Year 10 2020-2021

Half Term 2 (Autumn 2)

GCSE Biology B3 Organisation and the Digestive System			
What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
To identify organs and organ systems, specifically the human digestive system. Understand the chemical makeup of food and how this is digested in our bodies usingenzymes	**Knowledge** • Name examples of organs and organ systems • State the organs within the digestive system • Recall the chemicals that makeup liquids, proteins and carbohydrates • Perform a food test practical and record results • Define the term enzyme and identify function • State of temperature and PH affect enzymes • Plot a line graph using results from practical • Identify the correct enzyme used to break down a certain food • Define the stomach and the livers role in making digestion efficient **Understanding** • State the function of organ systems • Suggest the function of glandular, epithelial, and muscular tissue in organs • Describe in detail the process of digestion • Explain in detail how the small intestine is adapted to its function. • Explain why food molecules are called polymers • Describe how enzymes speed up reactions and are used in metabolism • Plan an experiment to investigate how different catalysts affect the rate of a reaction. • Explain where enzymes are made in the body • Describe how bile and stomach acid makes digestion efficient **Skills** • Can write a simple hypothesis • Correct plotting of data • Understanding the difference between a hypothesis and prediction • Identify simple trends and patterns within data • Used knowledge and understanding to write simple predictions • Writing detailed observations from reactions • Suggest next lines of enquiry • Define: Specify the meaning of something. • Link: write to link structure and function • Convert between common measurements (cm-m)	Confident use of graph skills and drawing tangents to identify rate of reaction using enzymes A structured and well planned investigation into the rate of enzymes – practical carried out safely and effectively Exploring how to use chemical indicators to test a range of food samples – use hypothesise to predict results Analyse the chemical makeup of foods and use this knowledge to create a meal plan / diet advice for individuals suffering from particular diseases Research early experiments by Dr. Beaumon and explain how this lead to important discoveries regarding the function of stomach acid	BBC Bitesize Doddle – power points and quick quizzes You tube: ‘Free science lessons’ Seneca learning platform

Scheme of Work 2020-2021

Subject: GCSE Science: B3: Organisation and the Digestive System

Year Group: 10 /11

Specification: AQA Combined Science Trilogy

Skill focus: 2, 3, 9, 15, 19d and e, 23c

Lesson No	Topic & Objectives	Big Question – What will students learn?	Key Activities & Specialist Terminology (Do Now Task / Starter/Tasks/Plenary	Planned Assessment	Homework or flipped learning resources DODDLE resources	Lit Num SMSC Codes
B3.1 Tissues and Organs	**Aiming for Grade 4 LOs:** • State examples of cells, tissues, organs, and organ systems. • Name organs found in a given organ system • Order cells, tissues, organs, and organ systems according to their relative sizes. **Aiming for Grade 6 LOs:** • Define the terms tissue, organ, and organ system. • Describe the function of certain organs and organ systems. • Identify tissues that make up organs. **Aiming for Grade 8 LOs:**	How to cells manage to make an entire body? Why are multicellular organisms so complicated? How does the tissue an organ is made from	**Lesson Overview** **Starters** **Organising an organism** (10 min) Ask students to rearrange the key words organ, tissue, organism, cell, and organ system into an order of their choosing. Then remind students of the hierarchy of organisation, using these key words. **Organ system** (5 min) Show the students an image of the circulatory system. Ask them to describe its function and give an example of an organ, a tissue, and a cell that it contains. Introduce how cells are arranged into tissues, and tissues into organs. **Mains**	Class discussion Students' response Q & A between teachers and students Exam questions	Learn the Keywords for the topic: Cells Tissues organs organ system glandular epithelial and muscular tissue pancreases oesophagus	SO3 SO9 SP1 SP2 SP5 SP9 C2

