phylogeny Natural selection Variation</p>	<p><b>Knowledge</b></p> <p><b>Cell Division, Diversity &amp; Differentiation:</b> Cell Cycle Mitosis Meiosis Animal &amp; Plant Tissues &amp; Organs Stem Cells</p> <p><b>Classification:</b> Adaptation Natural Selection Evolution Statistical Techniques</p>
	<p><b>Skills</b></p> <p><b>Practical:</b> Using a light microscope, Heart dissection</p> <p>Biological Drawings</p> <p>Graticule &amp; Magnification calculations</p> <p>Spirometry analysis</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Biochemical tests, Stem dissection, Potometer</p> <p>Calculation of R<sub>f</sub> values</p> <p>ECG analysis &amp; related calculations</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Identification of white blood cells in blood smears</p> <p>Identification of common pathogens &amp; associated diseases</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Effect of temperature, pH, &amp; substrate concentration on enzyme activity, Sampling techniques</p> <p>Calculating Q<sub>10</sub> &amp; Simpson's Diversity Index</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Effect of temperature &amp; solvents on membranes</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Mitosis under the microscope</p> <p>Selecting &amp; calculating standard deviation, Student's t-test and Spearman's rank correlation coefficient</p>
<b>Assessment</b>	<b>AF1 Exam &amp; 3 DMT extended response questions</b>	<b>2 DMT extended response questions</b>	<b>3 DMT extended response questions</b>	<b>AF2 Exam &amp; 2 DMT extended response questions</b>	<b>2 DMT extended response questions</b>	<b>AF3 Exam &amp; 2 DMT extended response questions</b>

### Wider Learning



**PSHE:** Lifestyle choices, Communicable Disease, Ethics & Debate.

**CEIAG:** Exposure to a range of scientific careers including in healthcare and medicine, food science, epidemiology, ecology, biochemistry & various other fields.

**Enrichment:** Opportunity to visit a Field Studies Centre to complete required practical activities in the Biodiversity Topic. A wide range of lectures, talks, events and courses relevant to our specification and beyond are shared with students.

**Cross Curricular:** Links to Chemistry, Physics, Maths, Geography, History, PE & Food Technology.

**Literacy & Numeracy:** A wide range of scientific reading provided to students. Significant mathematical content in all units.

**Diversity:** Exposure to a diverse range of both historical and current scientists in these fields including well known and 'hidden' figures.





# Tolworth Girls' School Curriculum Map

## Y12 Chemistry



# Y12

## A Level OCR A



9 Hours Per Fortnight



### Brief Overview:

A flexible approach where the specification is divided into topics, each covering different key concepts of chemistry. Teaching of practical skills is integrated with the theoretical topics.

Autumn Teacher 1	Autumn Teacher 2	Spring Teacher 1	Spring Teacher 2	Summer Teacher 1	Summer Teacher 2	
Module 2 Foundations in Chemistry	Module 2 Electrons Bonding and Structure	Module 3 The Periodic Table	Module 4 Basic Concepts of hydrocarbons	Module 3 Physical Chemistry	Module 4 Alcohols, haloalkanes and Analysis	
<b>Knowledge</b> Atomic structure Quantitative chemistry: formulae, equations, amount of Substance and the mole Reactions of acids Oxidation number and redox reactions Bonding and structure.		<b>Knowledge</b> The periodic table: periodic and group properties Nomenclature and formula representation, functional groups, organic reactions and isomerism Aliphatic hydrocarbons		<b>Knowledge</b> Enthalpy changes and their determination Rates of reaction Reversible reactions and chemical equilibrium Consideration of energy and yield in improving sustainability. Alcohols and haloalkanes Organic practical skills and organic synthesis Instrumental analytical techniques to provide evidence of structural features in molecules.		
<b>Skills</b> PAG 1.3 Determination of the formula for magnesium oxide	<b>Skills</b> PAG 1.3 Determination of concentration of hydrochloric acid	<b>Skills</b> PAG 4.2 Identifying unknowns 2	<b>Skills</b> PAG 5.3 Oxidation of ethanol	<b>Skills</b> PAG 3.1, 3.2, 3.3 Determination of the enthalpy changes of neutralisation, Hess' Law And combustion	<b>Skills</b> PAG 7.1 Identifying organic unknowns 1 Use of apparatus for qualitative tests for organic functional groups	
<b>Assessment Opportunities</b>	AF1 Exam & End of topic TEST	End of topic test	2 DMTs	AF2 Exam	2 DMTs PAG based questions	AF3 Exam



