



Year 10 Science Medium Term Plan

Autumn Term 1

Learning Overview (Contents)	Overview of main learning objectives: Movement of substances in and out of cells States of matter Elements, compounds, mixtures Atomic structure The periodic table Forces - Movements and position Forces – movement, shape and momentum		
Assessment Opportunities	Assessments will occur at the end of each topic using exam style questions.		
Textbooks Published Lesson Resources	IG Biology SB	9780435185084	Pearson
	IG Chemistry SB	9780435185169	Pearson
	IG Physics SB	9780435185275	Pearson
Home Learning Resources	https://www.thenational.academy/teachers/programmes/biology-secondary-ks4-foundation-edexcel/units/eukaryotic-and-prokaryotic-cells/lessons https://www.thenational.academy/teachers/programmes/chemistry-secondary-ks4-higher-edexcel/units/states-of-matter/lessons https://www.thenational.academy/teachers/programmes/chemistry-secondary-ks4-higher-edexcel/units/separating-substances/lessons https://www.thenational.academy/teachers/programmes/chemistry-secondary-ks4-higher-edexcel/units/atomic-structure-and-the-periodic-table/lessons https://www.thenational.academy/teachers/programmes/physics-secondary-ks4-higher-edexcel/units/measuring-and-calculating-motion/lessons https://www.thenational.academy/teachers/programmes/physics-secondary-ks4-higher-edexcel/units/forces-make-things-change/lessons		

Knowledge organisers	Link to knowledge Organisers (look on the TES!)
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Week Number	Learning Overview / objective (outlined above)	What should pupils know, understand and be able to do by the end of the week? (Use clear Success criteria)	
1	- Understand the process of diffusion, osmosis and active transport - Investigate diffusion practical - Investigate osmosis practical		Learners should:
		2.15	understand the processes of diffusion, osmosis and active transport by which substances move into and out of cells
		2.16	understand how factors affect the rate of movement of substances into and out of cells, including the effects of surface area to volume ratio, distance, temperature and concentration gradient
		2.17	<i>practical: investigate diffusion and osmosis using living and non-living systems</i>
2	- Biology assessment on: Characteristics of living organisms, Variety of living organisms, Level of organisation, Cell structure, Movement of substances in and out of cells - States of matter and interconversion - Elements, compounds, mixtures and pure substances - Separation techniques – definitions		
		1.8	understand how to classify a substance as an element, compound or mixture
		1.9	understand that a pure substance has a fixed melting and boiling point, but that a mix may melt or boil over a range of temperatures
		1.1	understand the three states of matter in terms of the arrangement, movement and energy the particles
3	- Separation techniques – definitions - Chromatography - Atomic structure	1.2	understand the interconversions between the three states of matter in terms of: - the names of the interconversions - how they are achieved - the changes in arrangement, movement and energy of the particles
		1.4	know what is meant by the terms: - solvent - solute - solution - saturated solution

		1.10 describe these experimental techniques for the separation of mixtures: • simple distillation • fractional distillation • filtration • crystallisation • paper chromatography 1.11 understand how a chromatogram provides information about the composition of a mixture 1.12 understand how to use the calculation of R_f values to identify the components of a mixture 1.13 <i>practical: investigate paper chromatography using inks/food colourings</i> 1.14 know what is meant by the terms 'atom' and 'molecule' 1.15 know the structure of an atom in terms of the positions, relative masses and relative charges of sub-atomic particles 1.16 know what is meant by the terms: atomic number, mass number, isotopes and relative atomic mass (A_r) 1.17 be able to calculate the relative atomic mass of an element (A_r) from isotopic abundances	
4	• Periodic table • Consolidation lesson • Chemistry assessment	1.18 understand how elements are arranged in the Periodic Table: • in order of atomic number • in groups and periods 1.19 understand how to deduce the electronic configurations of the first 20 elements from their positions in the Periodic Table 1.20 understand how to use electrical conductivity and the acid-base character of oxides to classify elements as metals or non-metals 1.21 identify an element as a metal or a non-metal according to its position in the Periodic Table 1.22 understand how the electronic configuration of a main group element is related to its position in the Periodic Table 1.23 understand why elements in the same group of the Periodic Table have similar chemical properties 1.24 understand why the noble gases (Group 0) do not readily react	

5	- Distance time graphs - Velocity time graphs	1.3 plot and explain distance-time graphs 1.4 know and use the relationship between average speed, distance moved and time taken: $\text{average speed} = \frac{\text{distance moved}}{\text{time taken}}$ 1.5 <i>practical: investigate the motion of everyday objects such as toy cars or tennis balls</i> 1.6 know and use the relationship between acceleration, change in velocity and time taken: $\text{acceleration} = \frac{\text{change in velocity}}{\text{time taken}}$ $a = \frac{(v - u)}{t}$ 1.7 plot and explain velocity-time graphs 1.8 determine acceleration from the gradient of a velocity-time graph 1.9 determine the distance travelled from the area between a velocity-time graph and the time axis 1.10 use the relationship between final speed, initial speed, acceleration and distance moved: $(\text{final speed})^2 = (\text{initial speed})^2 + (2 \times \text{acceleration} \times \text{distance moved})$ $v^2 = u^2 + (2 \times a \times s)$
6	- Introduction to forces - Forces, mass and acceleration - - Weight, mass and terminal velocity - Stopping and breaking distances	1.11 describe the effects of forces between bodies such as changes in speed, shape or direction 1.12 identify different types of force such as gravitational or electrostatic 1.13 understand how vector quantities differ from scalar quantities 1.14 understand that force is a vector quantity 1.15 calculate the resultant force of forces that act along a line 1.16 know that friction is a force that opposes motion 1.17 know and use the relationship between unbalanced force, mass and acceleration: force = mass $\times$ acceleration $F = m \times a$

		1.18 know and use the relationship between weight, mass and gravitational field strength: weight = mass $\times$ gravitational field strength $W = m \times g$ 1.21 describe the forces acting on falling objects (and explain why falling objects reach a terminal velocity) 1.19 know that the stopping distance of a vehicle is made up of the sum of the thinking distance and the braking distance
7	- Hooke's law - Hooke's Law practical - Revision	1.22 <i>practical: investigate how extension varies with applied force for helical springs, metal wires and rubber bands</i>
		1.23 know that the initial linear region of a force-extension graph is associated with Hooke's law
		1.24 describe elastic behaviour as the ability of a material to recover its original shape after the forces causing deformation have been removed
8	- Consolidation - Physics Assessment	