

# Year 7 - 6 lessons per cycle

## Particles

Week	Lesson number/title	Core content
1	1 Solids, liquids and gases	<ul style="list-style-type: none"><li>Describe how the movement and spacing of the particles is different in solids, liquids and gases</li><li>Draw accurate diagrams to represent the particle arrangement in solids, liquids and gases</li><li>Use the particle model to explain properties of solids, liquids and gases</li></ul>
2	2 Changes of state	<ul style="list-style-type: none"><li>Describe changes of state that occur from solid to liquid and liquid to gas in terms of particles</li><li>Interpret melting point and boiling point data</li></ul>
2	3 Gas pressure	<ul style="list-style-type: none"><li>Describe gas pressure</li><li>Explain the effect of gas pressure on containers</li><li>Describe and explain the effect of temperature on gas pressure in terms of particles</li></ul>
2	4 Conservation of mass	<ul style="list-style-type: none"><li>Draw a particle model for a solution</li><li>Make accurate measurements to test the conservation of mass theory</li><li>Explain the meaning of conservation of mass in terms of particles</li><li>Check for reproducibility</li></ul>
3	5 Pure and impure substances	<ul style="list-style-type: none"><li>Define a pure substance and link this to melting and boiling points</li><li>Define a mixture</li><li>Describe simple separation techniques</li></ul>
3	6 Separating mixtures	<ul style="list-style-type: none"><li>Identify parts of a mixture to be separated</li><li>Write a method for separating a mixture</li><li>Name key pieces of equipment and processes for separation to be successful</li></ul>
3	7 Distillation	<ul style="list-style-type: none"><li>Explain how a simple distillation works</li><li>Identify hazards and risks and suggest how to reduce them</li></ul>

		<ul style="list-style-type: none"> <li>Identify the components of a Liebig condenser and give reasons for this being more suitable than simple distillation equipment</li> </ul>
4	8 Chromatography	<ul style="list-style-type: none"> <li>Identify mixtures using chromatography</li> <li>Describe how to separate a mixture using chromatography</li> <li>Interpret chromatograms to describe the composition of mixtures</li> </ul>
4	9. Solubility	<ul style="list-style-type: none"> <li>Define the term 'solubility' and determine the solubility of a salt in a given solvent</li> <li>Use the particle model to explain solubility</li> <li>Comment on reproducibility and suggest improvements to a method</li> </ul>
4	10. Solubility practical	<ul style="list-style-type: none"> <li>Suggest a hypothesis from an observation</li> <li>Describe the effect of temperature on solubility</li> <li>Process and present data in an appropriate form</li> <li>Identify anomalous results</li> <li>Describe and explain patterns in solubility data using knowledge of particle theory</li> <li><a href="#">Solubility practical</a></li> </ul>

## Cells tissues and organs - ATL Link (Love, life & loss - creative poster about how the respiratory system works and how we treat respiratory disease)

Week	Lesson number/title	Core content
5	1 Microscopes	<ul style="list-style-type: none"> <li>Label the parts of the microscope</li> <li>Describe how to use a microscope, using key terms correctly</li> <li>Calculate magnification</li> </ul>
5	2 Unicellular organisms	<ul style="list-style-type: none"> <li>Define the term unicellular and label common features of unicellular organisms</li> <li>Name and describe the functions of some of the structures of unicellular organisms</li> <li>Describe some uses and dangers of unicellular organisms</li> </ul>