**PSHE: Health and wellbeing; Relationships; Living in the wider world**

**CEIAG: The A Level Chemistry course will prepare learners for progression to undergraduate courses in Chemistry, Biochemistry, Medicine, Dentistry, Engineering, Pharmacy, one of the other sciences or related subjects. For learners wishing to follow an apprenticeship route or those seeking direct entry into chemical science careers, this A level provides a strong background and progression pathway.**

**Enrichment: Opportunities to assist in KS3 Science Lessons, Apply to attend summer schools at University.**

**Cross Curricular: Maths: PSHE, History**

**Literacy & Numeracy: The assessment of quantitative skills will include at least 20% Level 2 (or above) mathematical skills for chemistry. These skills will be applied in the context of the relevant chemistry.**

**Diversity: Diversity drives innovation and science needs innovators. Therefore, we want to build a culture in science lessons where difference is valued and part of what makes science inspiring.**



# Tolworth Girls' School Curriculum Map

## Y12 Physics



# Y12

## A Level OCR A



9 Hours Per  
Fortnight

### Brief Overview:



AS students study foundations of Physics under the headings Development of practical skills, Forces and Motion, Electrons, Waves and Photons

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Module 2: Foundations of physics	Module 4: Electrons, waves & photons	Module 3: Forces and Motion	Module 4: Electrons, waves & photons	Module 3: Forces and Motion	Module 5: Quantum Physics
	<p><b>Knowledge</b></p> <p><b>Physical quantities &amp; units:</b> Physical quantities S.I. Units</p> <p><b>Making measurements and analysing data</b> Measurements and uncertainties</p> <p><b>Nature of quantities:</b> Scalars and Vectors</p>	<p><b>Knowledge</b></p> <p><b>Charge and current:</b> Charge Mean drift velocity</p> <p><b>Energy, power and resistance:</b> Circuit symbols E.m.f. and p.d Resistance Resistivity Power</p>	<p><b>Knowledge</b></p> <p><b>Motion:</b> Kinematics Linear motion Projectile motion</p> <p><b>Forces in Action:</b> Dynamics Motion with non-uniform acceleration Equilibrium Density and pressure</p> <p><b>Work, energy and Power:</b> Work and conservation of energy Kinetic and Potential energies Power</p>	<p><b>Knowledge</b></p> <p><b>Electrical circuits:</b> Series and parallel circuits Internal resistance Potential dividers</p> <p><b>Waves:</b> Wave motion Electromagnetic Waves Superposition Stationary waves</p>	<p><b>Knowledge</b></p> <p><b>Materials</b> Springs Mechanical properties of matter</p> <p><b>Newton's laws of motion and momentum:</b> Newton's laws of motion Collisions</p>	<p><b>Knowledge</b></p> <p><b>Quantum Physics:</b> Photons The photoelectric effect Wave-particle duality</p>
	<p><b>Skills</b></p> <ul style="list-style-type: none"> <li>Make estimates of physical quantities</li> <li>Evaluate precision and accuracy</li> <li>Identify systematic and random errors</li> <li>Calculate absolute and percentage uncertainties</li> </ul>	<p><b>Skills</b></p> <p><b>Practical:</b> Determining the resistivity of a metal</p> <p><b>Practical:</b> Investigating resistance</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Comparing methods of determining g</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Determining the wavelength of light with a diffraction grating</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Determining the Young Modulus for a metal</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Determining planck constant</p>
<b>Assessment</b>	<b>Test Module 2 and 4</b>	<b>AF1 ( Written exam)</b>	<b>Test on 3.1 3.2 3.3</b>	<b>AF2 ( Written exam)</b>	<b>Test Module 3.4 3.5</b>	<b>AF3 ( Written task)</b>