	• Relate levels of organisation to familiar organ systems in order to give examples of cells, tissues, and organs. • Explain why the cells of multicellular organisms are organised into tissues, organs, and organ systems. • Suggest the function of glandular, epithelial, and muscular tissue in organs.	determine what it does?	**Tissue research** (20 min) Ask students to work in groups of four. Each student uses books and/or the Internet to research which tissues are present in one of the following organs: heart, stomach, liver, and pancreas. They also write down the function of each tissue in the organ. **Happy organ systems** (20 min) Supply each group of four students with a set of cards, each card showing a different organ. Students shuffle all of the cards together then deal them out evenly between the members of the group. Each student has to collect the three organ cards needed to make up an organ system. Students take it in turns to ask another student for an organ. If they have the organ in their hand, they have to give it to the asker and the asker gets to ask for another organ. If they don't have it in their hand then that student gets to ask for an organ. Once a student has collected an entire organ system, they put that group to the side. Once all the organ systems have been collected, students then play with for whole organ systems. Whichever student collects all of the organ systems wins. The organ systems to include are nervous (brain, eyes, spinal cord), digestive (stomach, pancreas, oesophagus), excretory (kidneys, bladder, liver), respiratory (lungs, trachea, bronchi), female reproductive (ovary, uterus, vagina), male reproductive (penis, testes, scrotum), and circulatory (heart, arteries, veins). **Plenaries** **How organisms are made** (10 min) Students use the interactive to match key words from the lesson with their definition. They then sort terms according to whether they are tissues, organs, or organ systems. **Mystery organ** (5 min) Show the students an image of the skin in cross-section. Ask them to identify different types of tissue and their		liver gall bladder carbohydrates proteins fats enzyme amylase lipases proteases pancreases digestion food molecules Doddle: AQA organisation-mini quiz	

			functions (e.g., epithelial as a barrier, glandular to produce sweat, muscular – smooth – to raise hairs and facilitate vasoconstriction).			
B3.2 The Human Digestive System	**Aiming for Grade 4 LOs:** • Identify some of the organs of the digestive system. • State the function of some of the organs of the digestive system. • State simply what happens to food during digestion. **Aiming for Grade 6 LOs:** • Name all of the organs of the digestive system. • Describe the functions of the organs of the digestive system. • Summarise the process of digestion. **Aiming for Grade 8 LOs:** • Link the process of digestion to other processes in the body in order to explain its function. • Explain in detail how the small intestine is adapted to its function. • Explain in detail what happens to food during digestion.	Are we really what we eat? Are some foods harder to digest than others? Is it true that some foods make us more likely to be overweight than others?	**Lesson Overview** **Starters** **What happens to my food?** (10 min) Ask students to draw an annotated sketch to show what they know already about what happens to food once it has been eaten. Take time to discuss prior knowledge and correct any possible misconceptions at this stage. **How long?** (5 min) Tell the students that the diameter of an average human cell is 1×10^{-6} m. The human digestive system of an adult man is around 9 million times or 6 orders of magnitude longer than this. Ask them to work out its length (9 m). **Main** **The digestive system** (40 min) Provide students with an unlabelled diagram of the human digestive system. Students label the diagram and state the function of each organ. They can use Figure 1 in the student book to help them. Then ask the students to use the information in the student book to find one adaptation of the pancreas. Discuss that it produces enzymes that help break down the food. Ask students to further label their diagram with other adaptations of the digestive organs that help them to carry out their function. Check the answers as a class or use peer assessment. **Plenaries**	Class discussion Students' responses Q & A between teachers and students Exam questions	Doddle: The digestive system presentation	SO3 SO9 SP1 SP2 SP5 SP9 C2

