

Year 8 - 7 lessons per cycle

Light

Week	Lesson number/title	Core content
1	1 Light waves	<ul style="list-style-type: none">• Describe some properties of light waves• Describe what happens when light meets a surface• Draw accurate light ray diagrams to illustrate light travelling and meeting different surfaces
2	2 Reflection	<ul style="list-style-type: none">• Follow a method to test a given hypothesis• Make a conclusion from data collected• Process secondary data appropriately and use it to check for reproducibility• Draw accurate ray diagrams• Know the law of reflection
2	3 Refraction	<ul style="list-style-type: none">• Draw the pathway light takes through a glass block.• Measure the angle of refraction using a protractor.• Describe and explain how refraction takes place using key words and phrases.
2	4 Vision	<ul style="list-style-type: none">• Label the parts of the eye• Use ray diagrams to show how images are formed in pinhole cameras and the eye• Describe how an image is formed and how we see
3	5 Correcting vision	<ul style="list-style-type: none">• Safely carry out an eye dissection• Describe how the eye focuses on near and far objects• Explain the cause of long and short sightedness and how this can be corrected

3	6 Colours	<ul style="list-style-type: none"> List the colours of the visible spectrum. Describe how white light can be dispersed to give a range of different colours Explain why we see objects as a particular colour.
3	8 Filters	<ul style="list-style-type: none"> Describe and explain how coloured filters change white light. Predict the colours of coloured objects in coloured light Apply knowledge to a range of exam questions

Chemical Reactions

Week	Lesson number/title	Core content
3	1 Indicators of chemical reaction	<ul style="list-style-type: none"> Describe evidence for a chemical reaction Apply conservation of mass to simple chemical change Explain why, in terms of particles, mass stays the same in a reaction
4	2 Oxidation	<ul style="list-style-type: none"> Describe evidence reactions with oxygen Represent oxidation reactions using word equations and diagrams Apply the conservation of mass theory to oxidation reactions
4	3 Acids and alkalis	<ul style="list-style-type: none"> Identify common hazard symbols and describe appropriate safety precautions Record observations accurately and using good language Classify substances as acid, alkali or neutral using simple indicators

4	4 pH scale	<ul style="list-style-type: none"> • Use Universal Indicator to determine the pH of a range substances • Classify substances as strong or weak acids or alkalis based on their pH • Explain why universal indicator is better than simple indicators
5	5 Metal and acid reactions	<ul style="list-style-type: none"> • Describe evidence for the reaction of metals and acids • Write word equations to represent the reaction of metals and acids • Describe the test for hydrogen gas and the positive result
5	7 Neutralisation	<ul style="list-style-type: none"> • Describe what happens to the pH when acids are added to alkalis or vice versa • Represent the reaction of acids and alkalis using word equations • Name the salt produced in acid alkali reactions
5	9 Antacid investigation	<ul style="list-style-type: none"> • Describe a method to find the best antacid medicine • Identify variables to change, measure and control • Design a table for results
5	10 Antacid analysis	<ul style="list-style-type: none"> • Collect accurate results and check for reproducibility • Display the results appropriately, explaining the choice of graph • Use the results to write a conclusion saying which is the best antacid
6	Test	
6	Feedback	

Biological Systems and Processes - ATL link (Health Project - campaign about modern health concerns)

Week	Lesson number/title	Core content
7	1 Musculoskeletal system	<ul style="list-style-type: none">• Describe the functions of the skeletal system• Describe the role of different parts of joints• Describe the function and give examples of antagonistic muscle pairings
7	2 Muscles	<ul style="list-style-type: none">• Identify major muscle groups involved in common movements• Describe how some of the muscular tissue in our organs work• Measure the force of some of the skeletal muscles in the body
7	3 The respiratory system	<ul style="list-style-type: none">• Describe the function of the structures in the respiratory system• Describe, using knowledge of diffusion, how gases are absorbed from the alveoli into the bloodstream• Explain how alveoli are adapted for their function