### Wider Learning



**PSHE: Health and wellbeing; Relationships; Living in the wider world. Physics in everyday life: Electricity bills, Car safety, Medical imaging**

**CEIAG: Practice employability skills, both within the classroom and with employers. This includes developing their IT skills, opportunities to practice presenting, and helping to build contacts and networks across a range of industries. Group work during practicals.**

**Independent study skills.**

**Enrichment: Opportunities to assist in KS3 Science Lessons. Physics challenge. Talks at educational institutions. Local educational trips to NPL and international educational trips to CERN and NASA.**

**Cross Curricular: Links to Chemistry, Biology, Maths, Geography, History, PE, Computing and Electronics.**

**Literacy & Numeracy: Using and applying key scientific vocabulary. Learners will be able to use appropriate mathematical terminology and data analysis techniques.**

**Diversity: Diversity drives innovation and science needs innovators. Therefore, we want to build a culture in science lessons where difference is valued and part of what makes science inspiring. Member of the institute of physics**



# Tolworth Girls' School Curriculum Map

## Y13 Applied Science



# Y12

## BTEC Pearson

9 Hours Per Fortnight



**Brief Overview:**



A fundamentally learner-centred approach to the curriculum, with a flexible, unit-based structure and knowledge applied in project-based assessments.

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
----------	----------	----------	----------	----------	----------

**Unit 2:** Practical Scientific Procedures and Techniques (Internal)  
**Unit 10:** Biological Molecules and Metabolic Pathways (Internal)

### Knowledge

#### Unit 2:

- A Undertake titration and colorimetry to determine the concentration of solutions
- B Undertake calorimetry to study cooling curves
- C Undertake chromatographic techniques to identify components in mixtures
- D Review personal development of scientific skills for laboratory work.

#### Unit 10:

- A Understand the structure and function of biological molecules and their importance in maintaining biochemical processes
- B Explore the effect of activity on respiration in humans and factors that can affect respiratory pathways
- C Explore the factors that can affect the pathways and the rate of photosynthesis in plants.

### Skills

#### Unit 2:

- 1 Laboratory equipment and its calibration; A2 Preparation and standardisation of solutions using titration; A3 Colorimetry
- B1 Thermometers; B2 Cooling curves
- C1 Chromatographic techniques; C2 Application of chromatography; C3 Interpretation of a Chromatogram
- D1 Personal responsibility; D2 Interpersonal skills; D3 Professional practice

#### Unit 10:

- Evaluate
- Explain
- Explore
- Evaluate
- Carry out an investigation
- Describe
- Analyse primary and secondary data

Assessment Opportunities	ASSESSMENT TASK <i>Unit 1 Exam Practice</i>	ASSESSMENT FORTNIGHT 1 <i>Unit 1 Exam Practice</i>	ASSESSMENT TASK <i>Unit 1 Exam</i>	ASSESSMENT TASK <i>Unit 3 Exam Practice</i>	ASSESSMENT TASK <i>Unit 3 Exam Practice</i>	ASSESSMENT FORTNIGHT 2 <i>Unit 3 Exam and End of Year Mock(s)</i>
--------------------------	--	--	---------------------------------------	--	--	--

Wider Learning



**PSHE:** Health and wellbeing; Relationships; Living in the wider world

**CEIAG:** Practice employability skills, both within the classroom and with employers. This includes developing their IT skills, opportunities to practice presenting, and helping to build contacts and networks across a range of industries.

**Enrichment:** Opportunities to assist in KS3 Science Lessons

**Cross Curricular:** Maths: PSHE

**Literacy & Numeracy:** Learners will be able to use appropriate mathematical terminology (for example rapid increase, decrease, approximately constant, etc.)

**Diversity:** Diversity drives innovation and science needs innovators. Therefore, we want to build a culture in science lessons where difference is valued and part of what makes science inspiring.



