

KS3

Specification

2017/18



SCIENCE



DEAN TRUST Wigan

- ❖ Topic 1 - Biology 1 - Cells
- ❖ Topic 2 - Biology 2 - Diet and Drugs
- ❖ Topic 3 - Biology 3 - Reproduction
- ❖ Topic 4 - Chemistry 1 - The Nature of Matter
- ❖ Topic 5 - Chemistry 2 - Atoms, Elements and Compounds
- ❖ Topic 6 - Chemistry 3 - Reactions
- ❖ Topic 7 - Physics 1 - Forces
- ❖ Topic 8 - Physics 2 - Levers, Moments and Pressure
- ❖ Topic 9 - Physics 3 - Electricity
- ❖ Topic 10 - Biology 4 - Life Processes
- ❖ Topic 11 - Biology 5 - Genetics
- ❖ Topic 12 - Biology 6 - Organisms and the Environment
- ❖ Topic 13 - Chemistry 4 - Acids and Alkalis
- ❖ Topic 14 - Chemistry 5 - Materials
- ❖ Topic 15 - Chemistry 6 - The Earth
- ❖ Topic 16 - Physics 4 - Energy
- ❖ Topic 17 - Physics 5 - Space
- ❖ Topic 18 - Physics 6 - Waves

Year 7 Formal Assessment

1. Secondary Ready Assessment
2. Baseline Assessment
3. End of Topic Tests (all topics)
4. Termly SAT exams
5. Termly GL Assessment

Year 8 Formal Assessment

1. Baseline Assessment
2. End of Topic Tests (all topics)
3. Termly SAT exams
4. GL Assessments
5. GCSE Ready Assessment

Year 9 Formal Assessment

1. Baseline Assessment
2. Termly GCSE Ready Assessment
3. End of Topic Tests (all topics)
4. GCSE Trilogy Exam (end of year)

Year 7 - Biology

	Band	Criteria
Cells	1	<ol style="list-style-type: none"> To recall the different parts of animal and plant cells; To accurately label a diagram of an animal and plant cell.
	2	<ol style="list-style-type: none"> To describe the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts; To compare the similarities and differences between plant and animal cells and specialised cells.
	3	<ol style="list-style-type: none"> To compare and explain the differences between yeast and bacteria cells; To describe the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems of organisms (with examples); To carry out a practical on Micro-organisms (pathogens and disease) (Sc1 agar).
	4	<ol style="list-style-type: none"> To understand the role of diffusion in the movement of materials in and between cells (Sc1 Diffusion); To understand the role of pathogens in the body; To carry out a practical on Fermentation (Sc1 yeast).

Diet and Drugs	1	<ol style="list-style-type: none"> To recall the food groups needed for a healthy balanced diet; To give examples of food types for the different food groups.
	2	<ol style="list-style-type: none"> To describe the functions of the different types of food groups in a balanced diet. To carry out a practical to determine the Energy stored in different foods (Sc1 energy in food); To calculate the of energy requirements in a healthy daily diet (Sc1).
	3	<ol style="list-style-type: none"> To recall and describe the different tissues and organs of the human digestive system, including adaptations to function; To describe how the digestive system is used to digest food (enzymes simply as biological catalysts); To carry out a practical on the activity of enzymes and what affects their function (Sc1 enzyme activity); To model digestion (Sc1: Visking tubing).
	4	<ol style="list-style-type: none"> To identify and evaluate the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases; To evaluate the effects of recreational drugs (including substance misuse) on behaviour, health and life processes; To carry out a practical investigation on reactions times (Sc1 reaction times).

Reproduction	1	<ol style="list-style-type: none"> To label the male and female reproductive systems;
	2	<ol style="list-style-type: none"> To explain/describe the function of the parts of the male and female (without details of hormones) reproductive system; To recall the changes that occur during adolescence. To compare these changes of adolescence between male and female, highlight the similarities and differences.
	3	<ol style="list-style-type: none"> To understand reproduction in humans (as an example of a mammal), including gametes, fertilisation, gestation and birth. To understand reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. To describe the stages of the menstrual cycle (without details of hormones).
	4	<ol style="list-style-type: none"> To evaluate the effects of maternal lifestyle on the foetus through the placenta. To explain the importance of plant reproduction through insect pollination. To describe how organisms affect, and are affected by, their environment, including the accumulation of toxic materials.