5	3 Diffusion	<ul style="list-style-type: none"> <li>• Define diffusion</li> <li>• Explain factors that affect diffusion</li> <li>• Explain examples of diffusion in the body</li> <li>• Identify variables to change, measure and control to investigate diffusion</li> <li>• Describe and explain patterns using ideas about diffusion</li> </ul>
6	4 Plant cells	<ul style="list-style-type: none"> <li>• Label a typical plant cell</li> <li>• Describe the function of the organelles in plant cells</li> <li>• Describe how to use a microscope to view plant cells in focus</li> </ul>
6	Test	
6	Feedback	
7	5 Animal cells	<ul style="list-style-type: none"> <li>• Label an animal cell and describe what each cell part does</li> <li>• Prepare a slide of human cells and observe using the microscope.</li> <li>• Calculate magnification or image/actual size given the equation</li> <li>• Compare plant and animal cells</li> <li>• Explain those differences in terms of functions of the parts</li> </ul>
7	6 Specialised cells	<ul style="list-style-type: none"> <li>• Describe features of specialised cells, using key structures</li> <li>• Describe specialisation to function in a range of animal and plant cells</li> <li>• Explain how the specialised features enable the cell to carry out its function</li> </ul>

7	7 Animals as organisms and Plant as organisms	<ul style="list-style-type: none"> <li>• Identify the major organ systems of the human body and describe their main functions</li> <li>• Describe the organisation of multicellular organisms, in terms of cells, tissues, organs</li> <li>• Explain why multicellular organisms need organ systems</li> <li>• Identify the organs of a plant and their functions</li> <li>• Name some of the tissues found in the leaf and describe their job</li> <li>• Describe ways in which the leaf is adapted to do its job</li> </ul>
8	8 Respiratory system	<ul style="list-style-type: none"> <li>• Label the parts of the respiratory system</li> <li>• Describe the path oxygen takes into the blood</li> <li>• Describe the adaptations of the breathing system to allow efficient diffusion</li> </ul>
8	9 Inhaled and exhaled air	<ul style="list-style-type: none"> <li>• Describe the composition of the air we breathe in and out</li> <li>• Explain the results of an experiment to prove the differences</li> <li>• Collect, display and process data with good resolution and process it appropriately</li> </ul>

## Energy

Week	Lesson number/title	Core content

8	1 Energy stores and transfers - Part A	<ul style="list-style-type: none"> <li>• Name the main energy stores and give examples</li> <li>• Describe energy transfers, identifying pathways</li> </ul>
9	2 Energy stores and transfers - Part B	<ul style="list-style-type: none"> <li>• Describe energy transfers using box diagrams</li> <li>• Apply the conservation of energy to examples</li> </ul>
9	3 Efficiency	<ul style="list-style-type: none"> <li>• Calculate energy stores in different contexts</li> <li>• Calculate the efficiency of energy transfers</li> <li>• Interpret Sankey diagrams</li> </ul>
9	4 Conduction  Convection  Radiation	<ul style="list-style-type: none"> <li>• Explain how heat is transferred by conduction</li> <li>• Describe how heat transfers occurs by convection</li> <li>• Explain what is meant by a convection current</li> <li>• Explain how heat is transferred by radiation</li> <li>• Explain everyday observations using an understanding of absorption and emission of radiation</li> <li>• Apply knowledge of conduction, convection and radiation to questions.</li> </ul>
10	5 Insulation	<ul style="list-style-type: none"> <li>• Describe an insulator in terms of energy transfers</li> <li>• Identify methods of reducing energy transfers and explain how they work</li> <li>• Apply knowledge of conduction, convection and radiation</li> </ul>

10	6 Power and energy	<ul style="list-style-type: none"> <li>• Explain the relationship between energy and power.</li> <li>• Convert given between watts and kilowatts and hours and minutes</li> <li>• Use the equation <math>p=e/t</math> to calculate power</li> </ul>
10	7 Energy in food 1	<ul style="list-style-type: none"> <li>• Identify variables to change, measure and control given a hypothesis</li> <li>• Write a method to test the hypothesis, including named equipment</li> <li>• Identify hazards and risks and suggest ways to reduce these with given equipment</li> </ul>
11	Test	
11	Feedback	
11	8 Non-renewable energy resources	<ul style="list-style-type: none"> <li>• Describe how fossil fuels are formed</li> <li>• Describe how electricity is generated in a fossil fuel power station</li> <li>• Explain advantages and disadvantages of fossil fuel use</li> </ul>
12	9 Renewable energy resources	<ul style="list-style-type: none"> <li>• Define renewable energy resources and give examples</li> <li>• Describe how renewable sources produce electricity using energy transfers</li> <li>• Describe the advantages and disadvantages of different renewable energy sources</li> </ul>