# Tolworth Girls' School Curriculum Map

## Y13 Biology



# Y13

## A Level OCR A

9 Hours Per  
Fortnight



### Brief Overview:



A2 students cover a wide range of advanced topics under the headings of Communication, Homeostasis, Genetics & Ecosystems. These give a solid basis for further scientific studies beyond 6<sup>th</sup> Form.

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Module 5 & 6	Module 5 & 6	Module 5 & 6	Module 5 & 6	Module 5 & 6	Public Exams
<p><b>Knowledge</b></p> <p><b>Communication &amp; Homeostasis:</b> <i>Homeostasis</i> <i>Endotherms &amp; Ectotherms</i></p> <p><b>Excretion:</b> <i>The Liver</i> <i>The Kidneys</i> <i>Osmoregulation</i> <i>Dialysis</i></p> <p><b>Photosynthesis:</b> <i>Chloroplasts</i> <i>Photosynthetic Pigments</i> <i>Light Dependent Stage</i> <i>Calvin Cycle</i> <i>Factors Affecting Photosynthesis</i></p> <p><b>Respiration:</b> <i>Glycolysis</i> <i>Mitochondrion</i> <i>Link Reaction &amp; Krebs Cycle</i> <i>Oxidative Phosphorylation</i> <i>Anaerobic Respiration</i></p>	<p><b>Knowledge</b></p> <p><b>Neuronal Control:</b> <i>Neurons</i> <i>Action Potentials</i> <i>Nervous Transmission</i> <i>Synapses</i></p> <p><b>Respiration:</b> <i>Anaerobic Respiration</i> <i>Energy Values of</i> <i>Respiratory Substrates</i></p> <p><b>Cellular Control</b> <i>Mutations</i> <i>The Lac Operon</i> <i>Body Plan Development</i></p> <p><b>Patterns of Inheritance:</b> <i>Monogenic &amp; Dihybrid</i> <i>Multiple Alleles</i> <i>Sex Linkage</i> <i>Codominance</i> <i>Autosomal Linkage</i> <i>Epistasis</i></p>	<p><b>Knowledge</b></p> <p><b>Hormonal Control:</b> <i>Endocrine System</i> <i>Adrenal Glands</i> <i>The Pancreas</i> <i>Blood Glucose Control</i> <i>Diabetes</i></p> <p><b>Patterns of Inheritance:</b> <i>Chi Squared Test</i> <i>Variation</i> <i>Speciation</i> <i>Hardy-Weinberg Equation</i> <i>Isolating Mechanisms</i> <i>Artificial Selection</i></p> <p><b>Manipulating Genomes:</b> <i>DNA Sequencing</i> <i>DNA Profiling</i> <i>PCR</i> <i>Electrophoresis</i> <i>Genetic Engineering</i></p>	<p><b>Knowledge</b></p> <p><b>Biotechnology</b> <i>Cloning – Natural &amp; Artificial</i> <i>Making Food</i> <i>Microorganism Cultures</i> <i>Immobilised Enzymes</i></p> <p><b>Plant &amp; Animal Responses:</b> <i>Plant Responses</i> <i>Tropisms</i> <i>Commercial uses of Plant</i> <i>Hormones</i> <i>Mammalian Nervous</i> <i>System</i> <i>The Brain</i> <i>Reflexes</i> <i>Controlling Heart Rate</i> <i>Muscle contractions</i></p>	<p><b>Knowledge</b></p> <p><b>Ecosystems:</b> <i>Biomass Transfer</i> <i>Cycling</i> <i>Succession</i></p> <p><b>Populations &amp; Sustainability:</b> <i>Population Size</i> <i>Conservation vs</i> <i>Preservation</i> <i>Human Conflicts</i></p> <p><b>Revision:</b> A review of key topics from AS and A2, focused on identified areas of challenge from all assessments sat to date</p>	
<p><b>Skills</b></p> <p><b>Practical:</b> Oxygen production in pondweed, Thin Layer Chromatography, Respiration in <i>Saccharomyces cerevisiae</i></p>	<p><b>Skills</b></p> <p>Analysis of Punnett Squares &amp; family trees Statistical techniques – application &amp; practice</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Electrophoresis &amp; PCR Debate: Issues related to GM</p>	<p><b>Skills</b></p> <p><b>Practical:</b> pH change during yoghurt production, Dilution plating,</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Chicken wing dissection, Phototropism, Exercise &amp; pulse rate</p>	
<b>Assessment</b>	<b>AF1 Exam &amp; 3 DMT extended response questions</b>	<b>AF2 Exam &amp; 2 DMT extended response questions</b>	<b>4 DMT extended response questions</b>	<b>AF3 Exam &amp; 2 DMT extended response questions</b>	<b>2 DMT extended response questions</b>