7	4 Aerobic respiration	<ul style="list-style-type: none"> • State the word equation for aerobic respiration • Explain the importance of respiration
8	5 Breathing	<ul style="list-style-type: none"> • Explain the process involved in breathing • Compare lung volumes in boys and girls • Calculate means and identify the range in data collected
8	6 Effects of exercise and respiration	<ul style="list-style-type: none"> • Describe the effects of exercise on the respiratory system • Explain the effects of exercise on the respiratory system
8	7 Anaerobic respiration	<ul style="list-style-type: none"> • State the word equation for anaerobic respiration • Explain the importance of this type of respiration & where it is used
9	8 How does exercise affect breathing rate? - an investigation	<ul style="list-style-type: none"> • Identify variables in an investigation • Describe a method to test a hypothesis
9	9 Effects of smoking	<ul style="list-style-type: none"> • Describe the effects of cigarettes on the tissues of the lungs and on gaseous exchange • Describe and explain the impacts on the health of smokers and their unborn babies • Describe trends in secondary data
9	10 Effects of alcohol	<ul style="list-style-type: none"> • Describe the effects of alcohol on the body and behaviour • Describe the effects of alcohol on health and the developing foetus • Display secondary data appropriately

Forces in Action

Week	Lesson number/title	Core content
9	1 Levers and Pivots	<ul style="list-style-type: none"> • Identify pivots and levers • Calculate moments • Explain why levers are force multipliers
10	2 Moments and Balance Part 1	<ul style="list-style-type: none"> • Explain, in terms of turning forces, how an object can be made to balance. • Describe moments as clockwise or anticlockwise
10	3 Moments and Balance Part 2	<ul style="list-style-type: none"> • Describe how we can change the moment of a force to balance an object • Use the moment equation to calculate force needed or distance to make turning forces balance
10	4 Work done Part 1	<ul style="list-style-type: none"> • Define and calculate work done • Use the formula for work done to calculate work done, force or distance • Change units for distance
11	5 Work done Part 2	<ul style="list-style-type: none"> • Define power • Use both formulae for work done and power • Change units where appropriate and round answers to 3 significant figures

11	6 Simple Machines	<ul style="list-style-type: none"> • Define and give examples of simple machines • Describe how some simple machines work • Process and describe patterns in secondary data
11	7 Investigating Elastic Objects	<ul style="list-style-type: none"> • Describe elastic deformation • Identify variables • Write a method for investigating the extension of a spring.
11	Test	
12	Feedback	
12	8 Hooke's law	<ul style="list-style-type: none"> • Recognise and explain what is meant by 'elastic limit' • Analyse graphs for Hooke's law • Use Hooke's Law to calculate force, extension or spring constant

Variation

Week	Lesson number/title	Core content
12	1 Variation between species	<ul style="list-style-type: none"> • Explain what is meant by a 'species' • Give examples of continuous and discontinuous variation • Collect and display data on variation, explaining the choice of graph

13	2 Practical - Human Variation	<ul style="list-style-type: none"> • Collect data on variation in human height and handspan. • Plot data on a graph • Describing patterns in data
13	3 Why is variation important?	<ul style="list-style-type: none"> • Use and explain a simple model to represent sexual reproduction • Compare chromosome content in body cells and gametes • Explain why sexual reproduction leads to variation
13	4 DNA	<ul style="list-style-type: none"> • Define the term DNA, gene and chromosome • Describe the work of Franklin, Wilkins, Watson and Crick • Create a model of DNA
13	5 DNA Case Study - Franklin, Wilkins, Watson and Crick	<ul style="list-style-type: none"> • Understand how the work of Watson, Crick and Franklin contributed to our understanding of the structure of DNA
14	6 Inheritance	<ul style="list-style-type: none"> • Use genetic terms correctly • Draw a simple Punnett square to show inheritance • Determine the probability of offspring displaying a particular characteristic