## Digestion

Week	Lesson number/title	Core content
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12	1 Healthy Diet	<ul style="list-style-type: none"> <li>• Name the components of food and describe what each is needed for in the body</li> <li>• Interpret and make calculations from nutrition labels</li> <li>• Calculate energy requirements for different activities</li> </ul>
12	2 Unhealthy diet	<ul style="list-style-type: none"> <li>• Describe some of the diseases linked with nutrient deficiency</li> <li>• Describe some of the diseases linked with imbalances in energy intake</li> <li>• Interpret data on the incidence of food related diseases</li> </ul>
13	3 Carbohydrates	<ul style="list-style-type: none"> <li>• Describe the difference between the two carbohydrates</li> <li>• Describe how to test for starch and sugar and their positive result</li> <li>• Work safely to carry out chemical tests for the presence of starch and sugar and record the results</li> </ul>
13	4 Protein and fats	<ul style="list-style-type: none"> <li>• Describe the chemical test for protein and fat and their positive results</li> <li>• Safely carry out the tests for protein and fat and record the results</li> <li>• Use the results collected to draw conclusions</li> </ul>
13	5 The digestive system	<ul style="list-style-type: none"> <li>• Explain why digestion is necessary</li> <li>• Label the organs of the digestive system and describe their function</li> <li>• Explain the importance of gut bacteria</li> <li>• Describe how the intestines are adapted for their function</li> </ul>
14	6 Adaptations of the small intestine	<ul style="list-style-type: none"> <li>• Describe and explain adaptations of the small intestine</li> </ul>

14	7 Enzymes	<ul style="list-style-type: none"> <li>Describe the action of the enzymes in the digestive system</li> <li>Explain the results of the 'model gut' experiment</li> <li>Evaluate the model</li> </ul>
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## Atoms and the periodic table

Week	Lesson number/title	Core content
14	1 Elements	<ul style="list-style-type: none"> <li>Define elements, name the two types of elements and locate them on the periodic table</li> <li>Recognise elements from drawings or names</li> <li>Describe the rules for writing chemical symbols</li> </ul>
15	2 Atoms	<ul style="list-style-type: none"> <li>Label a diagram of the atom and describe its structure</li> <li>Draw and write electron configuration for any of the first 20 elements</li> <li>Describe the link between electron configuration and place in the periodic table</li> </ul>
15	3 Metals and non-metals	<ul style="list-style-type: none"> <li>Describe some properties and uses of metals and non-metal elements</li> <li>Describe some of the stages in the formation of the periodic table</li> <li>Explain how the properties of the elements were used in early versions of the periodic table</li> </ul>
15	4 Compounds	<ul style="list-style-type: none"> <li>Describe compounds and use particle diagrams to represent them</li> <li>Make a simple compound and explain how it is different from the elements it is made of</li> <li>Name compounds given the elements contained</li> </ul>



16	5 Chemical formulae	<ul style="list-style-type: none"> <li>Name compounds given the elements or formulae</li> <li>Write formula using ideas of valency</li> <li>Interpret formulae in terms of number of each atom are present</li> </ul>
16	6 Making compounds	<ul style="list-style-type: none"> <li>Safely make a compound and predict the change in mass during the reaction</li> <li>Make accurate measurements to test the prediction made</li> <li>Use data collected to check the prediction and explain observations</li> </ul>
16	7 Conservation of mass	<ul style="list-style-type: none"> <li>Apply conservation of mass ideas to physical and chemical changes</li> <li>Plot secondary data and draw a line of best fit</li> <li>Describe and explain patterns in data</li> <li>Use secondary data to check for reproducibility</li> </ul>
17	10 Group 1	<ul style="list-style-type: none"> <li>Describe some of the properties of group 1 elements</li> <li>Describe trends in physical and chemical properties of group 1</li> <li>Write word (or symbol) equations to represent their reaction with oxygen and water</li> </ul>
17	Test	
17	Feedback	
18	11 Group 7	<ul style="list-style-type: none"> <li>Describe trends in physical properties of group 7</li> <li>Describe the trend in reactivity of group 7</li> <li>Write word equations to represent their reaction with group 1 elements</li> </ul>