			Digestion (10 min) Students use the interactive to label the part of the digestive system. They then match the organs of the digestive system with their function. **Digestion's place in the body** (5 min) Read out some other processes that occur in the human body, for example, respiration or excretion. Ask students to suggest how these processes are dependent on the digestive system.			
B3.3 The Chemistry of Food	**Aiming for Grade 4 LOs:** • Recall that food contains the molecules carbohydrates, lipids (fats), and proteins. • State the function of each food molecule in the diet. • Carry out a food test and record results in a table. **Aiming for Grade 6 LOs:** • Describe the structure of simple sugars, starch, lipids, and proteins. • Carry out multiple food tests in an organised manner. • Design a results table to clearly record results from food tests. **Aiming for Grade 8 LOs:** • Explain which food molecules are polymers. • Apply knowledge of the function of food molecules in the body to give diet advice. • Suggest what a food contains using results from food tests, evaluating the observed data collected	Are we really what we eat? Are some foods harder to digest than others? Is it true that some foods make us more likely to be overweight than others?	**Lesson Overview** **Starters** **Nutrient names** (10 min) Ask students to write down individually a list of nutrients found in food. They then compare lists in small groups before a teacher-led group discussion on the function of each nutrient. **Foods** (5 min) Show the class some images of food or food packaging and ask them what nutrients each food is a good source of. Discuss that foods contain the nutrients carbohydrates (which are simple sugars or complex carbohydrates), proteins, and lipids (fats). **Main** **Food tests** (40 min) Introduce students to the structure of carbohydrates, proteins, and lipids, and how each nutrient functions within the body. Students then conduct food tests on samples of food and record their results. They analyse their results to identify different nutrients present in each food source. **Plenaries** **Food molecules** (5 min) Students use the interactive to match the nutrient to its function. They then sort uses of nutrients into the correct categories. **Diet advice** (10 min) Ask students to work in groups. Give each group a different person who has a specific dietary need: • I need to lose mass. • I want to start body-building. • I am running a marathon.	B4: Use qualitative reagents to test for a range of carbohydrates, lipids and proteins. (spec.: 4.2.2.1, collins: 3.9)	Doddle: Benedict test for reducing sugar	SO3 SO9 SP1 SP2 SP5 SP9 C2

			• I am pregnant. Ask groups to advise the person on how to modify their diet. Groups should feed-back their advice with their reasoning.			
B3.4 Catalysts and Enzymes	**Aiming for Grade 4 LOs:** • Recall that enzymes are proteins that are biological catalysts. • State one function of enzymes inside the body. • State the independent variable in a given investigation. **Aiming for Grade 6 LOs:** • Describe how enzymes are used in digestion. • Use the lock and key theory to explain why the shape of an enzyme is vital for it to function. • Identify the key variables in a given investigation. **Aiming for Grade 8 LOs:** • Explain how enzymes speed up reactions. • Explain how enzymes control metabolism. • Plan an experiment to investigate how different catalysts affect the rate of a reaction.	Does metabolism affect weight gain? What happens if your enzymes stop working?	**Lesson Overview** **Starters** **Elephant's toothpaste** (5 min) Show a video of the 'Elephant's toothpaste' reaction to show the effect of a catalyst on the rate of breakdown of hydrogen peroxide. Make sure students understand that without the catalyst the breakdown still occurs, but very slowly. **Catalysts** (10 min) Ask students to write down their definition of the term catalyst. Listen to their ideas and construct a class definition. Then ask students to define the term enzymes. Take time to correct any misconceptions at this stage. **Main** **Breaking down hydrogen peroxide** (40 mins) Explain to students that enzymes are biological catalysts. Explain the lock and key model of how enzymes work. Students then plan an investigation to compare how an inorganic catalyst and an enzyme (catalase) affect the rate of breakdown of dilute hydrogen peroxide in oxygen and water. They should first state their variables (independent, dependent, and control), before deciding how to measure their dependent variable. You could show the students the equipment available to help them to decide this. If there is time, allow students to carry out a trial run first. **Plenaries** **Enzyme memory** (10 min) Provide students with a group of cards, each card showing either a key term or definition. Students use a memory game to test their understanding of enzyme key words by matching them to their definitions. **Enzymes** (5 min) Interactive where students complete a series of paragraphs summarising the key points about	Class discussion Students' response Q & A between teachers and students Exam questions	Doddle: Enzyme and digestion, Enzyme min quizzes	SO3 SO9 SP1 SP2 SP5 SP9 C2