Materials and the Earth

Week	Lesson number/title	Core content
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14	1 Structure of the Earth	<ul style="list-style-type: none"> ● Label a diagram showing the structure of the Earth and compare the layers in terms of composition, thickness and temperature ● Explain how the continents move ● Describe some of the evidence for 'continental drift'
14	2 Igneous rock	<ul style="list-style-type: none"> ● Describe the formation of intrusive and extrusive igneous rocks ● Explain the link between cooling rate and crystal sizes ● Describe the properties of igneous rock
15	3 Sedimentary rock	<ul style="list-style-type: none"> ● Describe the weathering, transportation and deposition of rocks at the Earth's surface ● Describe the formation of sedimentary rocks ● Describe the properties of sedimentary rocks
15	4 Metamorphic rock and the rock cycle	<ul style="list-style-type: none"> ● Describe the formation of metamorphic rocks ● Describe the properties of metamorphic rocks ● Apply knowledge of all 3 rock type formations to questions on the rock cycle
15	5 Fossils	<ul style="list-style-type: none"> ● Describe how fossils are formed ● Explain how fossils move to the surface of the Earth ● Interpret diagrams to identify the relative age of fossils
15	6 Crude oil	<ul style="list-style-type: none"> ● Describe the composition of crude oil using keywords ● Draw the first 5 alkanes ● Evaluate the extraction and use of crude oil
16	8 Earth's changing atmosphere	<ul style="list-style-type: none"> ● Compare the earth's early atmosphere to the atmosphere today ● Explain why carbon dioxide and oxygen levels changed in Earth's early history

16	9 Carbon cycle	<ul style="list-style-type: none"> Describe the main processes involved in the cycling of carbon
16	10 The greenhouse effect	<ul style="list-style-type: none"> Describe the greenhouse effect Explain the significance of an increased greenhouse effect
17	11 Climate change	<ul style="list-style-type: none"> Describe some of the potential consequences of climate change Analyse data related to climate change
17	12 Types of material	<ul style="list-style-type: none"> Describe some of the properties of ceramics, polymers and composites
17	Test	
17	Feedback	

Reactivity

Week	Lesson number/title	Core content
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18	1 Electron configuration	<ul style="list-style-type: none"> • Use the periodic table to work out numbers of protons, neutrons and electrons • Draw and write the electron configuration for given atoms • Explain why most atoms react but group 0 do not
18	2 Ions	<ul style="list-style-type: none"> • Draw and describe the formation of ions • Describe the formation of one type of chemical bond • Describe the link between place in the periodic table and the ion formed
18	3 Chemical Formulae	<ul style="list-style-type: none"> • Write and interpret chemical formula • Calculate relative formula mass.
19	4 Symbol Equations	<ul style="list-style-type: none"> • Write and interpret chemical formulae • Balance symbol equations
19	5 Acids and metals	<ul style="list-style-type: none"> • Write word (balanced symbol) equations for the reactions of metals and acids • Describe the test for hydrogen gas
19	6 Acids and Metal Oxides	<ul style="list-style-type: none"> • Write equations to describe the reactions of metal oxides and acids • Describe the steps in the production of a salt from a given metal oxide and an acid • Compare the reactions of metal oxides with those of metals and acids.
19	7 Making salts	<ul style="list-style-type: none"> • Define what we mean by 'salt' • Describe how to make a salt using filtration and crystallisation
20	8 Reactions of metal carbonates with acids	<ul style="list-style-type: none"> • Write word and symbol equations for the reaction of metal carbonates with acids • Describe the test for carbon dioxide and the positive result

20	9 Neutralisation	<ul style="list-style-type: none"> • Write word equations to represent the products and reactants in acid and alkali reactions • Explain what we mean by neutralisation • Describe a method of carrying out neutralisation accurately
20	10 Reactivity series	<ul style="list-style-type: none"> • Describe the reactivity series for metals • Use the reactivity series to predict a reaction • Write word and symbols equations to represent the reactions
21	11 Metal ores	<ul style="list-style-type: none"> • Explain why most metals are not found in their element form • Describe how metals can be extracted using carbon • Write word and symbol equations to represent the reactions
21	12 Displacement	<ul style="list-style-type: none"> • Use the reactivity series to predict whether a reaction will occur • Write word and symbol equations to represent reactions seen
21	13 Alloys	<ul style="list-style-type: none"> • Link properties of metals to their uses • Describe the difference between a pure metal and an alloy • Explain why alloys are more useful than pure metal