### Wider Learning



**PSHE:** Lifestyle choices, Communicable Disease, Ethics & Debate.

**CEIAG:** Exposure to a range of scientific careers including in healthcare and medicine, food science, epidemiology, ecology, biochemistry & various other fields.

**Enrichment:** Opportunity to visit a Field Studies Centre to complete required practical activities in the Biodiversity Topic. A wide range of lectures, talks, events and courses relevant to our specification and beyond are shared with students.

**Cross Curricular:** Links to Chemistry, Physics, Maths, Geography, History, PE & Food Technology.

**Literacy & Numeracy:** A wide range of scientific reading provided to students. Significant mathematical content in all units.

**Diversity:** Exposure to a diverse range of both historical and current scientists in these fields including well known and 'hidden' figures.



# Tolworth Girls' School Curriculum Map

## Y13 Chemistry



Y13 A Level OCR A 9 Hours Per Fortnight	Autumn Teacher 1	Autumn Teacher 2	Spring Teacher 1	Spring Teacher 2	Summer Teacher 1	Summer Teacher 2
	Module 5	Module 6	Module 5	Module 6	Module 5	Module 6
 <b>Brief Overview:</b>  A flexible approach where the specification is divided into topics, each covering different key concepts of chemistry. Teaching of practical skills is integrated with the theoretical topics.	Knowledge Rate equations, orders of reaction, the rate determining step Equilibrium constants, Kc and Kp Acid–base equilibria including pH, Ka and buffer solutions	Knowledge Aromatic compounds Carboxylic acids and esters	Knowledge Lattice enthalpy and Born–Haber cycles Entropy and free energy Electrochemical cells.	Knowledge Organic nitrogen compounds, Chirality and optical isomerism .Condensation polymerisation. Organic synthesis	Knowledge Transition elements. role of ligands in complex ions, Stereochemistry, precipitation, ligand substitution Redox reactions Qualitative inorganic tests	Knowledge Aromatic compounds carboxylic acids and esters Organic nitrogen compounds Amines and amino acids polymerisation Synthetic organic chemistry Modern analytical techniques in organic analysis.
	Skills PAG 9.1 Rate of decomposition of hydrogen peroxide PAG 10.1 Rates - iodine clock Use calculators to find and use power, exponential and logarithmic functions	Skills Use of reaction mechanisms to explain organic reactions.	Skills PAG 8.1 Electrochemical cells 1	Skills Use of experimental evidence for the proposal of reaction mechanisms.	Skills PAG 11.2 pH - titration curves PAG 12.1 Investigating iron tablets	Skills Analysis and interpretation of spectra. Use of analytical techniques to provide evidence for law courts, e.g. drink driving
<b>Assessment Opportunities</b>	<i>AF1 Exam &amp; 2 DMT extended response questions</i>	<i>AF2 Exam &amp; 2 DMT extended response questions</i>	<i>2 DMT extended response questions</i>	<i>AF3 Exam</i>	<i>Unified Assessment</i>	