			enzymes. They then identify true and false statements about enzymes.			
B3.5 Factors Effecting Enzyme Action	**Aiming for Grade 4 LOs:** • State that temperature and pH affect how well an enzyme works. • Plot a line graph. • State simply what a line graph shows about how temperature or pH affects the rate of an enzyme-catalysed reaction. **Aiming for Grade 6 LOs:** • Explain why high temperatures and changes in pH prevent enzymes from catalysing reactions. • Draw a tangent to a line and calculate the rate of a reaction with guidance. • Plot a line graph and use it to draw conclusions about how temperature and pH affect the rate of an enzyme-catalysed reaction. **Aiming for Grade 8 LOs:** • Explain in detail how a change in temperature or pH affects the rate of an enzyme-catalysed reaction. • Apply knowledge of enzymes to explain how some organisms can survive in extreme conditions. • Draw tangents in order to calculate the rate of a reaction.	What could happen if the rate of enzyme reaction changed? Are the effects of increasing or decreasing rate of reactions equal? How are some organisms able to live in such harsh environments? What is so special about the Wood Frog?	**Lesson Overview** **Starters** **Sentences** (5 min) Present the class with the words enzyme, active site, substrate, and product. Ask them to create a meaningful sentence containing all these words. **Egg-speriment** (10 min) Crack an egg into a small beaker and heat it over a Bunsen burner. Ask students to describe what changes are happening to the egg. Discuss the fact that you cannot return the egg to its original state and that the proteins in the egg have changed shape or denatured due to heating. **Main** **Does temperature affect the speed of an enzyme reaction?** (30 min)Introduce the factors that affect enzyme reaction – temperature and pH. Students plot a line graph of enzyme activity at different temperatures. They should explain what the graph shows using ideas about collision theory, active site, and denaturation in their answer. They then draw tangents to at least three different places on the line in order to calculate the rate of the reaction at different places. **Plenaries** **Reaction rate** (5 min) Interactive where students study a graph to select an enzyme's optimum temperature. They then study a graph and select statements about it that are true. **Body temperature** (10 min) Ask students to write down why they think body temperature is maintained around 37 °C. Discuss their answers and explain that if it goes much lower or higher than enzymes will not work as efficiently and vital metabolic reactions would slow down.	B5: Investigate the effect of pH on the rate of reaction of amylase enzyme. (spec.: 4.2.2.1, collins:3.6)	Doddle: AQA Enzyme activity practical quiz	SO3 SO9 SP1 SP2 SP5 SP9 C2
	Aiming for Grade 4 LOs: • State that enzymes are used in digestion to break down food molecules.	What would you consider if the most vital part	**Lesson Overview** **Starters**	Class discussion Students' response	Doddle: AQA enzyme digestion mini quiz	

B3.6 How the digestive system works	• Identify that carbohydrases break down carbohydrates, proteases break down proteins, and lipases break down lipids. • Plan a simple method to carry out an investigation. **Aiming for Grade 6 LOs:** • Explain why enzymes are needed for digestion. • For each food molecule, name the enzyme that acts on it, where it is produced, and which products are formed. • Plan and carry out an investigation in order to gather accurate results. **Aiming for Grade 8 LOs:** • Suggest how to test for substrates and products in a model gut. • Make a prediction with a clearly structured scientific explanation. • Analyse results in order to evaluate a method and the validity of conclusions, explaining suggestions for possible improvements.	of the digestive system?	**Question creation** (10 min) Present students with the terms enzyme, catalyst, active site, substrate, lock and key model, denature, digestion, carbohydrate, lipid, and protein. Ask them to write a question that has one of the key words as the answer. Ask students to read out their questions so the class can answer them. **Diffusion recap** (5 min) Draw a diagram on the board showing a cell with differing concentrations of glucose on either side of the membrane. Ask students to predict which way the glucose will move and explain why. **Main** **The effect of pH on the rate of reaction of amylase** (30 min) Students plan an experiment to investigate how pH affects the rate of amylase activity. Students should be guided to choose a suitable range for the independent variable and to use control variables. Students use their data to plot a line graph and answer questions in order to draw conclusions from the data and evaluate the method. Students should swap data with a group that investigated the other variable from them. More time can be devoted to this investigation next lesson. **Plenaries** **Digestive enzymes** (10 min) Students use the student book spread to find out the names of enzymes, where in the digestive system they are produced, what food molecules they break down, and the name of the products. They should summarise this information as a table. **The importance of enzymes** (5 min) Students use the interactive to identify the nutrients broken down by the enzymes amylase, lipase, and protease, and the products formed. Students then identify where each of the enzymes is produced in the body.	Q & A between teachers and students Exam questions		
B3.7 Making digestion efficient	**Aiming for Grade 4 LOs:** • State that the stomach contains acid. • State that the liver produces bile. • Write a simple hypothesis and prediction.	Why is bile so important? How is your digestive system adapted to	**Lesson Overview** **Starters** **Rates** (10 min) Give students the following situation:	Class discussion Students' response	Effect of changing pH on enzyme catalysed reactions	SO3 SO9 SP1