Space - ATL Link (Space Project - space tourism)

Week	Lesson number/title	Core content
22	1 Gravity	<ul style="list-style-type: none"> • Describe the term 'non-contact force' and give examples • Describe the forces of attraction between the Earth & moon and the Earth and the Sun • Describe the properties that affect the sizes of gravitational forces between different objects in the Solar system

22	2 Weight and mass	<ul style="list-style-type: none"> • Describe how gravity varies in the solar system • Calculate weight, mass and gravitational field strength on Earth and other planets • Change units and express answers to a given number of significant figures
22	3 Universe	<ul style="list-style-type: none"> • Define a light year and explain why they are used • Describe Earth's place in the universe • Describe what a star is and why it emits light
23	Test	
23	Feedback	
23	4 Seasons	<ul style="list-style-type: none"> • Use secondary data to describe and explain patterns in year lengths in the solar system • Describe and explain differences in day length, position of the sun and temperatures in different seasons • Explain why the Earth experiences seasons, but not every other planet in the solar system does

Sound waves

Week	Lesson number/title	Core content
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23	1 Sound waves	<ul style="list-style-type: none"> • Label the main features of a wave diagram • Compare light and sound waves
23	2 Pitch and frequency & Amplitude and volume	<ul style="list-style-type: none"> • Describe how the pitch of sounds is determined • Interpret oscilloscope traces • Describe how the loudness of a sound is determined • Interpret oscilloscope traces
24	3 Speed of sound	<ul style="list-style-type: none"> • Calculate the speed of sound in air • Describe how and explain why the speed of sound varies in different media in terms of particles • Rearrange equations
24	4 The ear	<ul style="list-style-type: none"> • Identify key structures in the ear • Describe how the parts of the ear work together to allow us to hear sound
24	8 Hearing and Ultrasound	<ul style="list-style-type: none"> • Explain what is meant by 'hearing range' and how this differs with age and in different animals • Measure the loudness of common sounds using appropriate units • Describe what is meant by ultrasound • Describe uses of ultrasound
24	9 Sound devices	<ul style="list-style-type: none"> • Describe how a microphone works • Describe how a loudspeaker works • Explain why the frequency of the sound produced in the speaker is the same as the original sound wave

Matter

Week	Lesson number/title	Core content
25	1 Particle theory	<ul style="list-style-type: none"> Describe the arrangement and motion of particles in a solid, liquid and gas Define diffusion in terms of particle concentration and explain effect of temperature on diffusion Explain changes of state in terms of particles
25	2 Change of State	<ul style="list-style-type: none"> Explain why changes of state using particle theory. Interpret heating and cooling curves.
25	3 Density	<ul style="list-style-type: none"> Explain observations using particle model and density Compare densities and predict if objects will float or sink Calculate the density of regular objects
26	4 Diffusion	<ul style="list-style-type: none"> Define diffusion and Brownian motion Describe how diffusion affects a substance in solution or the air Explain why diffusion is passive using Brownian motion
26	5 Pressure in liquids	<ul style="list-style-type: none"> Describe the action of pressure in liquids and the cartesian diver Describe how the pressure changes as you go deeper in a liquid
26	6 Floating and sinking	<ul style="list-style-type: none"> Describe the effect of upthrust on the weight of objects Explain why objects float in terms of resultant forces Explain how upthrust can vary in water
26	7 Atmospheric pressure	<ul style="list-style-type: none"> Define atmosphere and describe how atmospheric pressure is caused Explain how changes in atmospheric pressure can happen and what the effects are Calculate percentage change