Year 7 - Chemistry

The Nature of Matter	Band	Criteria
	1	<ol style="list-style-type: none"> To define the properties of the different states of matter (solid, liquid and gas) in terms of the particle. To describe and identify a pure substance.
2	<ol style="list-style-type: none"> To explain changes of state in terms of the particle model. To explain why mass is conserved during changes of state. To describe a mixture and explain what happens when substances are dissolved. 	
3	<ol style="list-style-type: none"> To carry out a practical to describe what happens when mixtures are separated (Sc1- Separating Mixtures). Explain conclusions using simple scientific ideas Draw a results table with headings and units on your own 	
4	<ol style="list-style-type: none"> Draw a simple line graph To use filtration and evaporation to purify water and use scientific ideas to justify what happens at each stage (Sc1 RP8 – Water purification). To explain how electrolysis is used to separate compound into elements (RP3 – Electrolysis). 	

Atoms, Elements and Compounds	1	<ol style="list-style-type: none"> To define and recall the principles underpinning the Mendeleev Periodic Table.
	2	<ol style="list-style-type: none"> How patterns in reactions can be predicted with reference to the Periodic Table. To create and use an atomic model to explain the arrangement of sub atomic particles. (Sc1- atomic structure modelling).
	3	<ol style="list-style-type: none"> To compare differences between atoms, elements and compounds (Sc1 Molymods). To use simple techniques for separating mixtures: distillation and chromatography (Sc1- Required practical activity 6 – Chromatography). To compare the differences in properties between metal and non-metals.
	4	<ol style="list-style-type: none"> To compare the differences in properties between metal oxides and non-metal oxides.

Reactions	1	<ol style="list-style-type: none"> To recall and use state symbols for chemical reactions. To explain the 2 main types of reaction: (i) Chemical, (ii) Physical.
	2	<ol style="list-style-type: none"> To explain what happens during chemical and physical reactions. To use chemical symbols and formulae to represent elements and compounds, identifying: (i) Number of elements, (ii) Number of atoms, (iii) How many of each atom.
	3	<ol style="list-style-type: none"> To represent chemical reactions using word equations. To calculate the mass in chemical reactions (conservation of matter). To have an awareness of the tests for: (i) Carbon dioxide, (ii) Hydrogen.
	4	<ol style="list-style-type: none"> To represent chemical reactions using formulae equations. To explain and justify how chemical reactions take place in terms of the rearrangement of atoms. To balance chemical equations using mathematical methods. To compare chemical reactions such as combustion, oxidation, thermal decomposition.

Band Descriptors

Year 7 - Physics

Band	Criteria
1	<ol style="list-style-type: none"> To recall that forces exist as pushes or pulls. To recall that forces occur because of the interaction between two objects. To recall that forces measured in Newtons. measurements of stretch or compression as force is changed
2	<ol style="list-style-type: none"> To use force arrows in diagrams to represent balanced and unbalanced forces. To recognise forces associated with deforming objects such as: stretching and squashing springs; rubbing and friction between surfaces; pushing things out of the way; resistance to motion of air and water.
3	<ol style="list-style-type: none"> To understand opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface. To recognise that forces are needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only). To determine what happens to the motion of an object To identify non-contact forces; gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity. To analyse and explain the interaction of forces when objects float and sink.
4	<ol style="list-style-type: none"> To calculate the speed of objects using the speed formula triangle. ($S = d \div t$). To represent the journey of an object on a distance-time graph. To compare the relative motion of objects: trains and cars passing one another. To plot a graph and discuss the Force-extension linear relation using Hooke's Law. To calculate the Gravity force, weight and mass of objects on Earth and how this compares to the same object on different planets and stars. To evaluate the differences of gravitational forces between Earth and Moon, and between Earth and Sun (qualitative only).