<b>Wider Learning</b> 	<p><b>PSHE: Health and wellbeing; Relationships; Living in the wider world</b></p> <p><b>CEIAG: The A Level Chemistry course will prepare learners for progression to undergraduate courses in Chemistry, Biochemistry, Medicine, Dentistry, Engineering, Pharmacy, one of the other sciences or related subjects. For learners wishing to follow an apprenticeship route or those seeking direct entry into chemical science careers, this A level provides a strong background and progression pathway.</b></p> <p><b>Enrichment: Opportunities to assist in KS3 Science Lessons, Apply to attend summer schools at University.</b></p>	<p><b>Cross Curricular: Maths: PSHE, Design Technology</b></p> <p><b>Literacy &amp; Numeracy: The assessment of quantitative skills will include at least 20% Level 2 (or above) mathematical skills for chemistry. These skills will be applied in the context of the relevant chemistry.</b></p> <p><b>Diversity: Diversity drives innovation and science needs innovators. Therefore, we want to build a culture in science lessons where difference is valued and part of what makes science inspiring.</b></p>
---------------------------	---	---



# Tolworth Girls' School Curriculum Map

## Y13 Physics



# Y13

## A Level OCR A



9 Hours Per  
Fortnight

### Brief Overview:



A2 students cover a wide range of advanced topics under the headings of Newtonian World & astrophysics, Particles and medical physics

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Module 5: Newtonian world & astrophysics	Module 5: Newtonian world & astrophysics	Module 5: Newtonian world & astrophysics	Module 6: Particles and medical physics	Module 6: Particles and medical physics	Public Exams
<p><b>Knowledge</b></p> <p><b>Thermal physics:</b> Temperature Solid, liquid and gas Thermal properties of materials Ideal gases</p>	<p><b>Knowledge</b></p> <p><b>Oscillations</b> Simple harmonic oscillations Energy of a simple harmonic oscillator Damping</p> <p><b>Gravitational fields:</b> Point and spherical masses Newton's law of gravitation Planetary motion Gravitational potential and energy</p>	<p><b>Knowledge</b></p> <p><b>Astrophysics and cosmology:</b> Stars Electromagnetic radiation from stars Cosmology</p>	<p><b>Capacitors</b> Capacitors Energy Charging and discharging capacitors</p> <p><b>Electrical fields:</b> Point and spherical charges Coulomb's law Uniform electric field Electrical potential and energy</p> <p><b>Electromagnetism</b> Magnetic fields Motion of charged particles Electromagnetism</p>	<p><b>Knowledge</b></p> <p><b>Nuclear and particle physics</b> The nuclear atom Fundamental particles Radioactivity Nuclear fission and fusion</p> <p><b>Medical imaging:</b> Using X-rays Diagnostic methods in medicine Using ultrasound</p> <p><b>Revision:</b> A review of key topics from AS and A2, focused on identified areas of challenge from all assessments sat to date</p>	
<p><b>Skills</b></p> <p><b>Practical:</b> Estimate a value for absolute zero from gas pressure and volume <b>Practical:</b> Determining the specific heat capacity of a material</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Investigating the factors affecting simple harmonic motion</p>	<p><b>Skills</b></p> <p>Research report</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Investigating the charging and discharging of capacitors <b>Practical:</b> Determining the magnetic field of a magnet</p>	<p><b>Skills</b></p> <p><b>Practical:</b> Investigating the absorption of alpha, beta and gamma by differing materials</p>	
<b>AF1</b>	<b>AF2</b>	<b>End of topic test</b>	<b>AF3</b>	<b>End of topic test</b>	

### Wider Learning



**PSHE: Health and wellbeing; Relationships; Living in the wider world. Physics in everyday life: Electricity bills, Car safety, Medical imaging**

**CEIAG: Practice employability skills, both within the classroom and with employers. This includes developing their IT skills, opportunities to practice presenting, and helping to build contacts and networks across a range of industries. Group work during practicals. Independent study skills.**

**Enrichment: Opportunities to assist in KS3 Science Lessons. Physics challenge. Talks at educational institutions. Local educational trips to NPL and international educational trips to CERN or NASA**

**Cross Curricular: Links to Chemistry, Biology, Maths, Geography, History, PE, Computing and Electronics.**

**Literacy & Numeracy: Using and applying key scientific vocabulary. Learners will be able to use appropriate mathematical terminology and data analysis techniques.**

**Diversity: Diversity drives innovation and science needs innovators. Therefore, we want to build a culture in science lessons where difference is valued and part of what makes science inspiring. Member of the institute of physics**