	Aiming for Grade 6 LOs: • Describe the functions of bile. • Calculate the mean rate of an enzyme-catalysed reaction. • Analyse data in order to determine whether a hypothesis is correct. **Aiming for Grade 8 LOs:** • Explain how acid in the stomach increases the efficiency of pepsin. • Explain how bile increases the efficiency of fat digestion. • Explain how the rate of an enzyme-catalysed reaction shows how efficient the reaction is.	ensure the fastest digestion? What could the consequences of part of this system being damaged? How do scientists know that this is how digestion works? (Research early experiments including the open stomach)	Two people walk to school. Sam's journey is 1 km and it takes him 20 minutes. Ruby walks 0.5 km in 15 minutes. Ask students to work out who walked at the fastest mean rate? Ask students to give their answer and explain how they worked it out. Explain that this is a mean rate as it does not tell you how their walking rate varied during the walk. Explain that the mean rate of enzyme-catalysed reactions can be worked out in a similar way – you can compare the times taken for the reaction to take place. **The gall bladder** (10 min) Show students a diagram of the gall bladder and tell them that it produces an alkaline substance called bile. Ask students to suggest why bile needs to be released into the small intestine. **Main** **Breaking down protein** (20 min) Set up the practical as detailed. Ask students to write a hypothesis for what they think will happen to the meat chunks. Then provide students with some data showing the time taken for a piece of egg white to break down in different pH solutions. Students calculate the mean rate of the reaction at each pH value. Then ask students to review their hypothesis and make any changes if necessary. The experiment will need to be revisited in a future lesson to confirm whether students' hypotheses are correct. **Functions of bile** (20 min) Discuss with the class why washing-up liquid is used. Explain that it breaks large fat globules in food down into smaller droplets that are mixed (emulsified) into the water and are washed away more easily. Carry out the demonstration as outlined. Ask students to use information in the student book and the Working scientifically sheet to come up with a hypothesis for the experiment. Show them the results – the washing up liquid emulsifies the lipids, so this reaction should be quicker. **Plenaries** **Analysing enzyme data** (10 min) Students analyse rates data in the form of results tables and graphs to draw conclusions on how pH affects enzyme activity.	Q&A between teachers and students Assessing students' answers Exam questions		SP2 SP5 SP9 C2

			Bile and enzymes (5 mins) Ask students to list all the enzymes involved in digestion and what they break down (lipase breaks down lipids, carbohydrase – amylase – break down carbohydrates, protease – pepsin – breaks down proteins). Use this as an opportunity to emphasise that bile is not an enzyme, and correct any students who list it.			

GCSE Chemistry C2 The Periodic Table			
What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
History of the periodic table and how atomic structure can explain trends	**Knowledge** • Key dates, scientists and developments in the history of the periodic table • Trends of group 1, 7 **Understanding** • Applying knowledge of atomic structure to explain the trends shown in the periodic table and predict the behaviour of 'unknown' atoms **Skills** • Make predictions using scientific knowledge and understanding • Drawing conclusions from data • Link a conclusion / investigation to the amendment of a scientific idea	Extended scientific writing that explains the trends shown in the periodic table in relation to their atomic structure. Effective and throughout use of data when drawing conclusions Independent research to expand on the history of the periodic table to include some of the more recently discovered elements Ability to create their own periodic table from the data they are given about each element and compare to the modern version. Extending thoughts to other groups in the periodic table to explain reactivity of the noble gases or question the reactivity of transition and group 4 elements	BBC Bitesize Doddle – power points and quick quizzes You tube: 'Free science lessons' Seneca learning platform