1	<ol style="list-style-type: none"> To recall that forces exist as pushes or pulls. To recall that forces occur because of the interaction between two objects. To define a moment as the turning effect of a force.
2	<ol style="list-style-type: none"> To recall that Moments are measured in Newtonmeters(Nm) or Newtoncentimetres(Ncm). To recall that Pressure is measured in N/m², N/cm² or Pascals (Pa).
3	<ol style="list-style-type: none"> To understand that simple machines give bigger force but at the expense of smaller movement (and vice versa): product force and displacement unchanged. To use formula triangles to calculate Moments. To use formula triangles to calculate Pressure.
4	<ol style="list-style-type: none"> To explain why pressure in liquids increases with increasing depth. To explain why atmospheric pressure, decreases with increase of height as weight of air above decreases with height.

1	<ol style="list-style-type: none"> To identify the two types of electricity: (i) Static Electricity (insulators), (ii) Current Electricity (Conductors). To understand that it is electrons that are responsible for electricity.
2	<ol style="list-style-type: none"> To compare the differences in resistance between conducting and insulating components . To recognise simple circuit symbols. To identify the two types of electrical circuit. To recall that electric current is measured in Amperes (A) and Voltage (potential difference) is measured in Volts (V).
3	<ol style="list-style-type: none"> To model Static Electricity and the separation of positive or negative charges when objects are rubbed together. To construct diagrams to show transfer of electrons between two insulating materials To determine the electrostatic forces created between charged objects and the effects they have on each other. To recall that Resistance is measured in Ohms (Ω).
4	<ol style="list-style-type: none"> Explain how the current and voltage behave in series circuits and parallel circuits. To calculate the Resistance in circuits using Ohms Law ($V = I \times R$). To analyse the magnetic effect of a current in electromagnets and d.c. motors (principles only).

Year 8 - Biology

Life Processes	Band	Criteria
	1	<ol style="list-style-type: none"> To identify the life processes (MRS GREN). To recall that Plants use photosynthesis to make their food. To understand that Respiration is used by both plants and animals to gain energy for life.
	2	<ol style="list-style-type: none"> To recall the word summary for aerobic respiration. To recall the reactants in, and products of, photosynthesis, and a word summary for photosynthesis. To describe a number of systems in the body - skeletal, circulatory, respiratory etc..
	3	<ol style="list-style-type: none"> To explain the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume. To describe the process of anaerobic respiration in humans and micro- organisms, including fermentation, and a word summary for anaerobic respiration. To understand how plants make carbohydrates in their leaves by photosynthesis and how they gain mineral nutrients and water from the soil via their roots.
	4	<ol style="list-style-type: none"> To analyse the structure and functions of the gas exchange system in humans, including adaptation to function. To evaluate the impact of exercise and asthma on the human gas exchange system. (Sc1) To compare the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism. To identify and describe the adaptations of leaves for photosynthesis. To explain the role of leaf stomata in gas exchange in plants.

Genetics	1	<ol style="list-style-type: none"> There are two types of variation (i) Genetic, (ii) Environmental.
	2	<ol style="list-style-type: none"> To produce a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA . To explain how animals and plants are adapted to their environment.
	3	<ol style="list-style-type: none"> To understand Heredity as the process by which genetic information is transmitted from one generation to the next. To construct bar charts and line graphs to compare continuous and discontinuous variation.
	4	<ol style="list-style-type: none"> To construct genetic diagrams (punnet squares), to determine the characteristics of offspring, including (i) eye colour, (ii) gender. To explain the effects of genetics disorders such as Huntingtons.

Organisms and the Environment	1	<ol style="list-style-type: none"> To recall that the Sun is the ultimate source of energy in food chains. To recall that plants use to Suns energy to make food by photosynthesis.
	2	<ol style="list-style-type: none"> To recall and use the following terms accurately: Producer, Herbivore, Consumer, Omnivore, Primary Consumer, Secondary Consumer, Predator, Prey. To draw basic food chains when provided with information. To explain how animals and plants are adapted to their environment.
	3	<ol style="list-style-type: none"> To use food webs to evaluate increases/decreases in population. To describe the factors that plants and animals compete for.
	4	<ol style="list-style-type: none"> To draw pyramids of Biomass from food chains and food webs. To explain in detail how energy/biomass is lost through food chains/food webs. To explain in detail how toxins, such as DDT, are passed through food chains.