18	13 Group 0	<ul style="list-style-type: none"> <li>• Describe properties of group 0 elements</li> <li>• Describe uses of group 0 elements</li> </ul>
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## Forces - ATL Link (Sporting Innovation - how forces and speed apply in sporting events)

Week	Lesson number/title	Core content
18	1 What are Forces? & Representing Forces	<ul style="list-style-type: none"> <li>• Identify forces in a range of context</li> <li>• Give examples of contact and non-contact forces</li> <li>• Represent the size and direction of force using arrows</li> <li>• State the unit of force</li> <li>• Represent the size and direction of forces using arrows in a free body diagram</li> <li>• State whether opposing forces are balanced or unbalanced</li> </ul>
19	2 Resultant Forces	<ul style="list-style-type: none"> <li>• Describe the effect of balanced and unbalanced forces on the motion of an object</li> <li>• Calculate resultant forces</li> </ul>
19	3 Gravity &	<ul style="list-style-type: none"> <li>• Measure and record the weight of known masses</li> <li>• Correctly plot a graph with a line of best fit</li> <li>• Describe the relationship between mass and weight on Earth</li> </ul>

	Weight	<ul style="list-style-type: none"> <li>• Use an equation to calculate weight</li> <li>• Explain why weight changes on different planets</li> <li>• Use a rearranged equation to calculate mass</li> </ul>
19	4 Pressure	<ul style="list-style-type: none"> <li>• State what is meant by pressure</li> <li>• Use an equation to calculate pressure</li> <li>• Apply knowledge to explain why pressure may be high or low in everyday situations</li> </ul>
20	5 Calculating speed using an equation	<ul style="list-style-type: none"> <li>• Use an equation to calculate speed</li> <li>• Give the correct units in all cases.</li> <li>• Calculate the relative speed of objects passing one another</li> </ul>
20	6 Distance-time graphs	<ul style="list-style-type: none"> <li>• Describe the features of distance time graph</li> <li>• Use a distance-time graph to calculate speed</li> <li>• Represent a journey using a distance time graph</li> </ul>
20	7 Calculating speed using distance time graphs	<ul style="list-style-type: none"> <li>• Compare speeds in distance time graphs</li> <li>• Calculate speed using the gradient of a distance-time graph</li> </ul>

# Reproduction

Week	Lesson number/title	Core content
21	1 Human reproductive system	<ul style="list-style-type: none"> <li>• Describe adaptations of the egg and sperm cells for their job</li> <li>• Label diagrams of the human male and female reproductive system</li> <li>• Describe the function of each of the parts</li> </ul>
21	2 Fertilisation	<ul style="list-style-type: none"> <li>• Describe how reproduction takes place in humans</li> <li>• Describe the process fertilisation and implantation</li> <li>• Explain the role of cilia found in the oviduct</li> <li>• Describe the process of cell division</li> </ul>
21	3 Gestation & Risk Factors during Gestation	<ul style="list-style-type: none"> <li>• Describe the development of the foetus and the function of the placenta, umbilical cord and amniotic fluid</li> <li>• Explain how the foetus gets its nutrition and oxygen, and how waste is excreted</li> <li>• Describe risks of smoking and alcohol during pregnancy</li> <li>• Use data to describe the impact of smoking on the unborn baby</li> </ul>
22	4 Birth	<ul style="list-style-type: none"> <li>• Describe patterns in secondary data</li> <li>• Describe how a baby is born</li> <li>• Explain differences in numbers of offspring for different animals</li> </ul>
22	Test	
22	Feedback	