Scheme of Work 2020-2021

Subject: GCSE Science: C2: The Periodic Table

Year Group: 10 /11

Specification: AQA Combined Science Trilogy

Skill focus: 3,9 and 14

Lesson No	Topic & Objectives	Big Question – What will students learn?	Key Activities & Specialist Terminology (Do Now Task / Starter/Tasks/Plenary	Planned Assessment	Homework or flipped learning resources DODDLE resources	Lit Num SMSC Codes
C2.1 Development of the Periodic Table	**Aiming for Grade 4 LOs:** • List the significant models for ordering the elements. • State how the elements are ordered in the periodic table. **Aiming for Grade 6 LOs:** • Describe how the elements are arranged in groups and periods in the periodic table. • Explain why the periodic table was a breakthrough in how to order elements. **Aiming for Grade 8 LOs:**	How do ideas change over time? How were scientists able to know which order to put all of the elements? Who discovered the elements? How can the periodic table	**Lesson Overview** **Starters** **Geography of the periodic table** (5 minutes) Students draw an outline of the periodic table and label metals, non-metals, alkali metals, halogens, transition metals, noble gases, group numbers, and period numbers. **What I know table** (10 minutes) Ask students to draw a table with three columns – what I know, what I want to know, and what I know now. Ask students to fill in the first column with bullet points about what they already know about the periodic table and in the second column, questions that they would like to have answered in the lesson. **Mains** **The development of the periodic table** (20 minutes) Students use secondary resources including the student book and the Internet to make a timeline to show how the	QnA between teachers and students Written responses to questions Class discussion Newspaper article	Doddle: The development of the periodic table animation AQA the periodic table mini quiz	So3 C3 Sp2 Sp9 Sp1 C5 So7

	• Explain how and why the ordering of the elements has changed over time.	help us pass our GCSE's?	elements were ordered in different ways. The timeline should include dates, the scientist who proposed the idea, and an outline of the idea (an image if available). **Newspaper article** (20 minutes) Students write a newspaper feature article to explain the development and importance of the periodic table. **Plenaries** **The history of the periodic table** (10 minutes) Interactive where students summarise their learning from the lesson by completing sentences on the work of chemists to arrange the elements. **What I know table revisited** (10 minutes) Ask students to look back at their table from the starter. In a different colour, make any corrections in the first column, answer the questions in the second column and list any other information they have found out in the lesson in the last column.			
C2.2 Electronic Structures and the periodic table	**Aiming for Grade 4 LOs:** • Define a group and period in the periodic table. • Describe how electronic structure is linked to the periodic table. • State that noble gases are unreactive. **Aiming for Grade 6 LOs:** • Describe how the electronic structure of metals and non-metals are different. • Explain in terms of electronic structure how the elements are arranged in the periodic table. Explain why the noble gases are unreactive and the trend in their boiling points. **Aiming for Grade 8 LOs:**	Why are some elements on the table more reactive than others? What makes an element dangerous? Why are some elements solid but others are gases?	**Starters** **The modern periodic table** (10 minutes) Introduce the periodic table and how elements in the same group within the periodic table have similar properties. Students summarise the arrangement of elements in the periodic table, then identify some simple properties of groups of the periodic table. **Diagrams** (10 minutes) Ask students to draw the electronic structures of lithium, sodium, and potassium. Ask students what they all have in common and how their electronic structures relate to their position in the periodic table. **Main** **Electron structures and the periodic table** (40 minutes) Give students a simplified version of the AQA periodic table photocopied onto an A3 sheet of paper, with plenty of space around the periodic table. Ask students to annotate the table to explain how electronic structure relates to position in the periodic table, how predictions of electronic structure can be made, why the noble gases are unreactive, the difference in electronic structures of	QnA between teachers and students Written responses to questions Class discussion Plenary verbally assessed	Doddle: AQA Electronic structure and atomic mass mini quiz Electronic structure worksheet	So3 C3 Sp2 Sp9 C5 C8 So7