Year 8 - Chemistry

	Band	Criteria
Acids and Alkalis	1	<ol style="list-style-type: none"> To understand that materials are either: (i) Acids, (ii) Alkalis, (iii) Neutral substances To recall that indicators are used to determine whether a solution is Acid, Alkaline or Neutral.
	2	<ol style="list-style-type: none"> To recall that the pH scale is used for measuring the strength of acids and alkalis. (Sc1- rainbow fizz). To recall that Acids and Alkalis react together in Neutralisation Reactions. To recall examples of common Neutralisation Reactions.
	3	<ol style="list-style-type: none"> To carry out, and describe using scientific knowledge, a neutralisation reaction. (Sc1- RP2 – Neutralisation) To understand that metals and carbon are arranged in order of reactivity in the reactivity series (Sc1 displacement reactions). To represent Neutralisation Reactions using word equations. To determine the metal salts produced in Neutralisation Reactions.
	4	<ol style="list-style-type: none"> To recall that reactions of acids with metals produce a metal salt plus hydrogen. To recall that reactions of acids with alkalis to produce a metal salt plus water. To represent Neutralisation Reactions using chemical equations. To prepare pure dry copper sulphate crystals - (Sc1 - RP) To explain the use of carbon in obtaining metals from metal oxides. To compare chemical properties of metal and non-metal oxides with respect to acidity (Sc1- testing the pH of oxides). To balance chemical equations representing Neutralisation Reactions.

Materials	1	<ol style="list-style-type: none"> To identify the two types of reaction: (i) Chemical, (ii) Physical.
	2	<ol style="list-style-type: none"> To explain what happens during chemical and physical reactions. To use chemical symbols and formulae to represent elements and compounds, identifying: (i) Number of elements, (ii) Number of atoms, (iii) How many of each atom. To investigate how reactions affect temperature. (Sc1 RP 4 – Temperature changes)
	3	<ol style="list-style-type: none"> To represent chemical reactions using word equations. To calculate the mass in chemical reactions (conservation of matter). To explain the differences between combustion, thermal decomposition, oxidation and displacement reactions. (Sc1 RP5 – Rates of reaction).
	4	<ol style="list-style-type: none"> To represent chemical reactions using formulae equations. To explain and justify how chemical reactions take place in terms of the rearrangement of atoms. To balance chemical equations using mathematical methods. To describe and compare the properties of ceramics, polymers and composites (qualitative) To carry out a practical to identify ions in solution (Sc1 RP7 – Identifying Ions).

The Earth	1	<ol style="list-style-type: none"> To recall the current composition of the atmosphere. To recall the structure of the Earth. To recall the types of rock: igneous, sedimentary, metamorphic.
	2	<ol style="list-style-type: none"> To recall that tectonic plates are pieces of the Earth's crust that move. To recall that tectonic plates move a few centimetres per year to create the Earth's crust features. To compare the different types of rock.
	3	<ol style="list-style-type: none"> To describe the processes that occur that to make the tectonic plates move. To compare the outcomes and effects of plate tectonic plate movement (constructive, destructive, conservative). To describe the processes involved in the rock cycle.
	4	<ol style="list-style-type: none"> To evaluate the production of carbon dioxide by human activity and the impact on climate. To evaluate the efficacy of recycling and how it can impact on the modern world. To explain in detail the events of the carbon cycle.