Energetics

Week	Lesson number/title	Core content
27	1 What is a rate?	<ul style="list-style-type: none"> Describe ways to measure the rate of a reaction Display data recording rate of reaction appropriately
27	2 Reaction rate graphs	<ul style="list-style-type: none"> Take readings from reaction rate curves Describe how and explain why reaction rate changes during a reaction
27	3 The Effect of Concentration	<ul style="list-style-type: none"> Identify variables to change, measure and control to test a hypothesis Display data appropriately Describe and explain the effect of concentration on the rate of reaction
28	Test	
28	Feedback	
28	4 Catalysts	<ul style="list-style-type: none"> Describe what a catalyst is and how it affects the rate of a reaction Describe the test for oxygen and its positive result
28	5 Exothermic and Endothermic reactions	<ul style="list-style-type: none"> Define endothermic and exothermic reactions Recognise endothermic and exothermic reactions from temperature changes

		<ul style="list-style-type: none"> • Make and explain suggestions to changes in the equipment that would improve the data collected.
29	6 Combustion	<ul style="list-style-type: none"> • Define a combustion reaction • Explain what is meant by complete and incomplete combustion and name the products
29	7 Complete and Incomplete combustion	<ul style="list-style-type: none"> • Compare complete and incomplete combustion • Evaluate different fuels
29	8 Thermal decomposition	<ul style="list-style-type: none"> • Define thermal decomposition • Write word and symbol equations to represent thermal decomposition reactions • Carry out a thermal decomposition reaction and explain it in terms of conservation of mass

Magnetism - ATL Link (Music - how loudspeakers work)

Week	Lesson number/title	Core content
30	1 Magnetic fields	<ul style="list-style-type: none"> • Draw the field lines around a magnet • Describe the magnetic field around a magnet, or the Earth, using fields lines
30	2 Magnetic forces	<ul style="list-style-type: none"> • Describe the forces of attraction and repulsion between magnets • Explain attraction and repulsion of magnets using field line patterns.

30	3 Electromagnets	<ul style="list-style-type: none"> • Describe how to make a simple electromagnet • Draw the shape of the magnetic field around a straight wire • Identify key variables for an investigation of electromagnets
30	4 Electromagnet investigation	<ul style="list-style-type: none"> • Investigate the factors which affect the strength of an electromagnet • Plot a graph of data • Analyse secondary data to draw conclusions
31	Revision	
31	EoY	
31	Feedback	
32	5 Uses of Electromagnets	<ul style="list-style-type: none"> • To state how electromagnets are used in a variety of devices • To understand how the motor effect is caused by magnetic fields • To state the factors affecting the speed of a direct motor
This allows for no loss of lessons, could continue into following weeks and allows for more revision around EOY assessment		

33	Biological Systems George Washington Carver	<ul style="list-style-type: none"> Describe George Washington Carver's contribution to botany Describe what is meant by crop rotation and how it improved crop yields Explain the advantages of crop rotation
33	Biological Systems Application of Knowledge	<ul style="list-style-type: none"> Write a conclusion from secondary data on stomata investigation Explaining the adaptation of leaves in relation to transpiration, rate of photosynthesis and plant growth
33	Chemical Reactions Case study of Helen Sharman	<ul style="list-style-type: none"> Understand key ideas about the life and work of Helen Sharman
34	Forces in action Robert Hooke and Uses of Elastic Objects	<ul style="list-style-type: none"> Describe the work of Robert Hooke Describe a use of an elastic object and explain the significance of Hooke's Law in context Describe how the spring constant affects how useful an elastic object is
34	Space Case study of Maggie Aderin-Pocock	<ul style="list-style-type: none"> Understand key ideas about the work of Dr Maggie Aderin-Pocock
34	Reactivity Harry Brearley	<ul style="list-style-type: none"> Describe the story of Harry Brearley Describe how he made stainless steel Compare stainless steel to other alloys
34	Sound Case study of James West	<ul style="list-style-type: none"> Understand the life and work of James West

35	Matter Robert Brown	<ul style="list-style-type: none">• Describe the work of Robert Brown
35	Energetics Mildred Cohn	<ul style="list-style-type: none">• Describe the story of Mildred Cohn