	• Explain how the electronic structure of metals and non-metals affects their reactivity. • Use the periodic table to make predictions about the electronic structure and reactions of elements. Predict the electronic structure of stable ions for the first 20 elements.		simple ions of the first 20 elements, and the trend in boiling point of the noble gases. Their annotations should be illustrated with real examples, for example, Group 1 elements all have one electron in their outer shell (e.g., Li 2,1 and Na 2,8,1). **Plenaries** **Electronic structure** (5 minutes) Ask students to suggest the symbol of: • positive ions with a 2,8 electron arrangement (Na^+, Mg^{2+}, Al^{3+}) • a neutral atom with a 2,8 electron arrangement (Ne) • negative ions with a 2,8 electron arrangement (F^-, O^{2-}, N^{3-}). **Jeopardy** (10 minutes) Ask students to write a set of questions that are answered by each key point. Students should record their questions with the key points as answers in their exercise book.			
C2.3 Group 1- The Alkali Metals	**Aiming for Grade 4 LOs:** • Name the first three elements in Group 1. • Describe the Group 1 metals as having low densities. • Write word equations from descriptions of how Group 1 metals react with water. **Aiming for Grade 6 LOs:** • Recognise trends in supplied data. • Explain why the elements in Group 1 react similarly and why the first three elements float on water. • Describe how you can show that hydrogen and metal hydroxides are made when Group 1 metals react with water. **Aiming for Grade 8 LOs:**	Why are some elements more reactive than others? Are all metals made equal? (Do they all have the same properties?) What may have happened when scientists were first testing these metals?	**Lesson Overview** **Starters** **Guess the alkali metal** (5 minutes) Ask students to write the symbol of the elements and ions 2,1 (Li), 2,8 (Na^+), 2,8,8,1 (K), 2 (Li^+), 2,8,1 (Na), and 2,8,8 (K^+) **Bar Chart** (10 minutes) Ask students to plot a bar chart to show how the density of Group 1 metals changes as you go down the group. **Main** **Reactions of alkali metals with water** (30 minutes) Show students the samples of Group 1 metals and explain why they are kept in oil. Demonstrate how easy it is to cut each metal, showing the speed of tarnishing and asking students to suggest how reactivity is changing as you go down the group. Demonstrate the metals reacting with water. You may wish to collect the hydrogen and test it (not with potassium as the hydrogen ignites in the reaction). Students should draw and complete a table with three columns (element, observations, equation).	QnA between teachers and students Written responses to questions Class discussion Answers in student practical book after observing practical	Doddle: Identifying alkali metals interactive	So3 C3 Sp2 C2 Sp9 C5 So7

	• Illustrate the reactions of Group 1 metals with balanced symbol equations. • Explain how Group 1 metals form ions with a +1 charge when they react with non-metals. • Justify how Group 1 metals are stored and the safety precautions used when dealing with them.		Students should complete the table as the demonstration progresses and reflect on the content using the student book to ensure all key information is recorded. **Plenary** **Guess the metal** (5 minutes) Ask students to suggest the symbol of: • the metal that floats as a molten ball of metal as it reacts with water – Na • the metal that floats as it reacts with water making a lilac flame – K • the metal that floats on water as it reacts to form LiOH – lithium Li • the gas made when a Group 1 metal reacts with water – hydrogen H_2 **Group 1** (10 minutes) Interactive where students summarise the electron arrangements and properties of the Group 1 elements. Students then complete a crossword of the key words from the lesson.			
C2.4 Group 7 – The Halogens	**Aiming for Grade 4 LOs:** • Name the first four elements in Group 7. • Recognise a halogen displacement reaction. • Describe the main properties of halogens. **Aiming for Grade 6 LOs:** • Recognise trends in supplied data. • Explain why the elements in Group 7 react similarly. Explain how to complete a halogen displacement reaction and explain what happens in the reaction. **Aiming for Grade 8 LOs:**	Why are some elements more reactive than others? Are the halogens the most diverse group on the table? How have the properties of the halogens been exploited by humans?	**Lesson Overview** **Starter** **Electronic structure** (5 minutes) Ask students to write the electronic structure for fluorine (2,7), fluoride ion (2,8), chlorine (2,8,7), and chloride ion (2,8,8). **Diagrams** (10 minutes) Show students samples of chlorine, bromine, and iodine in sealed containers. Explain that the elements are diatomic molecules. Ask students to use the particle model and draw a diagram of each of the elements in its state at room temperature. **Main** **Displacement reactions** (20 minutes) Ask students to design an appropriate results table where they can record their observations and write equations to illustrate any chemical reactions. Allow students to complete the experiment.	QnA between teachers and students Written responses to questions Class discussion Completing of practical using appropriate results table designed by students	Doddle: AQA Group 7 mini quiz What are the halogens interactive	So3 Sp5 C3 Sp2 Sp9 C5 So7