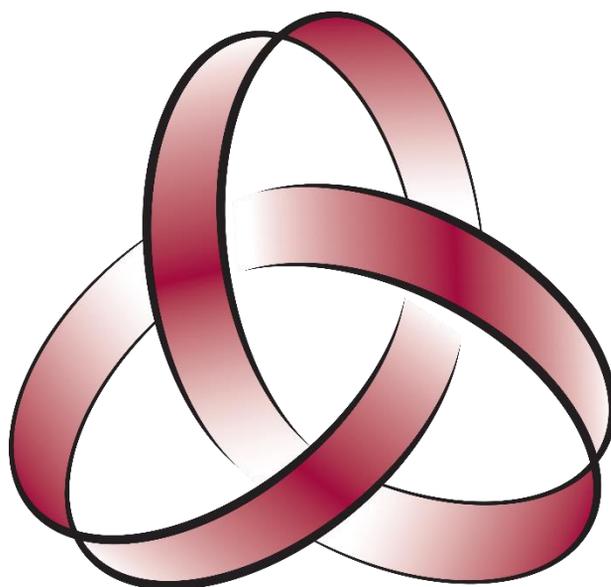
Year 8 - Physics

	Band	Criteria
Energy	1	<ol style="list-style-type: none"> To identify the Energy Stores and Energy types within them. To provide examples of everyday energy stores. To recall that Energy is measured in Joules.
	2	<ol style="list-style-type: none"> To draw Energy Transform Diagrams for everyday appliances. To understand that Energy is conserved. To understand that not all energy is useful and wasted energy is dissipated to the surroundings. To recognise the 4 main methods of Thermal Energy Transfer: (i) Conduction, (ii) Convection, (iii) Radiation, (iv) Evaporation.
	3	<ol style="list-style-type: none"> To analyse the temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation. To analyse the effects of surface area on Heat Transfer and how this leads to adaptations in animals and plants. To describe the motion and spacing of particles during convection and conduction. To accurately draw Sankey diagrams to represent energy transforms.
	4	<ol style="list-style-type: none"> To calculate and explain work done and energy changes on deformation. To use and calculate domestic fuel bills, fuel use and costs. To describe and compare Fuels and evaluate energy resources. To compare power ratings of appliances in watts (W, kW). To calculate and compare amounts of energy transferred (J, kJ, KW hour).

Space	1	<ol style="list-style-type: none"> To explain why we have day and night. To explain why a day lasts for 24hours. To explain why an Earth year is 365 1/4 days long. To recall the order of planets. To recall that our Sun is a star.
	2	<ol style="list-style-type: none"> To compare the year lengths of planets and explain their differences. To compare the surface temperatures of planets and explain why life does not exist on other planets in our solar system. To recall what a Moon is and what a lunar month is. To recall that a group of stars is called a galaxy. To give examples of stars and galaxies
	3	<ol style="list-style-type: none"> To understand and explain how the Earth's tilt: (i) provides different seasons; (ii) provides different lengths of the day. To compare and explain the differences in day length in different hemispheres and the different day lengths in different seasons. To explain how eclipses cast a shadow on the Earth's surface. To compare the differences between a lunar and a solar eclipse.
	4	<ol style="list-style-type: none"> To recall that a light year is a unit of astronomical distance. To calculate the distance of stars and galaxies using light years.

Year 8 - Physics

Waves	1	<ol style="list-style-type: none"> To recall that waves carry energy from one place to another. To explain how sounds are produced.
	2	<ol style="list-style-type: none"> To recall that light waves travelling through a vacuum travel at the speed of light. To compare the similarities and differences between light waves and waves in matter (sound waves including their speeds). To explain why sound needs a medium to travel and compare the speeds of sound in air, in water, in solids. To explain that echoes involve the reflection and absorption of sound. <ol style="list-style-type: none"> To explain that sound is produced by vibrations of objects and that sound is detected by vibrations in loud speakers, vibrations of the diaphragm in the ear drum; To recall that sound waves are longitudinal.
	3	<ol style="list-style-type: none"> To explain and compare transmission of light through materials in terms of absorption, scattering and specular reflection at a surface. To use a ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye. To study waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition. To explain colours and the different frequencies of light, white light and prisms (qualitative only) differential colour effects in absorption and diffuse reflection.
	4	<ol style="list-style-type: none"> To recall that frequencies of sound waves are measured in hertz (Hz). To calculate the frequencies of light and sound waves using diagrams and equations. To compare the auditory range of humans and animals. To describe how pressure waves transfer energy and how this can be used for cleaning and physiotherapy by ultra-sound. To describe how waves can be used to transfer information for conversion to electrical signals by microphone. Light transferring energy from source to absorber leading to chemical and electrical effects; photosensitive material in the retina and in cameras.



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