23	5 Puberty and the menstrual cycle	<ul style="list-style-type: none"> <li>• Describe some of the changes in males and female bodies during puberty</li> <li>• Describe the main events in the menstrual cycle</li> </ul>
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## Electricity - ATL (Technology over time - create a new smart product)

Week	Lesson number/title	Core content
23	1 Circuits	<ul style="list-style-type: none"> <li>• Name common circuit symbols</li> <li>• Make basic observations on what is needed for a circuit to work</li> <li>• Use a model to describe electricity</li> </ul>
23	2 Current and series circuits	<ul style="list-style-type: none"> <li>• Use an ammeter to make and record measurements of current at different points in a series circuit</li> <li>• Describe how current behaves in a series circuit</li> <li>• Describe and explain the effect of adding extra bulbs on current</li> </ul>
24	3 Current and parallel circuits	<ul style="list-style-type: none"> <li>• Recognise and draw parallel circuits</li> <li>• Make and record measurements of current in parallel</li> <li>• Describe how current behaves in parallel</li> <li>• Make predictions for untested circuits</li> </ul>
24	4 Potential difference	<ul style="list-style-type: none"> <li>• Describe potential difference using a model</li> <li>• Describe how to use a voltmeter to measure potential difference across components</li> <li>• Describe pd in series circuits</li> </ul>
24	5 Potential difference in parallel circuits	<ul style="list-style-type: none"> <li>• Describe pd in parallel circuits</li> <li>• Compare patterns of pd in series and parallel circuits</li> </ul>

25	6 Resistance	<ul style="list-style-type: none"> <li>Investigate the relationship between current, pd and resistance</li> <li>Use data collected to inform a conclusion</li> <li>Use an equation to calculate current, pd or resistance</li> </ul>
25	7 Measuring resistance	<ul style="list-style-type: none"> <li>Identify variables to change, measure and control</li> <li>Collect and display results appropriately</li> <li>Describe and explain the effect of length of wire on resistance</li> </ul>
25	8 Static electricity	<ul style="list-style-type: none"> <li>Describe what is meant by static electricity</li> <li>Describe how objects can become charged</li> <li>Describe how the charge can produce a force between charged objects</li> </ul>

## Ecological relationships and classification

Week	Lesson number/title	Core content
26	1 Food chains and webs & Representing food chains	<ul style="list-style-type: none"> <li>Interpret food webs</li> <li>Describe ways in which animals and plants are interdependent</li> <li>Draw and interpret pyramids of number</li> </ul>

26	2 Decay	<ul style="list-style-type: none"> <li>• State the best conditions for decay</li> <li>• Explain the importance of decay.</li> <li>• Describe what causes decay</li> <li>• Explain the design features of a compost bin</li> </ul>
26	3 Impacts on food webs	<ul style="list-style-type: none"> <li>• Describe how changes in the environment can affect different organisms</li> <li>• Explain how changes in the environment can affect organisms within a food web</li> <li>• Explain the process of bioaccumulation</li> </ul>
27	4 Random Sampling Estimating populations	<ul style="list-style-type: none"> <li>• Describe how to use a quadrat to sample an ecosystem</li> <li>• Construct a frequency table</li> </ul>
27	Test	
27	Feedback	
28	5 Classifying living organisms	<ul style="list-style-type: none"> <li>• Classify organisms given appropriate information</li> <li>• Explain the basis of the Linnaeus classification</li> </ul>
28	6 Adaptation	<ul style="list-style-type: none"> <li>• Suggest things organisms may compete for</li> <li>• Describe ways in which organisms are adapted to be better competitors</li> <li>• Explain how these adaptations help them survive in given conditions</li> </ul>

28	7 Natural selection	<ul style="list-style-type: none"> <li>• Describe ways in which organisms may vary within a species</li> <li>• Explain why some organisms within a species are better adapted to their environment</li> <li>• Explain why genetic variation within a species can drive natural selection</li> </ul>
29	8 Evolution evidence	<ul style="list-style-type: none"> <li>• Describe evidence for evolution</li> <li>• Explain how the evidence supports the evolution theory</li> <li>• Describe the changes that can lead to extinction</li> </ul>