	• Illustrate the reactions of Group 7 metals with balanced symbol equations. • Explain how Group 7 non-metals form ions with a −1 charge when they react with metals. Explain in detail how to compare the reactivity of the Group 7 elements.		**Flash cards** (20 minutes) Ask students to use secondary resources such as the student book, data books, and the Internet to make flash cards for each halogen. They should include the name, symbol, electronic structure, state at room temperature, diagram of the element in a molecule, diagram of the electronic structure of the halogen and its halide ion (showing outer electrons only), and a fascinating fact. **Plenaries** **Complete the equation** (5 minutes) Ask students to complete the following word and formula equations: • lithium iodide + bromine → (lithium bromide) + (iodine) • sodium chloride + iodine → (no reaction) • $2KI + (Cl_2) \rightarrow 2KCl + (I_2)$ **Group 7** (10 minutes) Students fill in the gaps of a series of sentences that summarise the basic properties of Group 7 elements. Students then complete a crossword of key words from the lesson.			
C2.5 Explaining Trends	**Aiming for Grade 4 LOs:** • State the trend in reactivity in Group 1. • State the trend in reactivity in Group 7. **Aiming for Grade 6 LOs:** • Explain how electronic structure affects the trend in reactivity of Group 1 and Group 7 elements. • Use the nuclear model to explain how the outer electrons experience different levels of attraction to the nucleus. **Aiming for Grade 8 LOs:**	Why are some elements more reactive than others? Which elements are likely to be the most useful to us? How can we safely work with the most dangerous elements in the world?	**Lesson Overview** **Starters** **Products** (5 minutes) Ask students to write an equation to summarise a reaction between: • a halogen and a Group 1 metal halide • a halogen and a Group 1 metal. **Clips** (10 minutes) Discuss the trends in reactivity of Group 1 and Group 7 as a class (or watch a video). Then ask students to summarise and describe the trend in each group in one sentence. **Main** **Explaining trends** (20 minutes) Remind students of some of the reactions of Group 1 and Group 7 elements, including how vigorous the reactions are depending on the element used. Students then sort a series of statements on the reactivity trends of Group 1 and Group 7 elements according to whether they describe Group 1	QnA between teachers and students Written responses to questions Class discussion	Doddle: The periodic table worksheet 2	So3 C3 Sp2 Sp9 C5 So7

	• Use electronic structure to explain the trends in physical and chemical properties of Group 1 and Group 7 elements. • Apply knowledge of reactivity of Groups 1 and 7 to suggest and explain the trend in reactivity of Groups 2 and 6.		elements, Group 7 elements, or both groups. Students use this to make an inforgraphic to explain the trends in reactivity of both groups. **Plenaries** **Higher or lower** (5 minutes) Give out the names of pairs of chemicals and ask students to suggest which is more reactive and why, for example, sodium or lithium – sodium is more reactive as it is a bigger atom and can lose its outer shell electron more easily. **Exam question** (10 minutes) Give students a five-mark past paper question. Ask them to write a mark scheme for the question, which should include the desirable answer, other accepted answers, and answers that are not to be accepted.			