## Plants and Photosynthesis

Week	Lesson number/title	Core content
29	1 Plant Roots	<ul style="list-style-type: none"> <li>• Describe the function of the root and root hair cells</li> <li>• Compare root hair cells to 'typical' plant cells</li> <li>• Explain how the adaptations of the root are related to its function</li> </ul>
29	2 Photosynthesis	<ul style="list-style-type: none"> <li>• Identify the reactants and products of photosynthesis</li> <li>• Describe photosynthesis using a word equation</li> <li>• Interpret and draw conclusions from data</li> </ul>
30	3 Uses of Sugar	<ul style="list-style-type: none"> <li>• Identify hazards and risks and suggest appropriate ways to reduce the risks</li> <li>• Make observations and describe results</li> <li>• Draw conclusions from results related to photosynthesis</li> </ul>



30	4 Rate of photosynthesis	<ul style="list-style-type: none"> <li>• Identify factors to change, measure and control to test a hypothesis</li> <li>• Collect and display data appropriately</li> <li>• Draw conclusions from data collected</li> </ul>
30	5 The leaf	<ul style="list-style-type: none"> <li>• Describe how leaves are adapted for their function</li> <li>• Use a microscope correctly to observe stomata</li> <li>• Explain how features enable the leaf to do its job</li> </ul>
31	EoY	
31	EoY	
31	EoY	
32	6 Transport in plants	<ul style="list-style-type: none"> <li>• Label the xylem and phloem</li> <li>• Describe the role of the xylem and phloem in transporting water and sugars</li> <li>• Describe the path of water and glucose around the plant</li> </ul>
32	7 Plants as food	<ul style="list-style-type: none"> <li>• Describe the role of plants as producers</li> <li>• Test for starch in common diet items</li> <li>• Describe the importance of insect pollination to food security</li> </ul>

32	Feedback	
<p>This allows for no loss of lessons, could continue into following weeks and allows for more revision around EOY assessment</p>		
33	Particles Case Study of Masataka Taketsuru	<ul style="list-style-type: none"> <li>● State key facts about the life of Masataka Taketsuru</li> <li>● Describe his involvement with the development of distillation of whiskey</li> </ul>
33	Cells, organs etc Case study of Betty Hay	<ul style="list-style-type: none"> <li>● Understand key ideas about the life and work of Betty Hay</li> </ul>
33	Energy Anne Easley	<ul style="list-style-type: none"> <li>● Describe the work of Anne Easley</li> <li>● Apply knowledge of energy stores to rocketry</li> </ul>
34	Digestion Case Study of Rebecca Lancefield	<ul style="list-style-type: none"> <li>● Understand key ideas about the life and work of Rebecca Lancefield</li> </ul>

34	Forces Avicenna and the story of inertia	<ul style="list-style-type: none"> <li>● Describe the contribution of Avicenna to understanding motion</li> <li>● Describe how theories of motion have developed over time</li> </ul>
34	Reproduction Jean Purdy and Fertility Treatment	<ul style="list-style-type: none"> <li>● Describe the work of embryologist Jean Purdy</li> <li>● Describe her contribution to fertility treatment and the uses of her discoveries</li> </ul>
35	Electricity Lewis Howard Latimer	<ul style="list-style-type: none"> <li>● Describe the contribution of Latimer to electrical lighting</li> <li>● Give the advantages and disadvantages of LED bulbs</li> <li>● Compare different types of bulbs</li> </ul>
35	Ecology Case Study of Mary Anning	<ul style="list-style-type: none"> <li>● State key facts about the life of Mary Anning</li> </ul>
35	Photosynthesis George Washington Carver	<ul style="list-style-type: none"> <li>● Describe George Washington Carver's contribution to botany</li> <li>● Describe what is meant by crop rotation and how it improved crop yields</li> <li>● Explain the advantages of crop rotation</li> </ul>

